Financial incentives for maternal health: evaluation of a national programme in Nepal

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ABSTRACT

People often behave in ways that are not in their best long term interest. Financial incentives are increasingly being used by governments to persuade individuals to improve health-related behaviours. In developing countries, financial incentives have been shown to increase uptake of preventive health interventions, but it is not well understood whether financial incentives are effective when targeted towards more complex types of care or when implemented at scale in low-income countries. This thesis explores the impact of financial incentives on health seeking behaviour, in the context of the Safe Delivery Incentive Programme (SDIP) in Nepal. Launched nationwide in 2005, the SDIP seeks to encourage greater use of professional care at childbirth by providing cash to women after they give birth in a health facility, as well as an exemption from user fees for those residing in the least developed districts.

The thesis develops a theoretical model of the programme's causal pathway and draws on consumer choice theory to derive a set of predictions. These are tested empirically using a variety of econometric methods applied to household data (from a secondary data source and a primary data source).The analysis comprises three main parts. First, it estimates the demand for maternity care using discrete choice models to understand the most important factors influencing a household's decision of where to give birth. By focusing on the role of price, this analysis serves as an ex-ante evaluation of the SDIP. Second, it investigates implementation of the SDIP. The analysis uses a number of key process indicators that emerge from the conceptual framework to explore what factors may have constrained the implementation process. Third, it estimates the impact of the SDIP on health seeking behaviour at childbirth in two areas of Nepal using propensity score matching and longitudinal methods of analysis. It finds that the programme had a modest impact on utilisation of women who had heard of the SDIP, but because programme uptake was low, it has led to only a small increase in skilled birth attendance across the entire population. Implications for financial incentive programmes and maternal health care in low-income countries are explored.

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Acronyms and Abbreviations

ATE	Average Treatment Effect
ATNT	Average Treatment Effect on the Non-Treated
ATT	Average Treatment Effect on the Treated
CCT	Conditional Cash Transfer
CI	Confidence Interval
D(P)HO	District (Public) Health Office
FCHV	Female Community Health Volunteer
GDP	Gross Domestic Product
GNI	Gross National Income
HDI	Human Development Index
HMIS	Health Management Information System
IIA	Independence of Irrelevant Alternatives
(I)NGO	(International) Non-Governmental Organisation
MDG	Millennium Development Goal
MIRA	Mother and Infant Research Activities
NDHS	Nepal Demographic and Health Survey
NLSMS	Nepal Living Standards Measurement Survey
NRS	Nepalese Rupees
OLS	Ordinary Least Squares
OOP	Out-Of-Pocket
PHCC	Primary Health Care Centre
PPP	Purchasing Power Parity
PSU	Primary Sampling Unit
SBA	Skilled Birth Attednant
SDIP	Safe Delivery Incentive Programme
SSMP	Support to Safe Motherhood Programme
TBA	Trained Birth Attendant
UNDP	United Nations Development Programme
VDC	Village Development Committee
WDI	World Development Indicators
WHO	World Health Organisation

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Chapter 1. INTRODUCTION

1.1 The promise of financial incentives

The way we behave has important implications for our health. In rich countries, health problems generally reflect the "giants of excess" – such as smoking, drinking, high calorie diets, and sedentary pursuits (Le Grand 2008). In developing countries, though major health problems may differ, they remain closely linked to individual behaviour. Certainly, the provision of health care is important to improving health. However, a big part of the challenge, and one that is being increasingly recognised, is persuading individuals to undertake changes in behaviour that promote their own health and the health of their families. Fiscal policy has long been used by governments as a means to influence behaviour through financial disincentives (taxes) and incentives (subsidies). Taxes on cigarettes and alcohol are obvious disincentives and have been shown to change behaviour (Sutherland, Christianson et al. 2008).

The basic premise underpinning the use of financial incentives is that people often behave in ways that are not in their best long term interest. Individuals may not be able to afford or are not capable of doing what is best for them. Incapable, because they make decisions based on erroneous or incomplete information, lack bargaining power within the household or behave myopically. These reasons justify why a "social planner" may place greater value on a good or service than the value placed by individuals themselves (Besley 1988).

Financial incentives are one of a number of policy tools used under the umbrella of what is termed libertarian paternalism. While individuals remain free to do what they want to do, the state provides a "nudge" to encourage behaviour that is better for them, as defined by their own preferred preferences (Sunstein and Thaler 2008). It represents a middle ground, if you will, between aggressive state intervention (eg. an outright ban or requirement by law) and more modest policy measures (eg. providing information). While a nudge may be acceptable, pushing individuals to behave in a way that is inconsistent with the preferences of their fully informed rational selves can be considered unacceptable (Marteau, Oliver et al. 2008). Anecdotes of

mothers being incentivised to take their children to unsanitary clinics lacking drugs and skilled health workers are suggestive of an unacceptable "shove".

Financial incentives are controversial, having been described both as "close as you can come to a magic bullet in development" and "superfluous, pernicious, atrocious and abominable" (Dugger 2004; Freeland 2007). The use of financial incentives to change behaviour is seen by some as bribery or a form of coercion, an impingement on individual autonomy and ultimately unfair, in that people should not be paid to do what they should do anyway (Marteau, Ashcroft et al. 2009). A more balanced view recognises that they can be an effective way of encouraging changes in behaviour, but have the potential for unintended consequences and are unlikely to address the systemic causes of poor health-related behaviour (Cookson 2008; Popay 2008; Brooks 2009).

In the development field, recent enthusiasm for financial incentives is based on evidence showing that payments aimed at initiating take up of preventive health interventions can be effective (Lagarde, Haines et al. 2007; Fiszbein, Schady et al. 2008). Financial incentives provide an immediate reward to individuals for behaviour that leads to health gains in the future and have been used to target a range of health-related behaviours. They have been used in a positive sense, to encourage uptake of health technologies and attendance at health clinics (Lagarde, Haines et al. 2007). They have also been used to encourage individuals to refrain from certain behaviours, such as smoking and contracting sexually transmitted diseases (Brighton and Hove NHS Trust 2006; Jack 2008; North East Essex NHS Trust 2009).

Financial incentives or "demand-side incentives" may seem an attractive policy option for several reasons. They may be more acceptable to a country's electorate than just cash handouts and the notion of paying individuals to influence their behaviour is both simple and intuitively appealing. However, the simplicity of the idea should not be confused with the complexity of implementing a demand-side incentive programme. Enthusiasm should be tempered in respect of the fact that it is not known whether demand-side incentive programmes work in low-income countries, particularly when implemented at scale. The available evidence comes largely from middle-income Latin American countries, where government capacity is relatively strong.

1.2 Challenge of maternal health

Demand-side incentives are often used in response to low levels of service utilisation. Nowhere is this more obvious than in maternal health. Professional care at childbirth, a strategy considered critical to improving maternal health (Campbell and Graham 2006), has stagnated in Sub-Saharan Africa and South Asia over the past decade, in part, because the provision of and the reluctance to use maternity services are inextricably linked to deep-rooted issues such as the state of the health system and the place of women in society (Koblinsky, Matthews et al. 2006). In Nepal, despite a remarkable improvement in maternal health outcomes in recent years, utilisation of maternity services remains unacceptably low (Pradhan, Aryal et al. 1997; Government of Nepal 2001; Government of Nepal 2007).

In light of the country's slow progress in raising the proportion of women who give birth with professional care, the Government of Nepal has turned to the use of financial incentives. Introduced nationwide in July 2005, the Safe Delivery Incentive Programme (SDIP) provides a cash payment (conditional cash transfer) to women who give birth in a public health facility, as well as an exemption from user fees for those residing in the least developed one third of districts (Government of Nepal 2005). It also provides a financial incentive to health workers who attend deliveries either in the health facility or at the home of the woman giving birth. The SDIP is a high-profile policy initiative that has attracted considerable interest from both national and international policymakers.

This thesis explores the impact of the SDIP on health seeking behaviour. While the programme offers an incentive to both health providers and recipients of health care, the general orientation of the thesis, reflected in the literature review, the methodological approach and the empirical analyses, is on the financial incentives given to women. Interactions between the supply-side and demand-side incentives, however, may not be trivial and attention is given to these where possible.

The PhD project was centred around an evaluation of the SDIP, conducted over the period 2006-2008. The evaluation was commissioned by the Support to Safe Motherhood Programme in Nepal, and its purpose was to study both implementation and the impact of the SDIP. This was with a view to providing recommendations to the Government of Nepal to guide further development of the programme. The thesis is based on several components of the evaluation. It

uses insights from standard consumer theory and a model of the programme's causal pathway as its starting point, before embarking on a number of econometric analyses that provide evidence on the performance of the SDIP. The analysis is based on primary data from a household survey in six districts, and secondary data from a community surveillance system of births in one district of Nepal.

1.3 Structure of thesis

The organisation of the thesis is as follows. Chapter 2 reviews the literature on the determinants of demand for health care, with a specific focus on maternal health. It considers the main theories that have been used to provide insights into the determinants of demand for health care. In the synthesis of empirical evidence, the review pays particular attention to the role of price as informed by findings from analyses of cross-section data and evaluations of financing reforms (removal of user fees and demand-side incentive programmes). The review also includes a survey of the literature on approaches to policy evaluation.

Chapter 3 describes the empirical methodology. It gives the research aim and objectives and then, building on the literature review, develops a conceptual framework to aid understanding of how the SDIP is expected to affect health seeking behaviour. The chapter introduces the empirical methods for each of the analyses and includes a detailed description of the various data sources. Chapter 4 provides relevant background information on Nepal, including an overview of the financing and provision of maternal health services in the country, as well as some background information on the SDIP.

The thesis contains four results chapters. Chapter 5 estimates a demand model for maternity care to understand what factors matter most in a household's decision of where to give birth. Chapter 6 investigates implementation of the SDIP. The analysis focuses on a number of key process indicators that emerge from the conceptual framework and explores what factors may have constrained the implementation process. The last two results chapters estimate the impact of the SDIP on health seeking behaviour at childbirth in different areas of Nepal. Chapter 7 uses propensity score matching methods to estimate programme impacts. It performs a subgroup analysis to explore heterogeneity in the effect of the programme. Chapter 8 estimates the impact of the SDIP through a longitudinal analysis of outcomes that include a health outcome measure in addition to the standard utilisation indicators.

Chapter 9 brings together the findings from each of the empirical analyses and places them in the context of the broader literature. The limitations of the thesis are described as the basis for a discussion of the policy implications of the findings. These focus specifically on demand-side incentive programmes, as well as maternal health care. The chapter concludes by suggesting avenues for future research.

Chapter 2. LITERATURE REVIEW

2.1 Introduction

The demand-side incentives of the Safe Delivery Incentive Programme (SDIP) are analogous to a subsidy on the price of maternity care. Economics provides clear insights on the role that price may play in influencing health seeking behaviour. The predominant theory underpinning this type of analysis in relation to health comes from Grossman's seminal work on human capital and the demand for health. He argued that demand for health care is derived from the demand for health, for it is health that people want, not health care *per se*. The price of care, however, is one of many factors that might influence a household's decisions on health seeking and theoretical frameworks to incorporate such a range of variables are found in disciplines outside of economics.

Empirical studies on the role of price come from two quite distinct literatures. For this reason, they are reviewed in separate sections in this chapter. First, there is the literature focused around the debate on whether to impose user fees for health care in developing countries. Central to this literature is the question of whether having to pay for health care discourages use and, if so, to what extent. The second body of literature comprises evaluations of programmes that provide positive financial incentives conditional on certain health-related behaviours. These programmes have provided an excellent opportunity to study the effects of price on health seeking and health outcomes.

The empirical literature has to contend with the econometric challenge of establishing causality in the relationship between price and utilisation of health services, which is the central concern of the majority of studies. A question raised less often is the generalisability of the findings beyond the specific context of the study. If findings have no relevance beyond the study setting, the research can offer little guidance on policymaking elsewhere.

Owing to the breadth of the topics covered, no literature review on Cochrane principles was conducted (Higgins and Green 2005) but rather one based on a transparent search strategy. The focus of the thesis on demand-side incentives dictated the scope of the literature review. The first

step was to search a number of electronic databases (PubMed, Embase, ISI Web of Science, and International Bibliography of the Social Sciences) for literature reviews using search terms related to the following topics: 1) health financing combined with health care seeking; 2) maternal health combined with health care seeking; 3) financial incentives in health (demand-side only); and 4) impact evaluation and specific policy evaluation methods.

The bibliographies of review articles identified via the above search terms were then screened for relevance, as were articles that referenced the same review articles. In addition, reference was made to economics and policy evaluation textbooks, as well as gray literature on the websites of numerous organisations (World Bank, World Health Organisation, National Bureau of Economic Research, Institute of Fiscal Studies, Poverty Action Lab, Brookings Institute, RAND, Department for International Development, Initiative for Maternal Mortality Programme Assessment and International Initiative for Impact Evaluation) and development gateways (Eldis, id21). The first three topics were limited to low- and middle-income countries, as defined by the World Bank, and articles concerning health or health care. The entire literature review was limited to articles in the English language.

The literature review is structured as follows. Section 2.2 considers the demand for health care, including its theoretical foundations, empirical approaches to estimation and the evidence on price and other determinants as influencing factors. Section 2.3 then synthesises the evidence on demand-side incentive programmes to understand whether and in what contexts they work. Section 2.4 reviews the literature on approaches to evaluation. This section brings together insights from the medical and economics literature to inform discussions around internal and external validity. Finally, section 2.5 identifies the gaps in the literature and priorities for future research in reference to this thesis.

2.2 Demand for Health Care

2.2.1 Theory

Human capital model

Much of the literature on the demand for health care uses, as a starting point, the pioneering work of Grossman (Grossman 1972; Grossman 1972). Building on contributions by Becker (1965), he developed the theory of human capital in relation to the demand for health. Grossman (2000) was motivated by what he saw as fundamental differences between health capital and other forms of human capital as well as between health as an output and health care as one of a number of inputs in the production of health. He was able to build a theory around a number of observations rarely considered until then. First, health rather than health care is what individuals want; the demand for health care is derived from the demand for health. Second, health capital is produced through the use of health care, along with time and other health inputs (such as diet, exercise etc). Third, the theory contrasts a pure consumption model, in which health capital enters the utility function directly, with an investment model, where health capital determines the amount of time available to work and earn income. With this in mind, the demand for health care is a rational response to a health shock and leads individuals to shift resources away from consumption towards the purchase of health care and other inputs that might improve health.

The main predictions of Grossman's model concern the effect of age, wages, and education on the production of health capital (Folland, Goodman et al. 1997). The optimal level of health in the investment model depends on the cost of capital (the interest rate plus the depreciation rate). It will decline as a person ages, but because the amount of health capital produced by a given amount of investment in spending on health care also diminishes, the elderly may demand more health care than the young. The effect of wages is ambiguous. The model provides a mechanism by which increases in wages can increase demand for health care, through an increase in the demand for health capital (via the increase in the returns from healthy days) and a substitution away from time inputs in the production of health to health care (Lindelow 2005). However, the increased wage rate also increases the opportunity cost of time in producing health and the marginal productivity of health capital may in fact shift downwards depending on factors such as technology. Since wealth has no impact on the marginal productivity of health capital or the price of time inputs, its influence on the demand for health care is a pure income effect. Education can be expected to increase the marginal productivity of health inputs, thus generating health capital

at a lower cost and explaining why higher educated individuals might choose a higher level of health capital stock. From a demand-side perspective, educated individuals may also recognise the importance of a healthy lifestyle.

In a static framework, consumer theory provides the analytical basis to study the trade-off a consumer faces between the use of income to purchase health care and other goods (Folland, Goodman et al. 1997). The trade-off is imposed by the budget constraint and consumers seek to maximise utility given their preferences. Demand for health care is determined by its price, the price of related goods, income, consumer tastes, and other good-specific elements (Varian 2003). Like other goods and services, the demand for health care slopes downwards, such that a rise in the price of health care leads to a fall in its demand. If, as is commonly assumed, health is a normal good, then health care will also be a normal good.

Theoretical extensions

Standard consumer theory and the human capital model impose strong assumptions on individual behaviour. Even if there is a competitive network of health providers, there are often other types of market failure that imply some of the assumptions are unlikely to hold in practice. The microeconomic theory behind these market failures can give clues as to why consumers might under-invest in health and can provide a rationale for government intervention (see section 2.3.1).[1]

A first type of decision-making failure concerns uncertainty. When certainty around future health states is relaxed, investment in health can be seen as a potentially risky endeavour (Chang 1996).[2] Insurance markets have developed partly in response to this uncertainty, allowing consumers to spread the risk of illness across the population and over time.

A second theoretical extension relates to time preferences. Investment in health capital is characterised by the decision to incur a current cost for a future benefit. Individuals with low discount rates might invest more in education and health. This idea lies behind Fuchs' (1982)

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[1] It should be noted that a barrier to health seeking does not necessarily constitute a market failure. A reluctance to use care may be a perfectly rational choice on the part of the consumer (Ensor and Cooper 2004).

[2] Faced with a risk of falling ill, an individual's decision to invest in health will depend on whether the increased investment from a shift in the marginal productivity of health capital outwards outweighs the decrease in investment from a lowering of the return of the health investment.

hypothesis that the correlation between health and education is driven by heterogeneous time preferences.[3] Inconsistent time preferences may provide clues as to what may determine the decision to invest in health, and ultimately the demand for health care. If the assumption of time consistency is relaxed and a decision-maker's preferences are allowed to change over time, individuals might avoid immediate costs such as paying for health care, a decision that is seemingly at odds with their own long-term attitude towards the future (Laibson 1997; O'Donoghue and Rabin 1999).[4]

A third reason why individuals may not consume as much health care as is privately optimal concerns conflict in the household. This can lead to incomplete altruism because the decision-maker, say the husband, discounts the future more heavily than the wife. The husband prefers the wife to hold an amount of health capital that is different from what the wife prefers to hold.[5] Bolin et al. (2002) extend the human capital model and shows that, if spouses act strategically, they will not in general have the same preferences of investment in health capital, leading to inefficiencies in the allocation of resources within the family.

Fourth, information problems are a well recognised type of market failure (Stigler 1961). Individuals may not be able to make informed decisions because they lack information or are unable to assimilate and use information effectively. One particular type of information failure, misguided beliefs, are likely to be closely linked to education and cultural barriers (Ensor and Cooper 2004). Addressing this information problem may be too costly for the family or certain beliefs may be self-reinforcing such that when an individual acts on it the outcome confirms the belief even though an alternative belief would have led to a better outcome (Piketty 1995; Benabou and Tirole 2006).

Other textbook examples of market failure include imperfect or missing capital markets that prevent families from making profitable investments (de Mel, McKenzie et al. 2009), and positive externalities that arise from altruistic preferences (Jacobsson, Carstensen et al. 2005) or preventive interventions such as insecticide treated bednets (Gimnig, Vulule et al. 2003).

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[3] Alternatively, but closely related, he also argued that time preferences are influenced by education, such that more education could result in more investment in health inputs and ultimately better health. The empirical evidence, however, seems to be stacked against time preferences as an explanation for the correlation between health and education (Grossman 2004).

[4] Hyperbolic discounting is one of a number of possible functional forms representing inconsistent time preferences.

[5] It is assumed that there are differences in intra-household bargaining power between members.

Health seeking behaviour models

Outside of economics, there is an abundance of models of health seeking behaviour. These are founded on social psychology, medical sociology and medical anthropology (Hausmann-Muela, Ribera et al. 2003). The models serve to provide a catalogue of potentially relevant determinants, but fail to offer a generalisable understanding of why these factors may influence behaviour. The models cover a similarly large spectrum of possible determinants, although the emphasis of each model tends to vary. The Theory of Planned Behaviour, for example, gives a central role to social networks (Conner and Sparks 1995), while the Health Care Utilisation Model emphasises structural factors that determine treatment (provider) choice (Andersen and Newman 1973).

New institutional economics provides quite a different perspective on health care seeking. Applied to health care, it places quality of care and the role of institutions in influencing the motivation of health care providers at the centre. Thus, Leonard explains patterns of health seeking via the influence that different types of health provider have on incentive structures within health institutions (Leonard 2003).

2.2.2 Empirical approaches to studying demand

A number of approaches have been used to explore empirically the determinants of demand for health care. These include descriptive analysis of cross-section household surveys, qualitative investigation of consumer views, ethnographic methods, econometric analysis of cross-section or panel data and randomised experiments. A different type of approach, not considered here, analyses the stated preferences of consumers over hypothetical choices rather than looking at decisions that have actually been made (revealed preferences).

Descriptive analysis of cross-section surveys uses bivariate and multivariate techniques to explore health seeking behaviour. These studies are typically motivated by psychosocial models of health seeking behaviour or, in some cases, new institutional economics (Andersen and Newman 1973; Andersen, Harada et al. 1995; Scrimshaw 2001; Leonard 2003). Bivariate analysis describes the relationship between reported behaviour and each of the household or provider characteristics. Multivariate analysis goes one step further and evaluates the relative weight of these characteristics by controlling for all other variables. In doing so, such studies are able to

demonstrate the marginal effect of an independent variable on behaviour and offer some predictive power of how a policy change might affect the wider population. However, they can offer little guidance on why factors are important or on pathways of influence.

Qualitative methods have the advantage of being able to explore issues in more depth and analyse those factors that are less amenable to quantitative measurement. They use tools such as key informant interviews, in-depth interviews and focus group discussions to learn about the reasons for observed health care seeking behaviour and unravel some of the more complex issues. There is a growing literature, for example, on the influence of interpersonal dimensions of care and the importance of trust between service provider and patient (Gilson 2003).

Static economic models of demand for health care have been used extensively in the study of health seeking behaviour in developing countries and have been influential in informing policy. These are typically motivated by Grossman's framework (Gertler, Locay et al. 1987; Gertler and Van der Gaag 1990).[6] While different settings have been explored, the theoretical foundations and analysis techniques remain applicable across countries. Econometric analyses of provider choice are founded upon the random utility model using discrete choice logit or probit specifications (McFadden 1981). The most credible empirical strategy is that of the randomised experiment, although issues around feasibility often preclude its use and the method is by its very nature narrowly focused on one variable of interest.

A number of relevant issues and challenges have emerged from studies exploring the demand for health care over the past three decades. These are summarised as follows:

- Most studies lack exogenous variation in price (or in any of the variables of interest) and are thus likely to suffer from bias due to unobservables (Gertler and Hammer 1997). For example, any variation in fees might reflect government policy or unobserved quality of care.
- Estimating demand when there is little or no variation in the independent variable is problematic. This has been found to be particularly pertinent in developing countries, where the price of government provided medical care is often zero. A response has been to include the opportunity cost of time as a price, although this introduces problems of measurement (Gertler and Van der Gaag 1990).

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[6] Owing to data limitations in developing countries, there are few studies based on Grossman's dynamic framework.

- Demand functions that take on a multinomial logit form suffer from a restriction imposed by the independence of irrelevant alternatives assumption that requires the conditional utility functions to be identical across alternative providers – ie. the cross-price elasticities must be the same across all alternatives (Gertler and Van der Gaag 1990). The validity of findings based on the multinomial specification have been questioned (Bolduc, Lacroix et al. 1996) and therefore specifications other than the multinomial logit have been used.

- Establishing appropriate measures of income, quality, perceived severity of illness, and knowledge is a challenge commonly faced. Proxy measures of income have become reasonably standardised. Data limitations, however, make it difficult to incorporate objective measures of quality and there is little consensus on what dimensions of quality are most important for household decision-making. Omission of process quality variables and a focus on just structural attributes, for example, can lead to biases (Mariko 2003).

- Self-reported morbidity can be misleading. It is well recognised that individuals of higher socioeconomic status are more likely to report illness, leading to problems of endogeneity (Akin, Guilkey et al. 1998; Sen 2002).

- A difficulty in modelling demand is obtaining ex ante data on provider characteristics, for it is expectations that shape behaviour. Not only may an individual's expectation of price (ex ante) be modified by the actual price paid at the chosen provider (ex post), data on perceptions of providers not chosen by the individual are unobservable (Gertler, Locay et al. 1987). While the average price of alternative providers experienced by others can act as a proxy, it is unlikely to be representative for that individual and raises the problem of selectivity bias. Data from health facilities can get round this problem, but it is not clear how accurately they reflect perceptions.

- There is the added difficulty of how to define the set of provider choices for which behaviour is being modelled (Bockstael 1999). This is of concern in the case of childbirth when health needs may be preventive or curative depending on complications (Gabrysch and Campbell 2009).

- The indirect costs of travelling and waiting must be accounted for and valued appropriately (Sauerborn, Nougtara et al. 1994; McNamara 1999). This is particularly challenging in rural communities where much of the work is non-wage labour and seasonal (Chima, Goodman et al. 2003).

- There has been debate over the empirical specification of the discrete choices models (Dor 1999). As Gertler et al. demonstrate, specification of linear utility functions in previous studies with alternative specific coefficients on income violates the transitive and order assumptions of preferences (Gertler and Van der Gaag 1990).

2.2.3 Determinants of demand for maternal health care

There are a number of characteristics of delivery care that set it apart from other health services. Childbirth is not inherently pathological and for the majority of women, it is a positive, natural experience free from illness. For an unfortunate few at the other end of the spectrum, childbirth can lead to death. The risk of maternal conditions and the fact that they can be unpredictable, severe and prone to rapid escalation means women may require access to emergency obstetric services (Graham, Cairns et al. 2006). A balance must be struck between maintaining the normality of childbirth on the one hand and being prepared to manage complications should they present themselves on the other hand. For this reason, the determinants of demand for delivery care may not exactly match those for general health services. With the exception of price, the literature review focuses on the former rather than the latter.

Before reviewing the determinants of demand, it is worth noting that studies in this body of empirical work are rarely grounded in theory. Not surprisingly, studies that have explored the role of economic variables, such as price and income, give greater consideration to the economic theory underpinning the analysis. It remains the case, however, that few empirical studies of demand for health care are linked to economic theories that incorporate market failures.

Prices and access to health care[7]

Studies exploring the role of price in determining demand for health care are usually motivated by the question of user fees. The user fee debate has a long history and still continues unabated (James, Hanson et al. 2006; Yates 2009). On this issue, there is a growing body of evidence emerging from randomised experiments. A number of studies have looked at the effect of price on uptake of specific health interventions, including deworming drugs in Kenya (Kremer and Miguel 2007), insecticide treated bednets for malaria prevention in Kenya (Cohen and Dupas

[7] The evidence of conditional cash transfers, which are analogous to price subsidies, is considered in a later section of the literature review.

2008; Hoffmann 2009), water disinfectant in Zambia (Ashraf, Berry et al. 2007), and curative care for malaria in Ghana (Ansah, Narh-Bana et al. 2009). They found that price is important and even a small price above zero dramatically reduces take up of the intervention. There is evidence of heterogeneous effects. For example, Ansah et al (2009) find that removing payments for curative care had the greatest impact on utilisation of formal health providers among the wealthiest quintile and those living between 5km and 10km from a health centre.

The evidence is mixed on the issue of whether higher prices stimulate use (Ashraf, Berry et al. 2007; Cohen and Dupas 2008). In terms of health impact, the study in Ghana found that removing direct payment for health care had no effect on anaemia, mortality, or parasite prevalence despite the increase in utilisation of curative care (Ansah, Narh-Bana et al. 2009). The few studies in which the price of a broad set of health services was randomised showed a negative effect of price on utilisation, with price elasticity of demand inelastic (Manning, Newhouse et al. 1987; Newhouse 1993; Gertler and Hammer 1997; Dow, Gertler et al. 2001).[8]

The non-experimental evidence from economic models of demand for health care has historically provided conflicting messages, with some studies reporting no statistically significant price effect and others concluding that demand is sensitive to changes in price (Gertler and Van der Gaag 1990). However, with evidence emerging from policy evaluations of user fees (both introduction and abolition) (Lagarde and Palmer 2008), the consensus more recently has veered towards the latter, that price elasticities are not zero but inelastic (Gertler and Hammer 1997; Van de Voorde, Van Doorslaer et al. 2001; James, Hanson et al. 2006). Evidence suggests that demand tends to be more elastic amongst poorer groups and any price increase is likely to adversely affect these groups disproportionately in terms of access to health services (Dor, Gertler et al. 1987; Gertler, Locay et al. 1987; Gertler and Van der Gaag 1990; Ching 1995; Xu, Evans et al. 2006).

The picture emerging from the literature specific to maternal health seeking is mixed. Economic models report a negligible effect of price on utilisation of maternity services (Heller 1982; Akin, Guilkey et al. 1985; Schwartz, Akin et al. 1988; Li 1996; Hotchkiss 1998), while policy evaluations of the removal of user fees suggest a large negative effect (Wilkinson, Gouws et al. 2001; Deininger and Mpuga 2004; Nabyonga, Desmet et al. 2005; Penfold, Harrison et al. 2007;

[8] The RAND experiment, although not in a developing country, is included on the basis that it is the largest ever study of the effect of price on the demand for health care.

Witter, Armar-Klemesu et al. 2008). The discrepancy in results may lie in the poor quality of data used in some of earlier modelling exercises, although the methods used in the policy evaluations do not stand up to much scrutiny either given the absence of credible comparison groups. Whether these findings suggest a difference between maternal health care and other health services is hard to establish (Witter 2009).

The official user fee is only one of many cost items likely to influence demand. These costs include the pecuniary value of items such as transport, medicines, supplies, food, as well as the time cost incurred while travelling, waiting, and receiving care at the health facility. While user fees are not unimportant, the non-medical costs of delivery care can outweigh the official price charged by health providers. A growing body of evidence suggests that the costs of delivery care place a substantial economic burden on the household and serve to discourage use (Borghi, Ensor et al. 2006). Studies in a number of developing countries have found the household cost of a normal delivery in hospital to vary between US$9 (3 percent of annual GDP per capita) and US$67 (26 percent of annual GDP per capita) (Nahar and Costello 1998; Kowalewski, Mujinja et al. 2002; Borghi, Hanson et al. 2003; Afsana 2004; Borghi, Ensor et al. 2006). Seemingly 'free' delivery care in hospitals can involve substantial hidden costs, which delay care seeking and act as an important barrier to utilisation, particularly among the poorest (Nahar and Costello 1998).

There is great variation in the cost of different health care seeking options. The cost of complicated deliveries is between three and ten times greater than a normal delivery (Borghi, Ensor et al. 2006). A lack of access to money at the time of need has also been found to constrain service use at hospitals and delay decision making (Thaddeus and Maine 1994; Nahar and Costello 1998; Pitchforth, van Teijlingen et al. 2006). Access to social networks can enable women to overcome some of the financial costs associated with seeking care (Parkhurst, Rahman et al. 2006). Moreover, flexibility in the payment method, such as acceptance of gifts in kind and delayed payment, has been shown to be an important consideration in the choice of providers. Traditional birth attendants providing delivery care at home, for example, can prove attractive for those requiring greater flexibility in the amount and means of payment than that offered by professional care services in facilities (Borghi, Ensor et al. 2004; Borghi, Ensor et al. 2006).

Distance and time costs are most important when the price of medical care is low or zero (Dor, Gertler et al. 1987; Borghi, Ensor et al. 2006). Family members often accompany the patient

when seeking care inflating time costs even further (Sauerborn, Ibrango et al. 1995). Research findings from countries in Asia (Schwartz, Akin et al. 1988; Raghupathy 1996; Borghi, Ensor et al. 2004; Rahman, Mosley et al. 2007; Mayhew, Hansen et al. 2008) and Sub-Saharan Africa (Hodgkin 1996; Thaddeus, Nangalia et al. 2004) confirm the negative impact of distance on the use of skilled attendance at delivery in health facilities. Other findings based on qualitative research methods also cite distance as a barrier to accessing maternity care (Amooti-Kaguna and Nuwaha 2000; Griffiths and Stephenson 2001; Phoxay, Okumura et al. 2001). However, evidence suggests distance may no longer be a deterrent when women have severe complications (Chakraborty, Islam et al. 2003; Borghi, Ensor et al. 2004), consistent with findings regarding severity of illness from the general health care literature (Borah 2006).

Other determinants of demand

Numerous other factors emerge from the literature as being important in determining maternal health care seeking (Thaddeus and Maine 1994; Say and Raine 2007; Gabrysch and Campbell 2009). Quality of care is expected to be of particular importance in maternal health because many preventive practices related to childbirth can prove to be iatrogenic when performed by unskilled providers, violating the principal precept 'first, do no harm.' (Graham, Cairns et al. 2006).[9] Poor perceived quality is an important variable in explaining provider choice and the observed practice of by-passing the nearest provider (Kyomuhendo 2003; Bawa, Umar et al. 2004; Duong, Binns et al. 2004; Audo, Ferguson et al. 2005).[10] Studies of women's views cite a lack of drugs, supplies, and qualified staff, the attitude of health professionals and cultural acceptability of services as common grievances and reasons for choosing to deliver at home (Prevention of Maternal Mortality Network 1992; Griffiths and Stephenson 2001; Duong, Binns et al. 2004; Blum, Sharmin et al. 2006). Other researchers, using more objective measures of quality that are defined in structural terms, have found a positive association between service use and quality (Schwartz, Akin et al. 1988; Acharya and Cleland 2000; Lindelow 2004).

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[9] Quality of care is commonly understood as "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (Institute of Medicine 2001).

[10] There are likely to be considerable problems in interpreting subjective measures of quality of care because of courtesy bias and the fact that perceptions of quality are probably influenced by patient beliefs around health care standards and how well informed clients are of their own health needs (McGlynn 1997; Annandale and Hunt 1998).

The influence of predisposing factors or traits of the individual on demand has been explored extensively, particularly through analysis of Demographic and Health Survey data sets. Socioeconomic status – whether it is measured in terms of income, wealth, occupation or education – is consistently found to be an important determinant of service use and choice of provider. Women of a higher socioeconomic status are more likely to deliver in the presence of a skilled attendant or in a health facility (Elo 1992; Thaddeus and Maine 1994; Raghupathy 1996; Addai 1998; Bolam, Manandhar et al. 1998; Addai 2000; Celik and Hotchkiss 2000; Magadi, Diamond et al. 2000; Griffiths and Stephenson 2001; Falkingham 2003; Letamo and Rakgoasi 2003; Mekonnen and Mekonnen 2003; Anson 2004; Bawa, Umar et al. 2004; Lindelow 2004; Stekelenburg, Kyanamina et al. 2004; Matthews, Ramakrishna et al. 2005; Chowdhury, Ronsmans et al. 2006; Furuta and Salway 2006; Ikeako, Onah et al. 2006; Islam, Chowdhury et al. 2006; Chowdhury, Islam et al. 2007; Rahman, Mosley et al. 2007; Sharma, Sawangdee et al. 2007; Anwar, Sami et al. 2008; Sepehri, Sarma et al. 2008). Education is likely to proxy not only socioeconomic status but also reflect multiple factors linked to assimilation of information, perceptions of need and the value attached to skilled delivery care (Furuta and Salway 2006). As Leonard argues, consumers do not conform to the medical model of health seeking behaviour as ill-informed, passive recipients of care, but rather take an active role in the choice of treatment options and do differentiate between caregivers, assessing attributes of both their illness and the providers (Leonard 2000).

Numerous other characteristics of the individual or household are shown to be associated with use of maternal health services. These include age, parity, ethnicity, caste, religion, marital status, residence (urban / rural), migration, household size, concern of the husband, autonomy of the woman in household decisions, and past experiences of illness and contact with service providers (Bolam, Manandhar et al. 1998; Addai 2000; Celik and Hotchkiss 2000; Magadi, Diamond et al. 2000; Bloom, Wypij et al. 2001; Chakraborty, Islam et al. 2002; Kyomuhendo 2003; Letamo and Rakgoasi 2003; Anson 2004; Bawa, Umar et al. 2004; Furuta and Salway 2006; Gyimah, Takyi et al. 2006; Ikeako, Onah et al. 2006; Chowdhury, Islam et al. 2007; Koenig, Jamil et al. 2007; Magadi, Agwanda et al. 2007). Qualitative research has shed light on further barriers to health care seeking for maternal care such as societal expectations, fear of and trust in service providers, stigma of abnormal birth, cultural acceptability of services, social influence of spouse, beliefs in the normality of childbirth, security, and women's knowledge of obstetric care (Prevention of

Maternal Mortality Network 1992; Amooti-Kaguna and Nuwaha 2000; Afsana and Rashid 2001; Phoxay, Okumura et al. 2001; Blum, Sharmin et al. 2006; Parkhurst and Rahman 2007).

Last, morbidity and severity of morbidity are found to be positively associated with use of professional delivery care services (van den Heuvel, de Mey et al. 1999; Amooti-Kaguna and Nuwaha 2000; Afsana and Rashid 2001; Paul and Rumsey 2002; Glei, Goldman et al. 2003; Matthews, Ramakrishna et al. 2005; Islam, Chowdhury et al. 2006). Over a third of women in Nepal, for example, gave an absence of complications as their primary reason for delivering at home (Borghi, Ensor et al. 2004). Few women are cognisant of the risk of complications at childbirth (Thaddeus, Nangalia et al. 2004) and thus perceptions may not reflect the true value of skilled delivery care.

2.2.4 Summary

The human capital model provides the basic theoretical framework to examine investment in health. Standard consumer theory has then typically been used to study health care seeking choices. Further theoretical insights on market failures in health and inconsistent time preferences throw light on potential mechanisms which may lead individuals to consume less health care than is privately and socially optimal. However, they have rarely provided the basis for empirical work in health.

The broad consensus from the empirical literature is that the price of health services has a negative effect on utilisation. Demand appears to be relatively inelastic with own price elasticities often well below unity. In contrast, the uptake of simple health care technologies seems to be highly sensitive to price changes at around zero. The literature also points towards many other factors that are associated with health seeking at childbirth, including quality of care; income, education, and other measures of socioeconomic status; severity of illness; and other individual or household characteristics. The next section reviews the evidence on where demand-side incentives have been tried and whether they have been successful.

2.3 Demand-side incentives

2.3.1 Rationale for intervention

Low utilisation of health services is a familiar problem in developing countries. A combination of both supply and demand side barriers restrict access to services, particularly for poorer households who are in greatest need of health care (Gwatkin 2003; Ensor and Cooper 2004; Gwatkin 2004; Travis, Bennett et al. 2004). Government strategies to address this challenge have traditionally focused on the provision of health services, but increasingly more attention is being given to demand-side interventions. One possible measure is to provide financial incentives to individuals in return for positive behaviour in health, otherwise known as demand-side incentives (Ensor 2004; Eichler and Levine 2009). Such incentives, given as cash or vouchers, serve to subsidise the price of the health services that they target in the expectation that a fall in the price will raise demand and, and in turn, utilisation.

Equity and market failures are the two main economic arguments put forward to justify government intervention (Jack 1999; Hurley 2000). There is strong evidence that the poor have inferior access and make lower use of publicly allocated resources and services (Demery 2000; Institute of Policy Studies 2001; van Doorslaer, O'Donnell et al. 2006). This is for a variety of reasons, including physical access to facilities, the allocation of resources away from diseases proliferating amongst the poor, ignorance of treatment options and household constraints preventing health seeking behaviour. Therefore, a common feature of many demand-side incentive programmes is a focus on poor socioeconomic groups within the population (Fiszbein, Schady et al. 2008).

The presence of market failures leads to a welfare loss as individuals under-invest in health. To argue, however, in favour of the use of demand-side incentives over any other type of intervention requires a closer examination of the various market failures given that the root cause of under-investment in health may determine the most appropriate action to be taken. If, for example, families fail to invest in health because they are unable to get access to credit, the economic argument would favour an unconditional cash transfer instead of a demand-side incentive because it gives the family the freedom to invest in whatever is most highly valued. There are other reasons, however, why individuals may not be capable of behaving in ways that are in their best long term interest.

As mentioned in section 2.2.1, private investment in health capital may be too low if individuals have inconsistent or heterogeneous time preferences, if they live in a household in which there is a conflict of interest yet are unable to take individual decisions and if they have erroneous beliefs that are persistent or too costly to correct through better information. In all these cases, individual welfare will be higher with a demand-side incentive rather than the equivalent amount given as a cash transfer with no conditions attached (Fiszbein, Schady et al. 2008). In essence, this is the argument behind merit goods, in which a social planner places a greater weight on the consumption of a good than that placed by the individual herself (Besley 1988). Beyond private inefficiencies, positive externalities in health may justify demand-side incentives. Preventive interventions are often thought to hold the qualities of an externality. Individuals may under-consume preventive health care if they do not fully internalise the cost of future curative care, which is likely to be subsidised by society and unable to be credibly withheld (Jack 1999).

2.3.2 Design, scale and country uptake of programmes

Demand-side incentives reward individuals or households for positive behaviour in health. The literature review encompasses two types of demand-side incentive (Table 2.1). The first, conditional cash transfers (CCT), target poor households, providing a schedule of relatively large payments that are conditional on household members engaging in specific health seeking behaviours. The programme rules require that households undertake the specified actions, otherwise they may be at risk of having their benefits withdrawn. The programmes are intended not only to encourage investment in human capital but also to act as a social safety net to guard against poverty, as implied by the amount and regularity of the cash transfer.[11] A common feature of CCT programmes is that the financial incentive is provided in addition to highly subsidised health services, generating in effect a negative price. CCT programmes have been implemented across Latin America and a number of other developing countries, the most well-known being Mexico's Oportunidades.

A second set of programmes are distinct in that they provide just a one-off financial incentive to encourage certain health-related behaviours. Typically, the sums of money are small, the benefit is universal rather than targeted towards the poor and the focus is purely on incentivising greater

[11] Note that the definition used by Lagarde et al. (2007) in their review of conditional cash transfer programmes differs, in that they do not require the intervention to target poor households.

use of a specific health interventions. Note that the distinction made between the two types of demand-side incentive programmes should not be confused with the distinction between conditional and unconditional cash transfer programmes. The question of whether to impose conditions on cash transfers is a separate issue and of limited relevance here because unconditional cash transfers do not fall within the definition of demand-side incentives.

Table 2.1 Overview of demand-side incentive programmes in health (non-exhaustive)

Scale	Programme	Payments
A. Conditional cash transfer programmes		
Nationwide	Mexico (Oportunidades)	CCT (poor)
	Brazil (Bolsa Família)	CCT (poor)
	Ecuador (Bono de Desarrollo Humano)	CCT (poor)
	Colombia (Familias en Acción)	CCT (poor)
	Jamaica (PATH)	CCT (poor)
Regional	Chile (Solidario)	CCT (poor)
	Turkey (Social Risk Mitigation Project)	CCT (poor)
Small (pilot)	Honduras (Programa de Asignación Familiar)	CCT (poor)
	Kenya (CT-OVC)	CCT (orphans)
	Nicaragua (Red de Protección Social)	CCT (poor)
B. Financial incentive programmes		
Nationwide	India (JSY scheme)	CCT (poor); provider payment
	Tanzania (NVS-ITN)	Voucher (universal)
Small (pilot)	Bangladesh (DSF)	Voucher (universal); provider payment
	Malawi (HIV test status)	CCT (universal)

The scale of CCT programmes varies considerably, from 11 million households targeted by Brazil's Bolsa Familia to just a few thousand families in Kenya's programme. They range from national programmes that play a central role in a country's welfare system to small pilot projects testing the concept of financial incentives. The geographical spread of CCT programmes shows a concentration in mainly middle-income countries,[12] which are characterised by adequate health infrastructure and strong administrative capacity, at least when compared with low-income countries (Lagarde, Haines et al. 2007). The conditions imposed by the CCT programmes are preventive health visits for young children (eg. vaccination, growth monitoring, and nutrition supplementation), and health education workshops. The size of payments ranges from 6 percent of household consumption in Ecuador to almost 30 percent in Nicaragua. The payment systems cover a range of possibilities – from the use of automated teller machines in Brazil to post offices in Kenya. The costs of administration range from 4 percent to 12 percent (Grosh, Del Ninno et

[12] In the case of Honduras and Nicaragua, they were low-income countries when they launched the CCT programmes.

al. 2008). Many of the CCT programmes have been subjected to rigorous evaluations, typically undertaken by external independent evaluators.

Financial incentive programmes focus on encouraging use of specific health interventions and tend to have been implemented in low-income countries. They include programmes that provide financial incentives conditional on: use of maternity services (Bangladesh and India); purchase of insecticide treated nets (Tanzania); and the collection of HIV test results (Malawi). The payments are small (ranging from US$1 to US$36) and are given as a one-off benefit. The payment systems are more basic than those used in the CCT programmes, relying on cash in hand or vouchers.

The literature contains little evidence on the implementation of demand-side incentive programmes beyond a description of programme design. One review of CCT programmes provides estimates of programme uptake, using programme coverage of the poor as a proxy measure (Fiszbein, Schady et al. 2008).[13] It finds that 54 percent and 64 percent of eligible households received the benefits in Brazil and Ecuador respectively. Individuals with more income and education were less likely to participate suggesting self-selection provides a reason for non-participation. In Honduras, 78 percent of target households received the health-related voucher (Morris, Flores et al. 2004). The payment system in Mexico works well, with 98 percent of payments made on time (Fiszbein, Schady et al. 2008). Qualitative evidence from a study of India's programme points to various problems in implementation, including low awareness among the target population, burdensome administration, and delays in the women receiving the conditional cash transfer (Devadasan, Elias et al. 2008).

2.3.3 Empirical evidence on impacts

The neglect of implementation issues in the literature is in sharp contrast to the relatively rich evidence on the effect of demand-side incentive programmes. In many instances, evaluations of CCT programmes have been able to benefit from randomised designs. There have been a number of reviews of the impact of CCT programmes on health seeking behaviour and health outcomes (Lagarde, Haines et al. 2007; Fiszbein, Schady et al. 2008; Glassman, Todd et al. 2009). They are consistent in their finding that CCTs can encourage greater use of simple preventive interventions and, in some cases, improve health outcomes. The findings from evaluations of demand-side

[13] It is not obvious that this a good measure of programme uptake because the programme never intended to cover all of the poor.

incentive programmes are summarised in Table 2.2, which is reproduced using information from tables contained within the reviews of the literature mentioned above.

Demand-side incentive programmes have had a positive impact on the utilisation of various types of health services. In Malawi, a pilot project was found to increase the percentage of individuals who collected their HIV test results by 44 percentage points (Thornton 2008). The programme in Honduras increased utilisation of prenatal care by women, routine paediatric examinations and child growth monitoring services (Morris, Flores et al. 2004). Similarly, in Jamaica, Colombia and Nicaragua, the programmes encouraged greater use of child preventive health visits (Attanasio, Battistin E et al. 2005; Maluccio and Flores 2005; Levy and Ohls 2007; Macours, Schady et al. 2008). No significant impact on health visits was found in Mexico, Chile, and Ecuador (Gertler 2000; Galasso 2007; Paxson and Schady 2008). The results of the impact of these programmes on immunisation coverage were mixed. There were positive impacts on immunisation rates in Colombia, Honduras, Nicaragua (based on administrative data but not household data) and Turkey (Morris, Flores et al. 2004; Attanasio, Gómez et al. 2005; Ahmed, Adato et al. 2007; Barnham and Maluccio 2008). Oportunidades in Mexico, however, failed to have any impact on immunisation coverage, perhaps because rates were already so high, at over 90 percent (Barnham 2005). As is clear from Table 2.2, the evidence on financial incentives is limited almost exclusively to the use of simple health technologies. More complex health services, whose quality of care is more difficult for patients to assess, have rarely been targeted using financial incentives.

In terms of anthropometric outcomes, a number of programmes showed positive impacts for some age groups. The programmes in Colombia, Mexico and Nicaragua increased height for age (Gertler 2004; Rivera, Sotres-Alvarez et al. 2004; Attanasio, Gómez et al. 2005; Behrman and Hoddinott 2005; Maluccio and Flores 2005). There was no significant effect on child growth indicators in Ecuador and Honduras (Hoddinott 2008; Paxson and Schady 2008), and in Brazil the impact was even negative (Morris, Olinto et al. 2004). There were further mixed results in terms of programme effects on anaemia or haemoglobin levels (Gertler 2004; Paxson and Schady 2008).

Table 2.2 Impact of demand-side incentives on measures of service utilisation and health status

Programme	Outcome	Age group	Treatment effect	Size of incentive	Evaluation design
Brazil (Bolsa Alimentacao)	Height-for-age Z score	<24 months	-0.110 (0.130)	9% of per capita spending	R
		24-28 months	-0.190 (0.110)		
		49-83 months	-0.040 (0.090)		
Chile (Solidario)	Regular checkups (%)	0-6 years	2.4 (2.7)	7% of per capita spending	RDD
Colombia (Familias en Acción)	Child had growth monitoring (%)	0-1 years	22.8*** (6.7)	17% of per capita spending	PSM with DD
		2-4 years	33.2*** (11.5)		
		>4 years	1.5* (0.8)		
	DPT vaccination (%)	<24 months	8.9* (4.7)		
		24-48 months	3.5 (2.6)		
		>48 months	3.2 (3.9)		
	Height-for-age Z score	<24 months	0.161* (0.085)		
		24-48 months	0.011 (0.055)		
		>48 months	0.012 (0.033)		
	Probability of diarrhoea reported in rural areas (%)	<24 months	0.106*[b] (0.059)		
		24-28 months	-0.109**[b] (0.037)		
Ecuador (Bono de Desarrollo Humano)	Child had growth monitoring (%)	3-7 years	2.7 (3.8)	10% of per capita spending	R
	Height-for-age Z score	0-23 months	-0.030 (0.090)		
		24-47 months	-0.060 (0.090)		
		48-71 months	-0.080 (0.090)		
Honduras (Programa de Asignación Familiar)	Child taken to health centre in past month (%)	0-3 years	20.2*** (4.7)	9% of per capita spending	R
	Women who completed >5 prenatal (%)	Pregnant	18.7*** n/a		
	DPT vaccination (%)	<3 years	6.9*** (3.0)		
	Tetanus vaccination (%)	<3 years	4.2 (7.1)		
	Measles vaccination (%)	<3 years	-0.2 (4.7)		
	Height-for-age Z score	0-60 months	-0.02 n/a		
Jamaica (PATH)	Number of visits to health centre for preventive care	0-6 years	0.278***[a] (0.085)	10% of per capita spending	RDD
Malawi (HIV test status)	Individuals who went to centre to collect HIV test result (%)	Adults	43.8*** (2.2)	$0.1-$0.2 voucher	R

Programme	Outcome	Age group	Treatment effect	Size of incentive	Evaluation design
Mexico (Oportunidades)	Number of visits to health facilities in past month	0-2 years	-0.0.32[a] (0.037)	20% of per capita spending	R
		3-5 years	0.027[a] (0.019)		
	Tuberculosis vaccination (%)	<12 months	1.6 (2.4)		
	Measles vaccination (%)	12-23 months	2.8 (2.8)		
	Height (cm)	12-36 months	0.959*** (0.334)		
		4-12 months	0.503 (0.524)		
	Change in height (cm)	12-36 months	1.016** (0.398)		
		36-48 months	-0.349 (0.529)		
	Children whose mother reported they were ill in past month (%)	<3 years	-4.7*** (2.0)		
		3-5 years	-3.2*** (1.2)		
Nicaragua (Red de Protección Social)	Child taken to health centre (%)	0-3 years	8.4 (5.9)	27% of per capita spending	R
	Child weighed at health centre (%)	0-3 years	13.1* (7.5)		
	Full vaccination (%)	0-3 years	13.0 (9.0)		
	Height-for-age Z score	<60 months	0.17** (0.080)		
	Underweight (%)	<60 months	-6.0** (2.6)		
Tanzania (NVS-ITN)	Children sleeping under an insecticide treated net (%)	<1 year	18*** n/a	$2.45 voucher	BA
		<5 years	14** n/a		
Turkey (Social Risk Mitigation Project)	Fully vaccinated	<6 years	13.6*** (4.2)	6% of per capita spending	RDD

Note: Treatment effect is the reported coefficient, with the standard error in parentheses. The unit of measurement is in percentage points, unless stated otherwise (see outcome). *** denotes coefficients are significant at 1%, ** at 5%, and * at 10%. [a]The unit is number of visits. [b]The unit is relative change in the probability. CCT = conditional cash transfer. RCT = randomised controlled trial. PSM = propensity score matching. DD = difference-in-difference. RDD = regression discontinuity design. BA = before and after.

In addition to improved nutrition, demand-side incentive programmes are expected to reduce mortality and improve health status. The only evidence on mortality comes from Mexico, where the programme showed a negative impact on infant and maternal mortality (Barnham 2005; Hernández, Ramírez et al. 2005). Moreover, in Mexico and Colombia (but not Jamaica), studies reported a reduction in the incidence of some childhood illnesses among recipients of the programme (Gertler 2004; Attanasio, Battistin E et al. 2005; Levy and Ohls 2007). Finally, Oportunidades in Mexico was shown to have a positive impact on adult health status (Gertler 2000).

There remain a number of key gaps in the literature. First, few studies were able to capture unintended consequences of the programmes. The exceptions include Honduras, in which there is some evidence of increased fertility as a result of the programme, and in Brazil where the negative impact on child growth indicators may be the consequence of mothers misinterpreting the eligibility rules and keeping their children malnourished so as to qualify for cash transfers (Morris, Flores et al. 2004; Morris, Olinto et al. 2004; Stecklov, Winters et al. 2006).

Second, the issue of efficiency has also been given only limited consideration (de Janvry and Sadoulet 2006). It has been noted that paying all beneficiaries, regardless of their expected compliance with the conditions, will lead to high costs per marginal visit. Efficiency can be improved through effective identification and then targeting of only those individuals, whose behaviour is altered by the financial incentive. Relatedly, not many of the programmes have been subjected to an economic evaluation. There is a cost-benefit analysis of the Familias en Accion in Colombia (Institute for Fiscal Studies, Econometría et al. 2006) and a cost-effectiveness analysis of Progresa in Mexico (Coady and Parker 2004).

Third, few of the evaluations are able to disentangle the various pathways or mechanisms through which the effects may have operated. For example, it is important to know whether the effect of the cash transfer on behaviour is due to an income effect or a substitution effect. Filmer and Schady (2009) tease out the two effects and conclude that it is in fact a substitution effect of the cash transfer that influences education outcomes.

Fourth, further questions relate to which components of the programme are most important. Many of the CCT programmes include health promotion and supply-side strengthening activities alongside the provision of cash transfers. However, evaluation findings almost always attribute the impact to the CCT, ignoring potentially important interaction effects between supply and demand. In some cases, the supply-side was strengthened only in intervention areas, such that it is not clear which component of the programme worked. [14] In other cases, the supply-side was strengthened in both intervention and control areas. Thus, it may be the interaction between supply and demand, and not just the CCT, that generates the positive impact on health seeking. This issue is rarely given explicit recognition in the literature, although there is some evidence

[14] The programme in Nicaragua, for example, strengthened the provision of services in intervention areas that also received the conditional cash transfers. In contrast, mobile health teams were deployed in both intervention and control areas in Mexico.

that weaknesses on the supply side inhibit the effectiveness of CCTs (Behrman, Parker et al. 2005).

2.3.4 Summary

The economic rationale for providing financial incentives to encourage greater use of health services is based on the premise that private investment in health, particularly among the poorest, is inefficiently low. To date, CCT programmes have been adopted mostly by middle-income countries in Latin America targeting simple health-related behaviours. Other demand-side incentive programmes in low-income countries focus solely on raising demand for health services and are not designed to act as a social safety net. For this reason, they tend to offer a smaller sum of cash as a one-off payment once individuals meet the health conditions.

Programme evaluations provide a rich body of evidence as to the impact of demand-side incentives on health care seeking and, to a lesser extent, health outcomes. Broadly, the literature suggests that financial incentives to consumers can be an effective means to encourage greater use of simple preventive interventions and, in some cases but certainly not all, improve health outcomes. However, there is a paucity of information on processes, which means little is known about the factors that constrain or facilitate implementation, and an insufficient understanding of the mechanisms through impacts are generated.

2.4 Approaches to evaluation

2.4.1 Purpose of an evaluation

It widely recognised that policymaking should be informed by evidence if interventions are to improve the health of individuals and families (Eriksson 2000).[15] Moreover, there is growing support for rigorous evaluations in response to demands for greater accountability of how funds are spent. Past evaluations that have simply interviewed programme managers about processes are no longer regarded as satisfactory (Ravallion 2008).

An evaluation should aim to fill knowledge gaps of highest priority and not be driven by preferences for any particular empirical method (Ravallion 2009; Rodrik 2009). In fact, the research questions identified by policymakers are likely to determine the feasibility and choice of empirical methods. It is widely recognised, for instance, that health systems are key to determining health outcomes, yet assignment of health system reforms can rarely be influenced by a researcher, let alone randomised (Mills, Gilson et al. 2008). Different decision makers might be interested in different questions, and thus these competing demands are also likely to influence the design of the evaluation (Habicht, Victora et al. 1999). On rare occasions, for example, policymakers may be satisfied with knowing whether targets set before the start of an intervention have been achieved. In most cases, however, policymakers are concerned with attribution and expect an evaluation to make inferences about causation. Thus, one of the main challenges of an evaluation is to establish internal validity.

The fundamental problem of causal inference is that it is impossible to observe at any one time the outcome of an individual exposed and not exposed to an intervention (Holland 1986). An impact evaluation must assess an intervention's performance against an explicit counterfactual, which is typically a situation in the absence of the intervention. Sometimes, however, it may be appropriate to evaluate one intervention in tandem with another plausible alternative to reflect the fact that policymaking is often about making choices.

A number of reasons why evaluations often fail to address important gaps in knowledge have been identified (Savedoff, Levine et al. 2006; Ravallion 2009). First, the demanders of evaluations may

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[15] The terms "policy", "programme" and "intervention" are used interchangeably in this section to refer generically to what is being evaluated.

be poorly placed to assess the quality of the research and therefore opt for methods that are quick and less costly, unappreciative of the fact that they might lead to weak causal inferences. Second, programme managers and other stakeholders often have considerable control over what gets evaluated, leading to a bias towards programmes that are expected to work well. Third, evaluations are likely to reap knowledge benefits beyond the specific programme, but this externality is not considered by programme managers leading to an underinvestment in evaluations.

There have been calls recently to shift the emphasis, or rather the scope, of evaluations. It has been argued that little has been learnt from the evaluation of interventions or projects in the past few decades because the focus has been solely on whether the intervention worked and not extended to exploring why it worked (Pawson and Tilley 1997). The current feeling is that more needs to be understood about the fundamental mechanisms that determine why an intervention works and the conditions in which it can be expected to work (Deaton 2009). This viewpoint has been articulated across a range of disciplines, in the economics, development and medical literature (Heckman 1992; Heckman and Smith 1995; Craig, Dieppe et al. 2008; White 2009), and essentially refers to the problem of external validity. For an evaluation to guide future policymaking, its findings should be generalisable to other populations and settings.

2.4.2 Complex interventions in health

The medical literature refers to some interventions as complex (Craig, Dieppe et al. 2008). For evaluation purposes, this is often motivated by the need to distinguish between simple biomedical products and more complicated interventions. While there is no sharp distinction between a simple and a complex intervention, drugs trials are often in mind when the former are mentioned (Shiell, Hawe et al. 2008). The evaluation of a drug is an entirely different proposition to the evaluation of, say, a national health financing policy because the causal pathway of a drug is short and its biological effect generally universal (Victora, Habicht et al. 2004). Complex interventions are akin to the type of intervention a social scientist is typically interested in, that is, one that seeks to influence behaviour.

Interventions may be described as complex if they contain several interacting components. Complexity may also refer to the range of outcomes affected by the intervention, the number of different stakeholders involved in its delivery, how prone the intervention is to being changed

during the implementation process, the number of different groups targeted by the intervention, and the number and degree of behavioural responses required by implementers and recipients (Pawson, Greenhalgh et al. 2005; Craig, Dieppe et al. 2008). The complexity of an intervention is likely to have implications for its evaluation (Pawson, Greenhalgh et al. 2005; Craig, Dieppe et al. 2008). First, and most importantly, external validity is generally a much greater issue. A vaccine that works on a child in one country, for instance, is likely to work on a child in another. In contrast, the effect of a complex intervention may be influenced by variations in preferences and constraints between individuals and the context in which it operates (Victora, Habicht et al. 2004; Imbens 2009). Second, a strong theoretical understanding of how the intervention leads to outcomes is needed. Third, sample sizes may need to be larger in order to understand better the variability in treatment effects. Fourth, a larger range of outcomes may need to be studied, including those that pick up unintended consequences. Last, attention will need to be given to implementation processes to allow interpretation of impact findings. These issues are discussed in greater detail below.

2.4.3 Empirical methods to identify impacts

A standard evaluation aims to provide a quantitative estimate of an intervention's impact. The method with perhaps the longest tradition is the randomised controlled trial, which has been used in medicine for decades to assess the efficacy of drugs. For largely ethical reasons, it had rarely been used in economics until recently (Duflo, Glennerster et al. 2008). In non-medical disciplines, in particular economics, non-experimental evaluation methods have flourished. In general, the literature has placed great emphasis on internal validity and study design, leading to a deep understanding of selection bias and the assumptions that allow identification of impacts (Imbens and Wooldridge 2009). These assumptions are the Achilles heel of any particular method. Where their plausibility can be defended, causal inferences will be considered more credible.

The randomised experiment offers the most credible approach to establishing causality. It assigns an intervention randomly to units in the population, such that the probability of assignment does not vary according to potential outcomes. It assumes that randomisation itself does not affect individual behaviour and a treatment on an individual can affect only the potential outcomes of that individual, the so-called Stable-Unit-Treatment-Value-Assumption (Rubin 1978). Otherwise,

the randomised experiment invokes few assumptions. The impact of an intervention is simply the difference in mean outcomes, a statistic which is easily explained to policymakers.

Weaknesses in the internal validity of the randomised approach relate not so much to the theory, but rather the practical application of the approach. Issues that may arise in the implementation of a randomised experiment include the possibility that treated individuals drop-out, control group members find close substitutes for the intervention, and randomised assignment differs from actual participation. These represent a problem because departure from the assignment will almost always be systematic (McKee, Britton et al. 1999). Individuals who are least likely to benefit from an intervention may be the least likely to accept assignment. Double blinding is one solution to the problem but is rarely, if ever, feasible unless the intervention is a drug or vaccine. A more feasible solution is to calculate the impact of the intention to treat, which may also be the most policy-relevant parameter. Other responses to the problem are available but they all, at the very least, rest on the assumption that the impact of the intervention across individuals is the same. If impacts are instead heterogeneous, the estimate of the intervention's effect may not apply to the intended study population but rather some subgroup.

Heterogeneous impacts pose a further, more substantive problem. Policymakers often want to know the proportion of the population that benefited from an intervention. However, the mean impact is the only statistic of the distribution of the impact that can be calculated from a randomised experiment without making further assumptions. An intervention may have a beneficial effect on average while at the same time making the majority of the population worse off. Responses to this problem include estimation of bounds on aspects of the distribution of the effect (Heckman, Smith et al. 1997; Djebbari and Smith 2008), estimation of subgroup impacts in a fully interacted regression model (Djebbari and Smith 2008; Ravallion 2008), and non-parametric tests of heterogeneity in treatment effects (Crump, Hotz et al. 2008).

Non-experimental evaluation methods are set apart by their identifying assumptions (Ravallion 2008; Imbens and Wooldridge 2009). A first category of methods assumes that, conditional on the observables, there are no unobserved factors that are associated both with exposure to the intervention and potential outcomes. The literature refers to this assumption variously as unconfoundedness, conditional independence, exogeneity and selection on observables (Imbens and Wooldridge 2009). Methods that rest on this assumption include ordinary least squares (OLS)

regression and matching methods (Rosenbaum and Rubin 1984). The latter represents an improvement over the former by carefully selecting a comparison group that is as similar as possible to the treatment group in its observable characteristics. Moreover, it is non-parametric requiring no ad hoc assumptions about the functional form of the outcome equation. With the inclusion of only comparable individuals in the analysis, matching methods require no extrapolation outside the region of common support – ie. the region in which both treated and untreated individuals with the same characteristics can be observed. An implication of restricting the sample to those found in the common support is that the treatment effect refers only to the selected subsample of treated individuals. If treatment effects are different across individuals, the estimated treatment effect will not correspond to the parameter that the analysis was originally intended to estimate – that is, the mean treatment effect over the entire sample.

The strength of these methods in establishing internal validity essentially rests on the plausibility of the unconfoundedness assumption, which, as Imbens and Wooldridge (2009) note, is controversial. The richness of the available data, an understanding of the factors determining programme participation, the methods of data collection, and whether treated and untreated individuals are taken from a common setting are all factors that will influence the credibility of impact estimates (Heckman, Ichimura et al. 1997; Heckman, Ichimura et al. 1998; Blundell, Dearden et al. 2005).

The second category of non-experimental methods relaxes the assumption of unconfoundedness. This set of methods includes instrumental variable estimation, regression discontinuity designs and difference-in-difference approaches.[16] Instrumental variables affect the outcome only through their influence on the treatment variable, and are at the same time uncorrelated with the unobservables (ie. the error term in a regression model) (Angrist, Imbens et al. 1996). The latter is called the exclusion restriction and is the key identifying assumption of instrumental variable estimation. Unfortunately, it is also untestable. In a world of heterogeneous impacts, instrumental variable estimation provides the local average treatment effect (LATE) as long as the influence of the instrument on uptake of the programme is in the same direction for all individuals whose behaviour changes as a result. The LATE provides the treatment effect for those individuals induced to take up the intervention by the instrument (Imbens and Angrist 1994). Interpretation of the impact parameter is difficult when this subgroup is essentially unobserved (Ravallion 2008;

[16] Other methods not considered here include econometric selection models and bound analyses.

Deaton 2009). Moreover, this subgroup of the population may or may not be of interest to policymakers. Generally, the local average treatment effect is of most relevance when the instrument corresponds to a policy change, but less so when it refers to individual characteristics.

Regression discontinuity designs take advantage of known eligibility rules – such as thresholds defined at a particular age or income – for participation in a programme. It mimics a randomised experiment by comparing the outcomes of treated and untreated individuals at or close to the eligibility threshold. At best it can identify a treatment effect for those at the threshold, similar in many ways to the LATE of instrumental variable estimation.

The difference-in-difference method is used widely in the literature (Ashenfelter and Card 1985). It requires data on two groups of individuals before and after the adoption of a programme. In one group, individuals participate in the programme in the second time period and in the second group, control individuals never participate in the programme. The impact of the programme is measured as the difference between the changes over time in each group. Identification rests on two assumptions, that there are common time effects across groups and participation depends on observed and unobserved permanent individual characteristics. It is unable to control for changes in unobservables that influence both participation and outcomes.

As Cartwright (2007) argues, no single method of evaluation or study design dominates; there is no gold standard despite the claims of certain groups to the contrary (Banerjee and Duflo 2008). When the choice of method is dictated by the research question, it becomes apparent that some methods may not be feasible. A fixation on internal validity over all else not only neglects important research questions, but fails to give due consideration to the generalisability of study findings.

2.4.4 Problem of external validity

Internal validity is necessary for external validity (Duflo, Glennerster et al. 2008; Dekkers, Elm et al. 2009). However, if one accepts that the purpose of an evaluation is to guide future policymaking, the study should also be designed to inform the question of external validity (Rodrik 2009). In this sense, there appears to be little justification for a focus on internal validity over external validity (Rothwell 2005; Rodrik 2009), as sometimes argued (Cook and Campbell 1979). The contrast in many papers between the rigour applied to establish internal validity and

the vague statements about the generalisability of findings serves to illustrate this imbalance (Cartwright 2007). Frustration with the empirical literature in improving our understanding of why interventions do or do not work is closely tied to this question of external validity (Deaton 2009).

Concerns over external validity have long been voiced in the medical literature, but it remains neglected (Rothwell 2005). Many of the criticisms are levelled at randomised experiments, typically characterised as a black-box that can reveal little outside the immediate context of the study. However, other methods *per se* are not immune to this charge and, in some respects, the focus on randomised experiments obscures this fact (Banerjee and Duflo 2008). Still, randomised experiments may be *more* susceptible than other methods to the problem of weak external validity because they often lack coverage over time and space (Rodrik 2009). The implication is that evaluations with greater coverage over these two dimensions will tend to have greater external validity.

It is only recently that researchers have begun to conceptualise external validity. While a number of frameworks have been suggested in the medical literature (Rothwell 2005; Bonell, Oakley et al. 2006; Dekkers, Elm et al. 2009), these issues are only just beginning to be touched upon in the economics literature (Banerjee and Duflo 2008; Heckman 2008; Imbens 2009). As Rothwell (2005) states, an obvious but important first step is to ask "to whom do the results apply?". This goes beyond defining what Dekkers (2009) refers to as the *target population*, but also defining the setting or context to which the findings are to be generalised. Few studies state explicitly the target population or setting for which the intervention is being considered.

Victora *et al.* (2005) provide a useful distinction between factors that affect impact through their influence on implementation and factors that affect impact directly. Implementation-related factors seem to fall into a number of broad categories. First, there is the issue of scale. Findings from a small-scale project or pilot programme may not generalise to a national policy. Yet policymakers are almost always more interested in the latter. Scale is likely to be an important influence on impact for the following reasons: large-scale programmes may be more likely to attract rent-seeking from corrupt officials (Deaton 2009); the intervention itself may get modified, particularly if local adaptation is encouraged; and resources to supervise and administer the programme may be more stretched. Also, general equilibrium effects – although unrelated to

delivery of the intervention – may operate at a national level (Heckman, Lochner et al. 1998). Randomised experiments are particularly vulnerable to this problem since, for logistical and political reasons, they can rarely evaluate interventions delivered on a large scale (Black 1996). This is not true in all cases and indeed there are excellent examples of randomised experiments of national policies, for example in politics and in health (Chattopadhyay and Duflo 2004; Gertler 2004).[17]

Second, the institutional environment and broader context around implementation may affect delivery of an intervention and, in turn, its impact (Pawson and Tilley 1997). For example, great care may be taken and considerable capacity made available in the delivery of an intervention during a trial or pilot (Deaton 2009). There has been criticism of randomised trials that evaluate interventions delivered by non-governmental organisations (NGO) because their performance in this regard is likely to exceed that of government, yet it is the latter which typically interests policymakers.[18] Aspects of the health system that are important for the delivery of an intervention may also be different between the study setting and the target setting. Specific factors related to the institutional environment might include the level of supervision, the administrative capacity of the institution and the incentives faced by implementers (Ravallion 2008).

Factors affecting impacts directly tend to refer to characteristics of the study population. Again, this is a problem for randomised experiments because they are often conducted in small, selected sites whose population is likely to differ from the national population (Duflo, Glennerster et al. 2008). External validity will also be an issue for instrumental variable estimation and regression discontinuity designs even when using a national dataset since the local average treatment effect applies only to a subset of the population.[19] When evaluating complex health interventions, socioeconomic status, baseline health status, and accessibility to health services are likely to be potential effect modifiers. Another less obvious factor relates to whether the appropriate outcomes are studied on the appropriate population group or whether the intervention is studied

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[17] It is perhaps no coincidence then that these evaluations have attracted immense policy interest.

[18] Randomised experiments in developing countries are most feasible when there is no government involvement which probably explains why an NGO often facilitates delivery of the intervention, for example see Manandhar et al. (2004). It is not clear to what extent this problem for external validity can be mitigated merely by providing a detailed description of the implementation process or by replicating the same experiment in different location (Banerjee and Duflo 2008).

[19] This is sometimes framed as a problem for internal validity.

for a sufficient amount of time to allow impacts to surface or dissipate (Rothwell 2005; Victora, Schellenberg et al. 2005; Habyarimana and Jack 2008; Ravallion 2009)

2.4.5 Understanding what determines impacts

The discussion around internal and external validity points towards the need to supplement purely quantitative analyses that provide an estimate of mean impact with theoretical insights and data on contextual factors. Even the findings from a randomised experiment on their own are unlikely to convince a critical reader and must typically be supported by substantive evidence of how the intervention influenced the outcome (Victora, Habicht et al. 2004). This is partly because there is always a possibility of obtaining a statistically significant finding by chance alone, particularly when multiple outcomes are assessed (Freemantle 2001).

The literature emphasises the importance of having a theoretical understanding of how an intervention is expected to change outcomes (Deaton 2009).[20] In some cases the theory may already be anchored to a strong body of evidence. A theoretical model, however conceptualised, is more or less divorced from time and place (Rothman, Greenland et al. 2008), and provides predictions of the intervention's effect, while making explicit the assumptions upon which these are based. It can be useful in the early stages of an evaluation to identify specific evaluation questions; to inform the development of the intervention; and to provide the basis with which to critique the intervention (Weiss 1998; Rossi, Lipsey et al. 2004; Craig, Dieppe et al. 2008). In this last respect, theory can play an important role in understanding whether the intervention really addresses the problem and whether it will achieve its stated goals, particularly in terms of its distributional impact (Devarajan, Squire et al. 1997).

Perhaps the most formal link between theory and empirical work can be found in economics with the estimation of structural models (Attanasio, Meghir et al. 2005; Card and Hyslop 2005; Todd and Wolpin 2006). A behavioural model combined with variation from a randomised experiment can provide a set of structural parameters that remain fixed when estimating counterfactual outcomes. It can be used to make generalisations beyond the study population or particular policy

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[20] It should be noted that the literature is not unanimous in this view. Banerjee (2005) argues that one of the strengths of randomised experiments is its atheoretical approach, particularly if the theory is weak. Examples exist of evidence preceding theory. Doctors in Vienna were advised to wash their hands after evidence suggested this reduced mortality. This was based on no understanding of the causal mechanism and it would not be another three decades until germ theory was discovered (White 2009).

design to understand better what might happen under different policy regimes (Heckman and Vytlacil 2007; Heckman and Vytlacil 2007). Similar approaches have been used in an ex-ante sense to model the impact of an intervention either as a key input into the initial development of an intervention (eg. by allowing a comparison of impacts arising from different policy designs) (Torgerson and Byford 2002; Bourguignon and Ferreira 2003; Eldridge, Spencer et al. 2005) or to provide a sense of the range of impacts that might be expected from an intervention (Todd and Wolpin 2006).

A theoretical understanding of an intervention may also be useful in hypothesising its causal pathway and the individual processes that lead to change. This is in essence the tenet of theory-based evaluation (Weiss 1998; Stame 2004). It breaks down the logic of an intervention by charting the intermediate steps involved in reaching outcomes, making explicit the assumptions that underpin the process and placing emphasis on how context influences outcomes.[21] This type of approach has been the basis of a number of studies in developing countries, including an evaluation of a nutrition programme in Bangladesh (White and Masset 2007), a multi-country evaluation of Integrated Management of Childhood Illnesses (IMCI) (Bryce, Victora et al. 2005), and the evaluation of vouchers for bed-nets in Tanzania (Hanson, Marchant et al. 2009).

Research into implementation processes is a critical component of an evaluation (Craig, Dieppe et al. 2008). A process evaluation explores intermediate indicators of behaviour, uptake of the intervention and the context in which it is delivered (Oakley, Strange et al. 2006). In this way, an evaluation can distinguish between a faulty underlying mechanism (failure of concept or theory) and a faulty process (poor delivery or implementation) (Oakley, Strange et al. 2006). A process evaluation may also assess the fidelity of implementation or, put another way, whether in practice the intervention follows closely the stated policy or protocol. These types of information are critical in the interpretation of impact findings. Qualitative research is likely to be central to any process evaluation because the research questions, such as why uptake of an intervention has been low, can rarely be unravelled fully with quantitative data.

When the analysis is grounded in relevant theory, implementation research can provide insights beyond a description of what happened. Frameworks, such as the stage heuristic (Lasswell 1956;

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[21] The stepwise approach to evaluation, as proposed by Habicht et al. (1999), seems to share many of the same principles.

Brewer and deLeon 1983), the policy triangle framework (Walt and Gilson 1994) and network frameworks (Thatcher 1998), provide broad guidance in which researchers can situate their research. Implementation theories are characterised as viewing decision-making as top-down, bottom-up or both (Sabatier 2007). Lipsey (1983), for example, places emphasis on how implementation of policy is influenced by "street level bureaucrats" or staff involved in the frontline delivery of services. The literature on implementation is dominated by studies conducted in high income countries (Saetren 2005), and is a surprisingly neglected area in health research in developing countries (Walt, Shiffman et al. 2008).

Another approach to understand what determines impact is through analysis of the heterogeneity in treatment effects. This could be done by repeating the same experiment in settings across which there is variation in those factors that might be expected to matter most for outcomes (eg. institutional environment or scale) (Banerjee and Duflo 2008) or by identifying in one study what factors drive impacts, conditional on their being sufficient variation in the relevant variables. As Ravallion notes, geographic differences in impacts can be hugely informative, particularly if the evaluation is able to measure some of the factors, such as policy design, that may vary by location (Ravallion 2009). Ultimately, this line of enquiry is limited by what can be observed. Djebbari and Smith, for example, find that some of the heterogeneity in impacts in Mexico's Progresa programme is caused by factors unobserved to the researcher (Djebbari and Smith 2008). Nevertheless, theory can inform how treatment effects might vary with covariates and efforts should be made to obtain data on such variables (Heckman, Smith et al. 1997). Data mining for impacts on subgroups defined retrospectively is a concern (Freemantle 2001).[22] However, there appears to be some consensus amongst economists that interesting but ex ante unexpected subgroup findings can at least provide a set of new hypotheses for further research (Duflo, Glennerster et al. 2008; Deaton 2009).

2.4.6 Summary

Rigorous evaluations are important for informing policy decisions, but they should focus on the issues and questions most relevant to policymakers. Many interventions in health that are relevant to policymakers can be characterised as complex, and this has implications for their evaluation. Close attention has been given in the literature to establishing internal validity in an evaluation,

[22] The same concern applies also to the reporting of secondary outcomes.

and there have been considerable advancements in the development of policy evaluation methods. The poor record in making inferences about external validity appears to stem from a failure to conceptualise the issue. The findings of an evaluation will have more generalisability if the evaluation has greater coverage over time and space, is grounded in theory, and can shed light on both implementation processes and the factors that lead to variation in impacts.

2.5 Research gaps and priorities

The literature review identified a number of gaps, which this thesis intends to fill. First, there have been few economic analyses of the determinants of demand for maternity care and, with the exception of one study (Schwartz, Akin et al. 1988), sample sizes have been relatively small. Previous studies have estimated demand models for health care but rarely have these been linked to ongoing financing reforms.

Second, the evidence on large-scale demand-side incentive programmes is limited to middle-income countries. The specific context in which these programmes are delivered – adequate provision of health services, already highly subsidised health care and relatively strong administrative capacity in the government – raises questions about the generalisability of the findings to low-income countries. This problem is compounded by the lack of implementation research to understand the factors that constrained and facilitated their implementation.

Third, the evidence on the effect of demand-side incentives is limited to relatively simple behaviours such as attendance of children at health clinics and participation in vaccine programmes. None of the demand-side incentives programmes that have been evaluated have focused on delivery care. Health seeking behaviour at childbirth is distinctly different. Maternal complications are unpredictable, female autonomy around decision making may play a greater role and the quality of care is much more difficult to judge from the perspective of the consumer. The upshot may be that delivery care is less amenable to change through the use of financial incentives.

Fourth, and more broadly, there is a poor record of evaluations making inferences about the external validity of their findings, which is essential for policymaking. The recent literature emphasises an approach to evaluation in which an assessment of impact retains centre stage but is complemented with a theoretical understanding of the intervention, an assessment of implementation processes that gives due attention to the context in which the intervention is delivered, and an understanding of the heterogeneity in impacts.

Finally, there is limited evidence on the cost-effectiveness of demand-side incentives in health and thus scant information on whether they are value for money relative to other ways of achieving the same outcomes. In particular, there is a concern that universal financial incentives may be

hugely costly due to the inefficiency of paying many individuals to do what they would have done anyway in the absence of the programme.

This thesis will aim to fill in turn each of the gaps identified above. In Chapter 5, it estimates a demand model for maternity care and, on the basis of these results, conducts simulations to model the effect of the SDIP on utilisation. These findings set the context for an ex-post evaluation of the SDIP in the subsequent chapters. Chapter 6 seeks to understand the factors that have facilitated and impeded implementation of the SDIP. Analyses in Chapter 7 and Chapter 8 seek to provide robust estimates of the SDIP's impact on utilisation of delivery care services at childbirth. An estimate of the cost-effectiveness of the programme, albeit crudely calculated, is provided in Chapter 9.

Chapter 3. METHODS

The basic premise underpinning the use of demand-side incentives is that an increase in the utilisation of professional care at childbirth will increase the welfare of the woman and her family. The literature review considered the main theoretical mechanisms that might lead individuals to consume less health care than is privately or socially optimal. It also found a reasonably strong body of evidence showing that demand-side incentives to motivate individuals to use simple preventive health interventions can be effective. However, it remains unclear whether demand-side incentives programmes can work both in low-income settings and when targeting more complex health services such as maternity care.

This chapter describes the methods used in the thesis. It first describes the financial incentives provided by the Safe Delivery Incentive Programme (SDIP). Section 3.2 sets out the research objectives and then section 3.3 develops a conceptual framework to aid understanding of how the SDIP is expected to affect health seeking behaviour. The conceptual framework draws on the literature concerning demand theory and approaches to evaluating complex interventions, reviewed in the previous chapter. It generates a set of model predictions that provide the basis for the empirical work. Section 3.4 outlines the empirical methods, describing the various analyses as well as the types of econometric methods to be used and the sources of data. It also shows the linkages between this thesis and the evaluation of the SDIP. Section 3.5 is concerned with the ethical approval and funding arrangements for the research.

3.1 Safe Delivery Incentive Programme

The objective of the SDIP is to increase the proportion of women who deliver with skilled birth attendance. The programme seeks to change the behaviour of both families and health workers though a package of financial incentives that include (Table 3.1): i) a cash payment (conditional cash transfer) to women; ii) free maternity care, in addition to the conditional cash transfer, for those women from the 25 least developed districts; and iii) a cash payment to the health provider for each delivery attended (Government of Nepal 2005).

The SDIP offers cash to women on the condition of giving birth in a public health facility. Money is paid by the health provider or accountant on discharge and the amount varies across the three main geographical regions of Nepal to reflect differences in the cost of accessing health services faced by households (Borghi, Ensor et al. 2006). The programme was limited to public sector health facilities for the entire study period of this research but subsequently expanded to include both not-for-profit and private health facilities.

Table 3.1 Financial incentives offered by the SDIP

Financial benefit	Eligibility criteria
1. Conditional cash transfer to women: ▪ 1,500 NRS ($23.4) in mountain districts ▪ 1,000 NRS ($15.6) in hill districts ▪ 500 NRS ($7.8) in tarai districts	Woman delivered in a public health facility and had no more than two living children or an obstetric complication
2. Free delivery care to the woman and facility reimbursed: ▪ 1,000 NRS ($15.6) reimbursed to health facility	Woman is resident in one of the 25 least developed districts and meets the eligibility criteria required for the conditional cash transfer
3. Provider incentive: ▪ 300 NRS ($4.7) per delivery	Doctor, nurse, midwife, health assistant, auxiliary health worker or maternal and child health worker attended a delivery at home or in a public health facility

Note: US dollar amounts are converted using the exchange rate of 64 Nepalese Rupees per dollar.

Women from the 25 least developed districts are exempted from health facility charges as an additional benefit to the conditional cash transfer. The least developed districts are essentially districts in the mountain region of Nepal. The policy stipulated that health facilities are to be given 1,000 NRS ($15.7) by the government for each delivery provided free of charge, to compensate them for the lost revenue.

The conditional cash transfer and free delivery care are available only to women with two or fewer children, unless the woman has an obstetric complication. The restriction was put in place to accommodate concerns that the programme might inadvertently increase fertility. In practice, however, health workers found it difficult to verify a woman's parity and the condition was scrapped after the second year.

The SDIP provides 300 NRS ($4.7) to health workers for each delivery attended either at home or in the health facility. The policy specifies the cadres of health worker eligible to receive the incentive, but is intentionally vague on whether or how the incentive should be shared amongst

health workers, leaving the decision to the management committee of the health facility. Initially, auxiliary health workers were not eligible for the provider incentive, but after one year of widespread protests, the policy was changed to include them.

3.2 Research aim and objectives

The aim of the thesis is to assess the impact of demand-side incentives to promote the use of safe delivery care in Nepal.

The specific objectives are:

1. To describe health care seeking behaviour at childbirth through analysis of the determinants of demand for delivery care
2. To explore implementation of the SDIP through analysis of the level and the determinants of its uptake
3. To estimate the impact of the SDIP on health seeking behaviour at childbirth
4. To use the empirical results to discuss implications for the design and implementation of demand-side incentive programmes in low-income countries, and maternal health seeking more generally

The intention is that the objectives together provide enough scope for a thorough evaluation of what is a complex intervention. The first objective is primarily a modelling exercise to understand what factors matter most in a household's decision of where to deliver. In this sense, the analysis of the determinants of demand for delivery care is an ex-ante evaluation, providing empirical evidence to inform expectations of the impact of the SDIP. It can also shed light on the role of non-economic factors, thus contributing to the discussion around the suitability of both the SDIP and other interventions to improve access to professional care at childbirth.

The second objective concerns the implementation process, an area that is critical if the research is to distinguish between failure of the underlying theoretical mechanism of the programme and poor implementation. The third objective focuses on the impact of the SDIP. An important part of this objective is to examine the heterogeneity in impacts and, where possible, explain reasons for any differences between groups.

3.3 Conceptual framework

The conceptual framework is made up of three components. The first part is a theoretical model of the SDIP's causal pathway. The second part focuses on the influence of price on behaviour that is at the heart of the how the SDIP is expected to cause change. An economic model of demand for delivery care provides predictions of how the demand-side incentives influence health seeking behaviour. The third part lays out the econometric framework of the archetypal evaluation problem.

3.3.1 Model of the programme's causal pathway

The main objective of the SDIP is to increase skilled birth attendance. The World Health Organisation defines a skilled birth attendant as an "accredited health professional – such as a midwife, doctor or nurse – who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth and the immediate postnatal period, and in the identification, management and referral of complications in women and newborn children"(WHO 2004). This definition goes some way to clarifying what skilled attendance at delivery should comprise, but nevertheless remains vague in terms of the specific competencies of the attendant and the enabling environment (De Brouwere and Van Lerberghe 2001). There is a general consensus that skilled attendance at delivery must encompass all basic emergency obstetric functions at the primary level with referral to comprehensive emergency obstetric care in secondary level health facilities when required.

The evaluation of the SDIP starts with a conceptualisation of the pathways through which inputs lead to outcomes. This process can be broken down into a number of distinct steps, each of which is necessary if the programme is to have an impact on the stated outcomes. This method of assessing programme performance has been referred to in the literature as the theory-based evaluation approach (Weiss 1998; White and Masset 2007). Essentially, it breaks down the logic of the programme by charting the intermediate steps involved in reaching programme outcomes and making explicit the assumptions that underpin the process.

An approach that evaluates both process and impact is important for two reasons. First, it provides a means of explaining not just whether a programme worked, but also why it did or did not work. Second, it can help in assessing the plausibility of impact findings when confounding cannot be completely ruled out – ie. in the absence of randomisation. If major problems are

identified at various stages of the implementation process, judgements about the programme impact are likely to be better informed.

Applying the framework of the theory-based approach to the SDIP leads to the identification of a number of steps that can be considered necessary if the programme is to lead to a change in health seeking behaviour, as shown in Figure 3.1.[23] The model focuses on the SDIP's demand-side incentives (ie. the conditional cash transfer and free delivery care in the 25 least developed districts) in keeping with the scope of the thesis. It makes the distinction between individual actions and government involvement in the implementation process.

At the individual level, the key steps include: households with a pregnant woman hear about the financial incentives offered by the SDIP; households perceive the promise of financial incentives as credible (they expect to receive the benefits); women give birth with professional care in a health facility (skilled birth attendance); and after giving birth women receive the demand-side incentives in a timely manner. The feedback loop in Figure 3.1 indicates a mechanism through which credibility of the payment system is influenced. Women's experience of the administration process is communicated to other families, which in turn affects their expectation of whether they will receive the demand-side incentives in the future.

The government plays a key role in the implementation process. It must promote the SDIP if target households are to know about the demand-side incentives on offer and it must ensure funds are available in health facilities if women are to be paid on time. The latter requires a well functioning public financial management system since the funds must flow from the central treasury to each district health office and then to each health facility.

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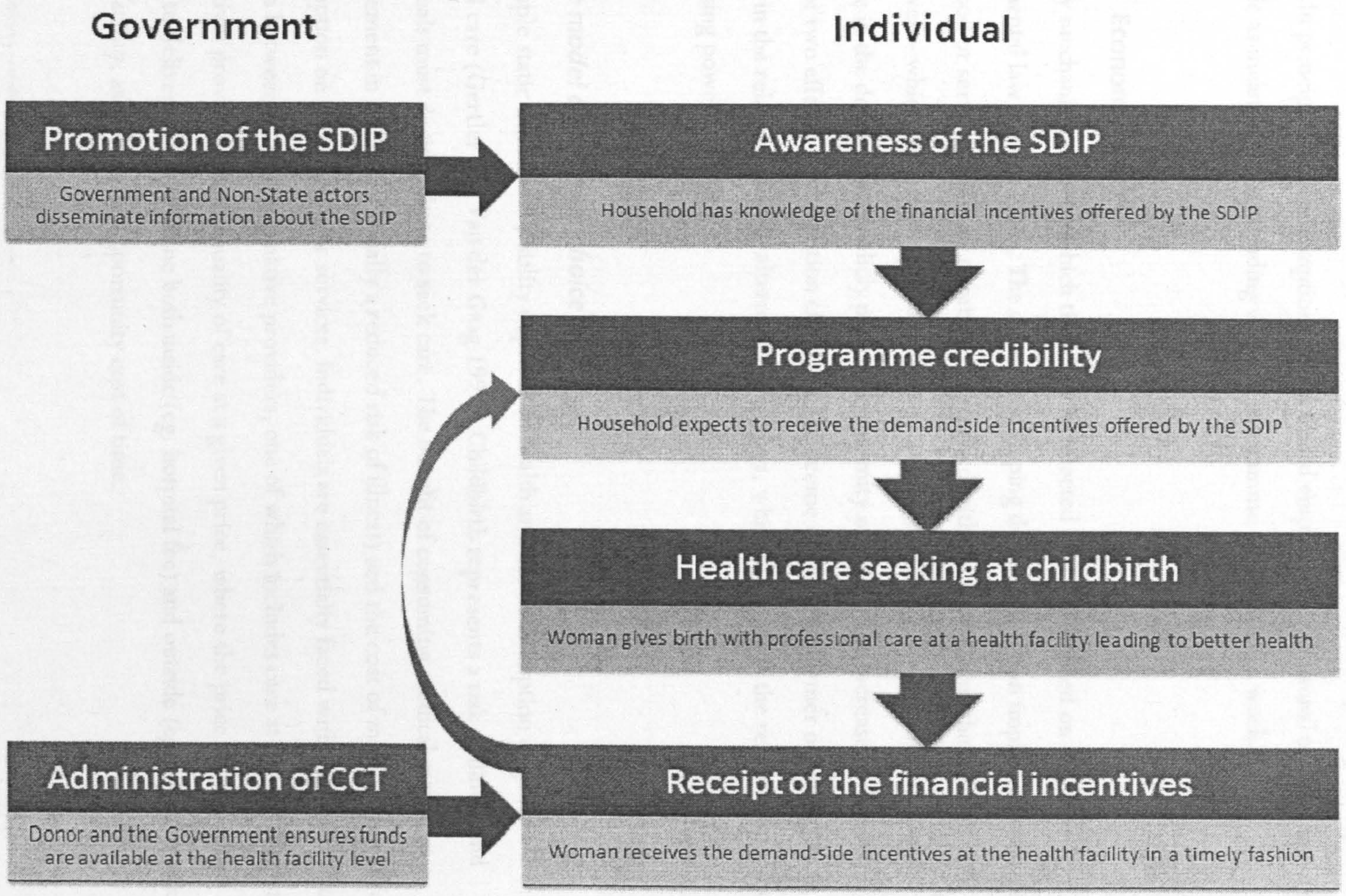
[23] The programmatic pathway model has been adapted as the research has progressed.

Figure 3.1 Model of the Safe Delivery Incentive Programme's causal pathway



Implicit in this framework are a number of assumptions (Glassman, Todd et al. 2009). First, maternity services, as noted at the beginning of the chapter, are under-utilised in the sense that an increase in utilisation raises welfare. Second, the demand-side incentives have a greater impact on welfare than an equivalent cash transfer with no conditions attached. Third, maternity services are available or, alternatively, the supply of services will follow demand as beneficiaries hold health providers to account.[24] And finally, maternity services are of a sufficient quality to improve health. In principle, these assumptions can be tested empirically conditional on their being data available as means of understanding why the programme did or did not work.

3.3.2 Economic theory

The key mechanism through which the SDIP is expected to work is based on the most fundamental law of economics. The downward sloping demand function implies that the demand for a good or service should be negatively correlated with its price. Thus, the demand-side incentives – which represent a subsidy on the price of the delivery care – should induce an increase in the demand for publicly provided maternity services. The increase in demand is the result of two effects: a substitution effect and an income effect. The former occurs because of a change in the relative prices of alternative providers, while the latter is the result of an increase in purchasing power.

Simple model of provider choice

In a simple static framework, utility depends on health and the consumption of goods other than medical care (Gertler and Van der Gaag 1990). Childbirth represents a risk of illness and individuals must decide where to seek care. The benefit of consuming medical care is an improvement in health (or equally a reduced risk of illness) and the cost of medical care is forgone consumption on other goods or services. Individuals are essentially faced with a discrete choice decision between a set of alternative providers, one of which includes care at home. The various alternatives provide a certain quality of care at a given price, where the price includes costs related to delivery that are borne both inside (eg. hospital fee) and outside (eg. transportation) the health facility, as well as the opportunity cost of time.

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[24] This assumption is likely to be particularly strong in the case of caesarean sections due to the shortage of inputs for blood transfusion, anaesthesia and surgery in Nepal.

Let the utility of an individual conditional on delivering at health provider j be represented as:

$$U_{ij} = U(h_{ij}, c_{ij}, \varepsilon_{ij}; \boldsymbol{\omega_{ij}})$$

where, h_{ij} is the expected health status after delivering at the provider, c_{ij} is non medical care consumption, ε_{ij} is a random error, and $\boldsymbol{\omega_{ij}}$ is a parameter vector. The marginal product or quality of the medical care given by provider j is the expected improvement in health (or reduction in the risk of illness). This is determined by the characteristics of the provider (eg. medical knowledge) as well as those of the individual (eg. severity of morbidity). Thus, the health production function is given by:

$$h_{ij} = h(\boldsymbol{x_i}, \boldsymbol{z_j}; \boldsymbol{\alpha_{ij}})$$

where $\boldsymbol{x_i}$ is a vector of individual and household characteristics, $\boldsymbol{z_j}$ is a vector of provider characteristics and $\boldsymbol{\alpha_{ij}}$ is a parameter vector. It is assumed that the health production function is independent of non-health consumption. This assumption can be defended on the basis that the onset of maternal health complications is determined largely by biological rather than behavioural factors and it is the latter which are closely linked to socioeconomic status. Non-health consumption is a function of exogenous income, y_i, and the price (inclusive of costs incurred at the facility and outside, as well as the opportunity cost of time), p_{ij}, at provider j:

$$c_{ij} = y_i - p_{ij}$$

such that income affects utility through the consumption term. The choice of provider at childbirth is represented by the utility maximisation problem, in which the individual has a choice of $j + 1$ alternative providers, where the $j = 0$ alternative is delivery at home. The choice of provider is given by the following indicator function:

$$S_{ij} = 1[U_{ij} = max(U_{i0}, U_{i1}, \dots U_{ij})]$$

where S_{ij} is 1 if the utility is the highest obtainable for individual i at provider j and 0 otherwise. The central feature of the model is the trade-off between health and non-health consumption.

Under certain conditions, a household may be able to consume more health care while protecting current consumption using coping mechanisms, such as savings, borrowing or the sale of assets (Morduch 1995). In a future time period, however, there is likely to be a cost associated with any means of consumption smoothing, such that this trade-off between health and non-health consumption remains relevant.

Demand for health increases with income if health is a normal good. A necessary condition for normality is that as income rises the marginal rate of substitution of consumption diminishes, holding health constant (Gertler and Van der Gaag 1990). The implication of normality is that as incomes rise, individuals are more likely to choose the higher price / higher quality option given the choice between a set of discrete alternatives. This is equivalent to saying that a reduction in the price is less likely to encourage wealthier individuals from choosing the higher price / higher quality option. In other words, all else being equal wealthier individuals have a lower price elasticity of demand for delivery care than poorer individuals. Whether health is a normal good is an empirical question that is addressed by estimation of the indirect utility function derived from the model above. It should be noted that the package of financial incentives offered by the SDIP differs across geographical regions, which has implications for the model predictions.

Incorporating credibility

Assuming government health providers make no adjustment to prices in the presence of the SDIP, the price of care at a government provider (g) during the SDIP is given by:

$$p_{ig}^{1} = p_{ig}^{0} - d_i$$

where p_{ig}^{1} is price of care for individual i during the SDIP, p_{ig}^{0} is the price of care in the absence of the SDIP and d_i is the value of the demand-side incentives received by the woman.

Incorporating credibility into the model, the price of care at a government health provider during the SDIP is now given by:

$$p_{ig}^{1} = p_{ig}^{0} - k \cdot d_i$$

where k, the credibility of the promise of the demand-side incentives, is simply the expected probability of receiving the benefits and is limited to $0 \leq k \leq 1$. In the extreme case, when $k = 0$, the utility maximisation problem will be the same as in the absence of the SDIP. When $k = 1$, demand for government maternity services increases, the extent to which depends on the price elasticity of demand. An individual faced with a higher credibility of payment will be more incentivised to choose the government provider of delivery care.

To illustrate, suppose there are two individuals and credibility of the SDIP for individual 1 is high, and credibility of the SDIP for individual 2 is low. Assuming the individuals are same in every other respect, $p_{1g} < p_{2g}$ and therefore $U_1^g > U_2^g$. At the margin, there are some individuals for whom the higher credibility raises the utility of the government option such that it becomes the option with the highest utility.

Model predictions

The predictions emerging from the analytical framework are as follows:

- The SDIP will encourage greater utilisation of government maternity services, with women substituting away from home care and non-state providers;
- The impact of the SDIP on utilisation of government maternity services will be greatest amongst households who are poorer, all else being equal;
- The impact of the SDIP will be greater in regions where the package of demand-side incentives offered by the programme represents the greater subsidy relative to the cost of care; and
- Individuals for whom the credibility of the promise of the demand-side incentives is greater will be more likely to deliver in a government health facility.

3.3.3 Archetypal evaluation problem

The main purpose of an impact evaluation is to quantify the causal impact of a programme on an outcome or set of outcomes. What outcomes are relevant to an evaluation depend on the programme itself. Those individuals who receive the programme are said to be treated.

An impact evaluation aims to estimate the causal effect of a treatment relative to the counterfactual of not receiving treatment on outcome Y experienced by units in the population. The counterfactual may be the absence of treatment or it may be another treatment. The standard formulation of the evaluation problem follows the potential outcomes framework (Neyman 1923; Roy 1951; Quandt 1972; Rubin 1974). Let the value of the outcome if individual i is treated be Y_{1i}, and if the individual i is not treated, Y_{0i}. The observed outcome for individual i is therefore:

$$Y_i = D_i Y_{1i} + (1 - D_i)Y_{0i} = Y_{0i} + D_i(Y_{1i} - Y_{0i})$$

where D_i is an indicator of the treatment actually received and the outcome of one unit is assumed not to be affected by participation of another. The treatment effect or programme impact for a single unit is $\beta_i \equiv Y_{1i} - Y_{0i}$. The fundamental problem of causal inference is that both Y_{1i} and Y_{0i} can never be observed at the same time on any unit, which means, by implication, that it is impossible to observe the individual treatment effect. Characterised in this way, impact evaluation essentially becomes a problem of missing data. It involves using available data on observed Y_i, X_i, D_i with assumptions to identify and estimate characteristics of the distribution of β_i.

In an impact evaluation, it is standard practice to give average parameters of effect. The most common and policy relevant of these is the average treatment effect on the treated (ATT). Also of interest may be the average treatment effect on the untreated (ATNT) and the average treatment effect in the population whether or not one takes the treatment (ATE):

$$ATT = E(Y_{1i} - Y_{0i}|D_i = 1) \equiv E(\beta_i|D_i = 1)$$

$$ATNT = E(Y_{1i} - Y_{0i}|D_i = 0) \equiv E(\beta_i|D_i = 0)$$

$$ATE = E(Y_{1i} - Y_{0i}) \equiv E(\beta_i)$$

Conditional versions of the various average effects for a set of observed characteristics, X_i, of individual i are: $ATT \equiv E(\beta_i|X_i, D_i = 1)$, $ATNT \equiv E(\beta_i|X_i, D_i = 0)$, and $ATE \equiv$

$E(\beta_i|X_i)$. The problem of missing data, as mentioned above, extends to the identification of average effects, since neither $E(Y_0|D=1)$ nor $E(Y_1|D=0)$ is observed.

The model can be specialised further with the introduction of the Xs (Blundell, Dearden et al. 2005). For simplicity outcomes are assumed linear in their parameters, giving:

$$Y_{1i} = m_1(X_i) + u_{1i}$$

$$Y_{0i} = m_0(X_i) + u_{0i}$$

The parameters m_j are defined such that X is exogenous ($E(Y_{ji}|X_i) = m_j(X_i)$ for $j = 0,1$). Note also that the vector of covariates Xs are measured before treatment or are time-invariant – ie. $X_{1i} = X_{0i} = X_i$. A single regression for the observed outcome can be derived:

$$Y_i = m_0(X_i) + \beta_i D_i + u_{0i}$$

where $\beta_i = [m_1(X_i) - m_0(X_i)] + [u_{1i} - u_{0i}] = b(X_i) + b_i$. In this general framework, β_i represents the impact of the programme for individual i and is allowed to vary across individuals, $b(X_i)$ is the common effect for all individuals with characteristics X_i and therefore captures observed heterogeneous returns, and b_i the unobserved idiosyncratic effect for individual i. When the latent effects are the same in both the treated and the untreated group (ie. $u_{1i} = u_{0i} = u_i$), the treatment effect is the same across all individuals and is said to be homogeneous. If $u_{1i} \neq u_{0i}$, treatment effects are heterogeneous. The conditional average effects are given by:

$$ATT(X_i) = E(\beta_i|X_i, D_i = 1) = ATE(X_i) + E(u_{1i} - u_{0i}|X_i, D_i = 1)$$

$$ATNT(X_i) = E(\beta_i|X_i, D_i = 0) = ATE(X_i) + E(u_{1i} - u_{0i}|X_i, D_i = 0)$$

$$ATE(X_i) = E(\beta_i|X_i) = m_1(X_i) - m_0(X_i)$$

In the homogeneous impact model, all three measures of impact are identical. With heterogeneous returns, an important issue then to consider is whether or not selection into the

programme depends on unobservable determinants of an individual's marginal returns, conditional on observable X_i. If selection is not affected, all three measures of impact are the same as in the homogeneous returns model. If, however, selection is affected by person-specific individual returns, the impact parameters are not equal and various treatment effects can be defined (Heckman, Ichimura et al. 1997; Dearden 1999; Card 2001).

A naïve estimator of the average treatment effect on the treated using data that are likely to be available is the single difference (SD) in the mean outcomes between the treated and the untreated:

$$SD = E(Y|D = 1) - E(Y|D = 0) = E(Y_1 - Y_0|D = 1) + B$$

where $B \equiv E(Y_0|D = 1) - E(Y_0|D = 0) = B_1 + B_2 + B_3$. In the literature, B is referred to as selection bias. There are three principal sources of selection bias (Heckman, Ichimura et al. 1998). First, there is selection bias stemming from non-overlapping support of the observables (B_1), which means the non-participants used to infer the counterfactual do not share the same characteristics as the participants – ie. are not comparable individuals (Rosenbaum and Rubin 1983). Second, selection bias may arise from differences in the distribution of the observables between the two groups over the common support (B_2), leading to an inappropriate weighting of individuals in the comparison group. Third, selection bias may stem from unobserved characteristics that jointly influence selection into the programme and outcomes (B_3). Any difference in the conditional means of the outcomes may be due to non-programme factors that are simply unobserved to the researcher.

Here, it is useful to distinguish between selection on unobserved characteristics and selection on unobserved returns. The former may be termed ability bias and the latter, returns bias (Roy 1951). Ability bias arises if the error term and treatment are correlated. Suppose, for example, that wealthier women with better health seeking practices at childbirth are more likely to be reached by the SDIP and that wealth is unobserved to the researcher. The two terms will be positively correlated giving an upward bias in the estimated mean difference in utilisation between the treated and untreated groups. Returns bias arises when selection into the programme is correlated with an individual's returns. If, given the observables, women with greater potential gains from the SDIP (as measured by an improvement in health seeking behaviour) are at the same

time more likely to be reached by the programme, the ATT will be biased upwards. The empirical challenge is to construct the counterfactual in the presence of selection bias such that it is possible to separate out the effect of the programme from the effect of confounding factors.

3.4 Empirical methods

Table 3.2 provides an overview of how the research objectives link with the empirical methods and the data sources. The empirical methods exploit both primary and secondary sources of data in an effort to address each objective. The following sections describe the empirical methods and sources of data. It remains, however, for each individual results chapter to outline in detail the econometric methods used in the analysis. Similarly, specific limitations of the empirical methods are reserved for each results chapter and broad limitations of the thesis are discussed in chapter 9.

Table 3.2 Empirical methods and sources of data used for each research objective

Research objective	Empirical method	Data source
1. To describe health care seeking behaviour at childbirth through analysis of the determinants of demand for delivery care	Discrete choice multinomial models	Community Surveillance System and Cost of Delivery Survey
2. To explore implementation of the SDIP through analysis of the level and the determinants of its uptake	Bivariate and multivariate regression analysis of process indicators	Survey of Women
3. To estimate the impact of the SDIP on health seeking behaviour at childbirth	Propensity score matching Longitudinal analysis to identify discontinuity in outcome	Survey of Women Community Surveillance System

3.4.1 Demand for delivery care at childbirth

The analysis of the demand for delivery care examines the influence of health provider characteristics (eg. price and time costs) and characteristics of the individual (eg. wealth, age, perceived morbidity) on the place of childbirth. Discrete choice models and full information maximum likelihood estimation techniques are used to make inferences about the relative importance of each determinant. The individual is assumed to know all attributes of the provider and to choose the one that maximises his (indirect) utility. The observed choice is determined by the difference in utility (ie. net utility).

Multinomial models, motivated by McFadden's random utility model, are required when dependent variables are discrete and take unordered multinomial outcomes (McFadden 1981). Different models make different assumptions, some more restrictive than others. Thus, the

robustness of the results to different econometric models is assessed by comparing parameter estimates from a multinomial logit and a multinomial probit model.

Interpretation of the parameter estimates is made easier by calculating the price elasticity of demand for delivery care at each health provider and conducting simulation exercises. Both of these methods provide an indication of how responsive demand is to changes in a single determinant or factor.

3.4.2 Process evaluation

The main rationale for evaluating implementation processes is to distinguish between a failure in the underlying theoretical mechanism and poor implementation. Separating out the two is likely to be particularly important in the case of the SDIP, given that it was implemented at scale with no prior piloting.

Assessment of the SDIP's implementation is guided by the theoretical framework of how the programme is expected to influence health seeking at childbirth. The approach is quantitative, measuring the SDIP's progress at each step along the programmatic pathway using a set of appropriate indicators. The analysis focuses on the level of uptake by the target population at each step, as well its socioeconomic and geographical distribution. Bivariate and multiple regression analysis techniques are used to analyse in more depth the determinants of variation in uptake.

This approach can identify if there are major bottlenecks in the implementation process, but ultimately provides only a limited understanding of what causes these constraints. There are likely to be numerous factors that are less amenable to quantitative measurement. For this reason, the findings from a qualitative study conducted during the first phase of the evaluation provide are drawn on (see section 3.4.5). The results of this component of the evaluation are not reported in this thesis, but instead are referred to at length in the discussion of chapter 6 (Powell-Jackson, Morrison et al. 2009).

3.4.3 Identification of impacts

There are two results chapters concerned with the impact of the SDIP. The conceptual framework directly informs the empirical strategy used in each analysis. In the first analysis,

women are defined as treated if they had knowledge of the SDIP's demand-side incentives prior to delivery and perceived the promise of payment as credible. The comparison group is made up of women who had never heard of the SDIP before they gave birth. Propensity score matching methods are used to estimate the impact of the programme on various outcomes of service utilisation at childbirth.

The approach attempts to correct for some of the selection bias inherent in single difference comparisons of mean outcomes by using an appropriate comparison group to assess the counterfactual. The idea is to select a comparison group of non-participants that is as similar as possible to the treatment group in its observed characteristics. In terms of the various sources of bias, propensity score matching can limit bias associated with non-overlapping support of the observables and a lack of common support. It must, however, assume away selection on unobservables.

The analysis uses primary data from the Survey of Women, designed specifically to evaluate the SDIP using this approach. The survey sought to collect rich data on factors that might influence both participation in the programme and the outcomes of interest. Further analysis tests the hypothesis that knowledge of the SDIP – in the absence of credibility – is not sufficient for the SDIP's demand-side incentive to influence health seeking behaviour. It also explores the distributional impact of the programme across geographical regions and socioeconomic groups. The latter is particularly relevant, given the desire of policymakers "that more benefits [will] reach to [the] poor, disadvantaged and marginalised women" (Government of Nepal 2006).

The second empirical analysis of impacts focuses on one district of Nepal, Makwanpur. The analysis makes use of data from a Community Surveillance System of births, which contains seven-years of data on individual level health seeking behaviour at childbirth. Identification of a structural change in the relationship between time and the outcome at the time implementation of the SDIP began is interpreted as the causal effect of the programme. It is identified as either a shift in the level or change in direction of the outcome in a longitudinal analysis that controls for time, characteristics of the individual or household and village-level fixed-effects. The impact of the SDIP is assessed on a set of utilisation outcomes and neonatal mortality. While the latter is of interest in itself, it is not a proxy for maternal mortality.

Confounding factors potentially pose a serious threat to the internal validity of the analysis. For this reason, a number of methods are used to improve the plausibility of the results. The first approach estimates the causal effect of the SDIP on an outcome known to be unaffected by it, but closely related to the other outcomes under investigation. A second method uses data on contextual factors to assess in a descriptive manner the threat of possible confounders across a number of relevant dimensions. The data were collected through interviews with key informants in the district and document review.

3.4.4 Data sources

The analysis in the first research objective uses secondary data from a Community Surveillance System in Makwanpur district, complemented by additional primary data on a subsample of women, collected in the Cost of Delivery Survey (Table 3.2). Analysis in the second objective relies on primary data from a cross-section Survey of Women who recently delivered in six districts of Nepal. Finally, the third objective uses data from both the Community Surveillance System and the Survey of Women.

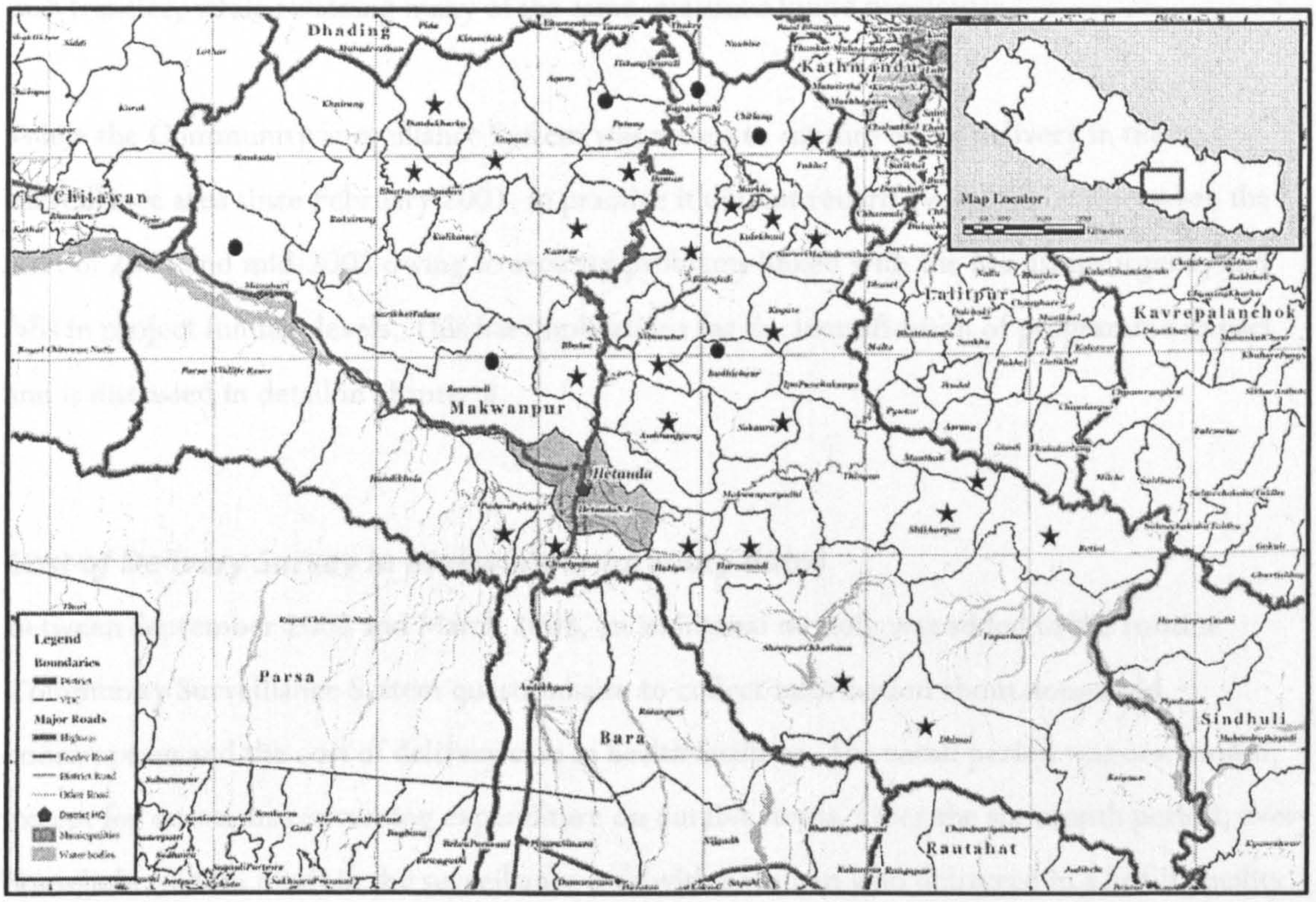
Community Surveillance System in Makwanpur (secondary data)

The description of the Community Surveillance System in Makwanpur draws on a published paper (Manandhar, Osrin et al. 2004), as well as extensive discussions with the field staff based in the district. The surveillance system has been running in rural areas of Makwanpur district since 2001, set up for the purposes of collecting data for a randomised control trial to assess the effectiveness of a participatory intervention with women's groups (Manandhar, Osrin et al. 2004). It is managed by Mother and Infant Research Activities (MIRA), an organisation based in Kathmandu but with a field office in Makwanpur.

Between April 2001 and August 2005, the Community Surveillance System covered 24 village development committees (VDC), the administrative unit below a district. These VDCs were randomly selected for inclusion in the study from a total of 42 VDCs (see Figure 3.2). The women's group intervention was allocated randomly to 12 of the VDCs and buffer zones were used to limit spillover of the intervention into control VDCs. Each household in the surveillance area was allocated a unique identification number and every female aged between 15 and 49 years

providing verbal consent was identified through a household member listing exercise and also given a unique identification number.

Figure 3.2 Map of Makwanpur district and coverage of the Community Surveillance System



Note: The map is sourced from the United Nations Development Programme, Nepal. The original 24 study VDCs are denoted by ★. The 6 new study VDCs are denoted by ●.

Surveillance was done by 255 enumerators, 25 field interviewers and 9 field coordinators. Pregnancies were identified by female ward enumerators who visited all participants in their area every month. If consenting, each pregnant woman was interviewed twice: at seven months of gestation and one month after delivery. The questionnaires obtained information on the woman's health seeking behaviour during pregnancy and at childbirth, perceived health status, home care practices, the survival status of the newborn, and her socioeconomic and demographic characteristics (see Appendix A2). Verbal autopsies were conducted in the case of an unfortunate outcome (maternal death, stillbirth or neonatal death) with the relevant family member.

In September 2005, the Community Surveillance System was adapted. It was enlarged to cover an additional six VDCs, selected randomly from those not previously under surveillance (see Figure

3.2). The women's group intervention was slowly expanded into the 12 VDCs previously not covered, and the six new VDCs acted as control areas. The two interviews were consolidated into a single interview, given at one month postpartum. The questionnaire was revised to collect more information on socioeconomic status, health care seeking and receipt of the SDIP's conditional cash transfer, while retaining many of the same questions found previously.[25]

While the Community Surveillance System was meant to capture every delivery in the surveillance area since February 2001, in practice it did not record every delivery between the start of 2004 and mid-2005 owing to security problems linked with the Maoist insurgency and falls in project funding levels. This has implications for the identification of programme impact and is discussed in detail in chapter 8.

Cost of Delivery Survey in Makwanpur (primary data)

Between September 2007 and March 2008, an additional module was added to the routine Community Surveillance System questionnaire to collect information about household consumption and the cost of delivery care in health facilities. The recall period was one month, except for questions concerning expenditure on durable items. Over the six-month period, every household (300 in total) in the surveillance area with a woman who delivered in a health facility was interviewed.

The additional module captured general household expenditure, following closely the Nepal Living Standards Measurement Survey (Government of Nepal 2004), as well as household expenditures on delivery care and outstanding debt (see Appendix A3). The approach to measuring household living standards was comprehensive, capturing information on not only household expenditures, but also the value of home production and those goods or services received in kind. This allows computation of household consumption, a proxy for permanent income (Deaton and Grosh 2000). The cost of delivery covered facility-based charges (registration; delivery fee; operating theatre; bed charge; drugs; medical supplies; diagnostic tests; food, gifts to health staff, and spending on traditional practitioner if sought during labour),

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[25] The number of deliveries recorded between April 2001 and August 2005 was 8,595 and complete data were available for 8,199 deliveries. Between September 2005 and July 2007, the Community Surveillance System recorded 8,728 deliveries (6,602 deliveries in the original 24 VDCs), giving complete data on 8,726 deliveries (6,600 deliveries in the original 24 VDCs).

additional charges (lodging and food of accompanying family; and drugs, medical supplies, and food bought outside) and transport charges.

The questions relating to the cost of delivery were based heavily on those used in a previous survey in Nepal (Borghi, Ensor et al. 2006). It was pre-tested in the study area in Nepali by the lead researcher in MIRA's Makwanpur field office. The interviews were conducted by the Community Surveillance System's field coordinators, who were trained in the use of the questionnaire during a two-day workshop. Owing to the nature of the new module, the primary respondent for this part of the questionnaire was the household head (in the presence of the woman), who is typically more able than the woman to respond to questions regarding household expenditures.

Survey of Women (primary data)

The purpose of the survey was to provide estimates of health care seeking at childbirth and SDIP-related indicators for six districts (out of 75 districts) in Nepal. The survey was conducted between January and March 2008. The eligibility of interviewees was defined as follows: women who had a delivery between two months and three years prior to the survey. This was to ensure that women were interviewed at their homes rather than their maternal homes, for in Nepal it is common practice for women to go back to the home of their parents for about two months after they have delivered their baby. The recall period thus covered a five-month period prior to the official launch of the SDIP and a thirty-month period of the programme.

Six districts were selected using stratified sampling. The seventy-five districts of Nepal were stratified by region in order to select districts with differences in the package of financial incentives offered by the SDIP. Two districts were randomly selected within each stratum (tarai, hill and mountain). The districts selected were: Morang, Rupandehi, Myagdi, Achham, Jumla and Sankhuwasabha.

Sample design

The survey used the sampling frame provided by the Population Census (Government of Nepal 2001). In Nepal, each district is divided into VDCs and further subdivided into wards. The primary sampling unit (PSU) was the ward or a group of wards (in urban areas). The sample for the survey was based on a two-stage sample of households. In the first stage of sampling, 180

PSUs (30 in each district) were selected using systematic sampling with probability proportional to size. In the second stage of sampling, the number of households to be visited was determined by the expected number of eligible women in the PSU. The expected number of eligible women was calculated on the basis of regional estimates of the annual fertility rate found in the most recent Demographic and Health Survey (2007), using the formula:

$$\text{Expected Eligible Women} = (\text{Fertility Rate} / 1000) \times \text{Population} \times 3 \text{ Years}$$

In some PSUs, the expected number of eligible women was 35 or less. In these cases, every household was visited and the household head was asked if an eligible woman lived in the house. If the expected number of eligible women was less than 25, the ward was combined with the previous ward in the listing to form one PSU so as to ensure that 25 women or more were interviewed. In some PSUs, the expected number of eligible women was more than 35. In this case, not every household was visited but instead every n^{th} household was visited to ensure that the expected number of interviews was 30. The first step in this procedure was to conduct a household listing by drawing up a detailed social map of the ward. Then the enumerator started at the first household in the listing, defined as the house of the female community health volunteer in rural areas and the lowest household number in urban areas (these houses already have numbers). The first household was not visited and the enumerator visited every n^{th} household thereafter, following the order of the listing already conducted. This strategy ensured that the entire geographical area of the ward was represented. If the households selected were all visited and less than 25 interviews were completed, the enumerator started again at the beginning of the household listing and visited the first household in the listing plus 1, and every n^{th} household thereafter until 30 interviews were completed.

A maximum number of 35 interviews were conducted in each PSU. The survey was designed to obtain 900 completed interviews of women who had a delivery in the three years prior to the survey in each district (a total of 5,400 interviews). Although there was little information to guide the sample size calculation, it was deemed sufficient to identify variation in knowledge of the SDIP between districts and to assess the impact of the demand-side incentives using the entire

sample.[26] The oversampling in some districts relative to others requires the sample to be weighted.

Questionnaire and consent

The questionnaire was developed in English and translated into Nepali prior to pre-testing. It was designed specifically for the purposes of the study. The questionnaire is shown in Appendix A4. It contained the following sections:

- Household characteristics: socioeconomic information about the woman and her husband
- Household assets: ownership of assets by the household, income and proximity to health institutions
- Knowledge of the SDIP: knowledge and source of information about the SDIP
- Pregnancy history and experience of the SDIP: pregnancy history for all deliveries in the past three years, health seeking behaviour, knowledge of the SDIP during pregnancy, receipt of cash incentive and free delivery care, and stated preference regarding health care seeking behaviour.

The purpose of the study and its voluntary nature were described to the interviewee. Each interviewee was given the opportunity to ask questions about the survey and then requested to give consent by signing a separate form. If the interviewee was not willing to be interviewed, the enumerator moved on to the next household.

Preparation and fieldwork

The survey team was made up of: one international consultant (myself), two national consultants, 12 district supervisors (two per district) and 48 enumerators (eight per district). In addition, local non-governmental organisations in each of the study districts were contracted to provide some supervisory and administrative support. All the enumerators were recruited from the district they were to work in and 90 percent of them were female.

Enumerators and district supervisors were trained in two batches for five days each by the consultants, with an additional two days for the district supervisors. A training manual was

[26] For instance, 900 deliveries per district is sufficient to test whether knowledge of the SDIP is different between two districts with coverage of 20 percent and 28 percent at the 5 percent level of significance with 90 percent power (one-sided test and a design effect of two).

developed specifically for this purpose (obtainable on request). They were given training on the safe motherhood programme, how to conduct an interview, fieldwork procedures, general procedures for completing the questionnaire, and the content of the questionnaire itself.

The questionnaire was pre-tested in Nepali by the national consultant with the international consultant to ensure that the questions were clearly understood, the length of the questionnaire was appropriate and there were no errors in the skip patterns or wording of the questions. In addition, two days of the training programme were devoted to practice in the use of the questionnaire by the enumerators in households under the supervision of the district supervisors. This offered a final opportunity to make minor adjustments.

Data entry and response rate

Data entry was conducted in Kathmandu by 10 trained data entry clerks. Data entry was done using CSPro (US Census Bureau 2009), a specialised software that was programmed to ensure skip patterns are respected and implausible data entry errors rejected. Reliability checks were carried out by the international consultant based on a detailed review of summary statistics and the use of box graphs, with potential errors verified with the original paper copy of the questionnaire and, if necessary, corrected.

Table 3.3 Response rate of interviews with women

Result	Total
Households selected	15,141
Households with eligible woman	6,125
Total eligible women	6,234
Interview completed	5,513
Response rate (%)	88.4

Note: Total eligible women include women that were outside of the village for a prolonged period of time (ie. over one week) and therefore could not be interviewed.

Of the 15,141 households selected in the survey, 6,125 had eligible women living there (Table 3.3). This figure includes households where an eligible woman was known to live there (in some cases through information given by neighbours) but was not at the household any time during the three visits made by the enumerators. These households had 6,234 eligible women and 5,513 of

these were interviewed successfully, resulting in a response rate of 88.4 percent.[27] In the analysis, 10 of these interviews were excluded because the women were found not to meet the eligibility criteria.

3.4.5 Linkages with the SDIP evaluation

There is considerable overlap between this thesis and the evaluation of the SDIP, making it important to outline my role in the research. The evaluation was conducted over the period 2006-2008 and was carried out in close coordination with the Support Safe Motherhood Programme (SSMP) in Kathmandu, which provides technical support to the Government of Nepal's Ministry of Health. The contract to carry out the evaluation was given to the Institute of Child Health at University College London. I was the lead investigator with Professor Anthony Costello as my line manager.

As Table 3.4 shows, the evaluation was conducted over two phases of work. The first phase of work included a number of components and culminated in an interim report focused exclusively on the implementation process (Powell-Jackson, Neupane et al. 2007). A Survey of Health Providers was carried out in ten districts, which included the six districts sampled in the Survey of Women. It collected information on structural and process measures of quality in the provision of maternal health services at different types of health facility. The provider survey also included a module on revenue and expenditure in relation to the SDIP. This information was supplemented by financial data obtained from government offices at the district level and the central level to study the flow of funds for the programme. In the same districts, a qualitative study explored implementation practices and the experiences of a range of stakeholders involved in the process. Due to space limitations and the substantial contribution of other researchers in the analysis, the qualitative investigations are not included as a results chapter in this thesis and instead extensive references are made to it (Powell-Jackson, Morrison et al. 2009).

The second phase included the Survey of Women and the Cost of Delivery Survey. It also included a second qualitative study, which explored the role of the SDIP and other factors in the

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[27] This definition of response rate differs from that used by the Nepal Demographic and Health Survey in that the denominator includes not only eligible women currently present in the household but also women who, although identified by other household members as eligible, are for some reason or another away from the house for a prolonged period of time and hence unavailable for interview.

household decision of where to seek care at childbirth. A final report of the evaluation presented the results from both phases of work (Powell-Jackson, Neupane et al. 2008).

Table 3.4 Linkages between the components of the SDIP evaluation and this thesis

Evaluation component	Relationship with thesis
Phase I of the SDIP Evaluation	
Provision of maternal health services (quality of care) ▪ Survey of health facilities in 10 districts	References made to Powell-Jackson, et al. (2008)
Financial tracking of SDIP funds ▪ Survey of health facilities in 10 districts ▪ Record review at district health office, district treasury, central government, and donor	References made to Powell-Jackson et al. (2008)
Experiences of implementation (including fidelity) ▪ Key informant interviews of district officials and health workers in 10 districts ▪ Focus group discussion at district level in 10 districts	References made to Powell-Jackson et al. (2009)
Phase II of the SDIP Evaluation	
Impact of SDIP and process indicators ▪ Household survey of women who gave birth in 6 districts	Chapter 6 and chapter 7
Household cost of health seeking ▪ Household survey of women who gave birth in Makwanpur district	Chapter 5
Household decision making in seeking care and the role of the SDIP ▪ In-depth interviews of women who recently delivered ▪ Focus group discussion at community level	References made to Powell-Jackson et al. (2008)

I was responsible for all aspects of the evaluation and supported in my work by two Nepalese consultants, Professor Suresh Tiwari and Basu Dev Neupane. Specifically, I designed the data collection tools and developed the sampling strategy for each survey. Together with the national consultants, I trained 10 enumerators in the first phase of the evaluation, and a further 48 enumerators and 12 data collection supervisors in the second phase of work. During data collection, we travelled to each study district to supervise the process. I trained the data entry clerks and oversaw the process of data entry in Kathmandu. I conducted the analysis of the quantitative data but the analysis in the qualitative investigation also involved the two national consultants and the researchers who had collected the data.

3.5 Funding and ethics approval

Funding for the thesis was provided through a Joint Research Studentship from the Economic and Social Research Council and the Medical Research Council. The studentship required that the research be interdisciplinary, covering both the social science and medical disciplines. All fieldwork costs were funded by the Support to Safe Motherhood Programme in Nepal, which is managed by Options UK and supported through a five-year grant from the Department for International Development. The funder had no role in the study design, data collection, data analysis, data interpretation, or writing of the thesis.

The research for this thesis was given ethics approval by the London School of Hygiene and Tropical Medicine. Permission to use secondary data from the Community Surveillance System was obtained from Professor Anthony Costello and Professor Dharma Manandhar, the two principal investigators of the women's group study in Makwanpur.

Chapter 4. STUDY SETTING

4.1 Country setting

4.1.1 Political context

Nepal is a landlocked country in South Asia. It borders China to the north and India to the south, lying between the rugged Himalayas and the tarai or flat river plain of the Ganges (Figure 4.1). Half of the country's population of over 28 million people live in the tarai plains, while 44 percent of the population inhabit the hills (Government of Nepal 2001). Further to the north in the remote mountain region live just 7 percent of the population. The people remain largely rural, with 17 percent living in urban areas.

Figure 4.1 Map of Nepal

Source: Central Intelligence Agency World Factbook

For administrative purposes, Nepal is made up of 75 districts, which are further divided into village development committees (VDC) and municipalities. Each VDC comprises nine wards, which are equivalent to villages in rural areas. In municipalities the number of wards can reach as many as 35. Kathmandu is the capital city and economic centre of the country.

Nepal is a country of huge diversity, not only geographically but also ethnically. Although the majority of the population are Hindu and thus part of the caste system, all Nepalis are socially defined by their caste (Bennett, Dahal et al. 2008). The most recent census (2001) identified more than 100 caste and ethnic groups, speaking more than 70 languages or dialects. Caste has an enormous bearing on an individual's identity, social status and life prospects. A number of recent studies reveal the extent of disparities across different caste groups for a range of socioeconomic indicators (World Bank and DFID 2006; Bennett, Dahal et al. 2008).

With the exception of a brief experimentation with multi-party democracy in 1959, Nepal has been ruled by an absolute monarchy for most of its history (Pradhan 2002). It was not until 1990, following demonstrations fuelled by an Indian economic blockade, that the non-party *panchayat* system[28] collapsed and multi-party democracy was established within the framework of a constitutional monarchy. However, political instability quickly ensued. A violent insurgency led by the Maoists erupted in 1996, as they tapped into growing resentment over caste discrimination and the social privilege accorded to high-caste groups. It resulted in a decade-long civil war that has cost the lives of 16,278 people (BBC 2009).

In 2001, the crown prince massacred ten members of the royal family, including the King and himself, leading to a new monarch. Five years of hugely unpopular and repressive rule by King Gyanendra ended in April 2006, when mass protests across the country forced the King to reinstate parliament and start peace negotiations with the Maoists. These talks culminated in the signing of a peace accord leading to elections in 2008 that were won, to the surprise of the traditional political parties, by the Maoists.

The first act of the newly formed Constituent Assembly was to abolish the monarchy and declare the country a federal democratic republic. For almost a year the Maoists led a coalition government, but this collapsed in May 2009. Despite the quick formation of a new administration, the entire peace process is now under threat (International Crisis Group 2009). The last few years have been characterised by weakening public security, frequent petrol shortages and long power cuts.

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[28] The panchayat system was a hierarchical structure of government with which the King exercised absolute power through the national, district, and village panchayats.

The country performs poorly in terms of governance, in part reflecting the political upheaval it has gone through in recent years. It is ranked in the bottom 3 percent of countries for political stability and the bottom 30 percent of countries for voice and accountability, government effectiveness, rule of law, and control of corruption (Kaufman, Kraay et al. 2009).

4.1.2 Economic development

Nepal is one of the least developed countries in the world. Gross national income (GNI) was most recently estimated at US$ 400 per capita and the country is ranked 142nd out of 177 countries on the basis of the human development index (Table 4.1) (United Nations Development Programme 2004; World Bank 2009). Economic development has lagged behind that of other South Asian economies in the region. If per capita gross domestic product (GDP) continues to grow at the rate of 1.2 percent per annum (the growth rate over the period 2000-2007), it will take Nepal 61 years to double GDP or 52 years to reach the level of Bangladesh in 2007 (Asian Development Bank 2009). The country is highly aid dependent, with 34 percent of government expenditure funded externally in 2005 (World Bank 2009).

Table 4.1 Key indicators on Nepal

Indicator	Year (source)	Estimate
Demographic		
Population	2008 (Census 2001)	28.6 million
Population growth rate	2001 (Census 2001)	2.25%
Urban population	2008 (WDI)	17%
Economic		
GNI per capita	2008 (WDI)	400 US$
GNI per capita (PPP)	2008 (WDI)	1120 US$
Poverty incidence	2004 (NLSMS)	31%
Poverty gap	2004 (NLSMS)	7.5%
Gini coefficient	2004 (NLSMS)	0.45
Education		
Women with no education	2006 (NDHS)	49%
Men with no education	2006 (NDHS)	23%
Literacy rates of 15-24 year olds	2006 (NDHS)	79%

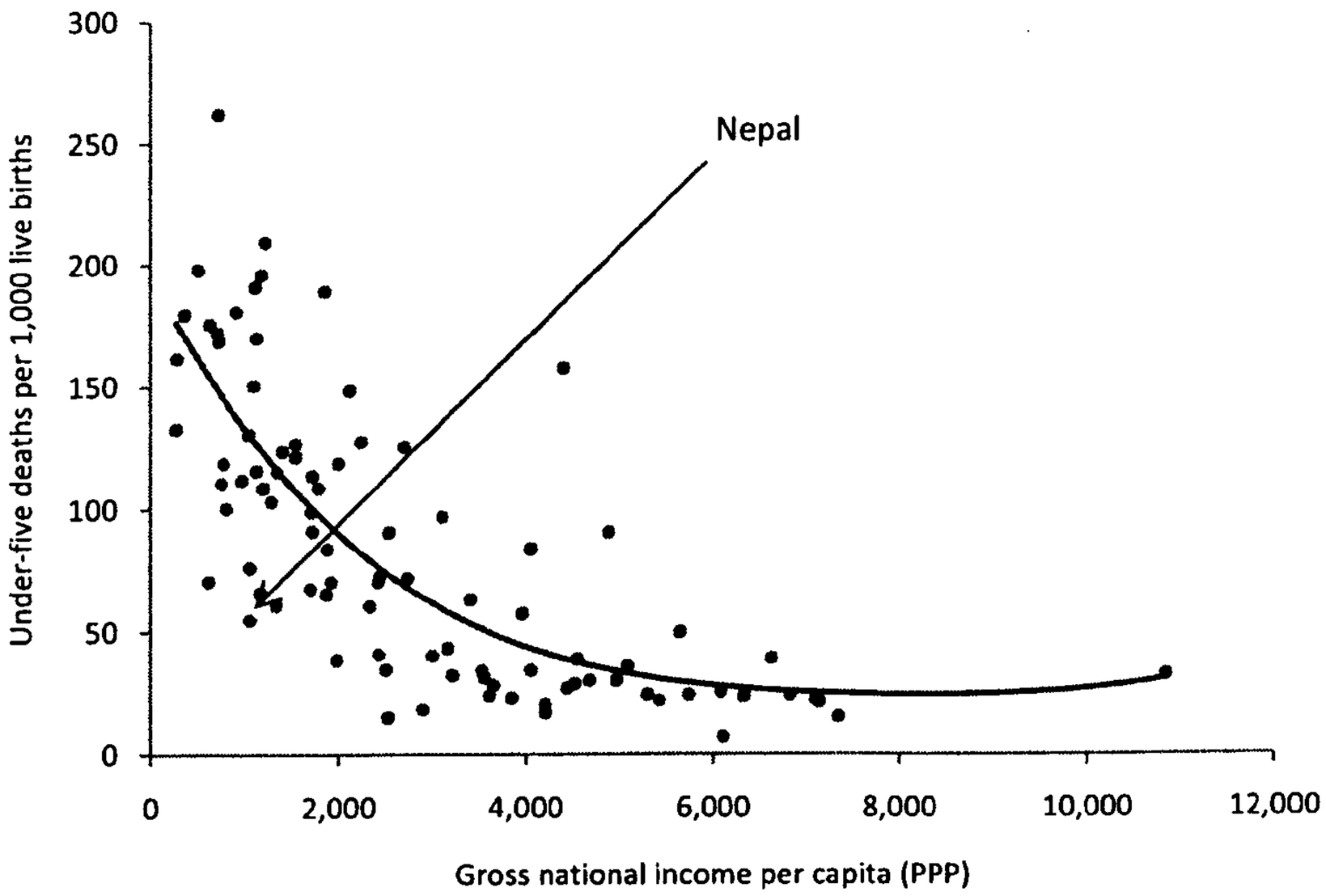
Notes: WDI = World Development Indicators of the World Bank. NLSMS = Nepal Living Standards Measurement Survey. NDHS = Nepal Demographic and Health Survey. Poverty incidence and the poverty gap are measured on the basis of the nationally defined poverty line.

Despite a weak economy, the incidence of poverty has fallen considerably from 42 percent of the population in 1996 to 31 percent in 2004 (Government of Nepal 2006). The fall in poverty has been attributed, in part, to growth in remittances from workers abroad, which quadrupled over

the same period to reach 12 percent of the economy in 2004. At the same time, the level of income inequality rose to what is now the highest in the South Asia. The services sector is the largest sector in the economy, accounting for 50 percent of total output, followed by agriculture (33 percent) and industry (16 percent) (Asian Development Bank 2009).

Indicators of educational attainment are improving. The literacy rate among young adults is now almost 80 percent. There remain, however, large disparities between men and women. Almost half of all women have no education. Under-five mortality in Nepal is considerably lower than other countries at a similar level of economic development (Figure 4.2). The country's achievements in health are studied in more depth in the next section.

Figure 4.2 Under-five mortality and GNI per capita in low and lower-middle income countries



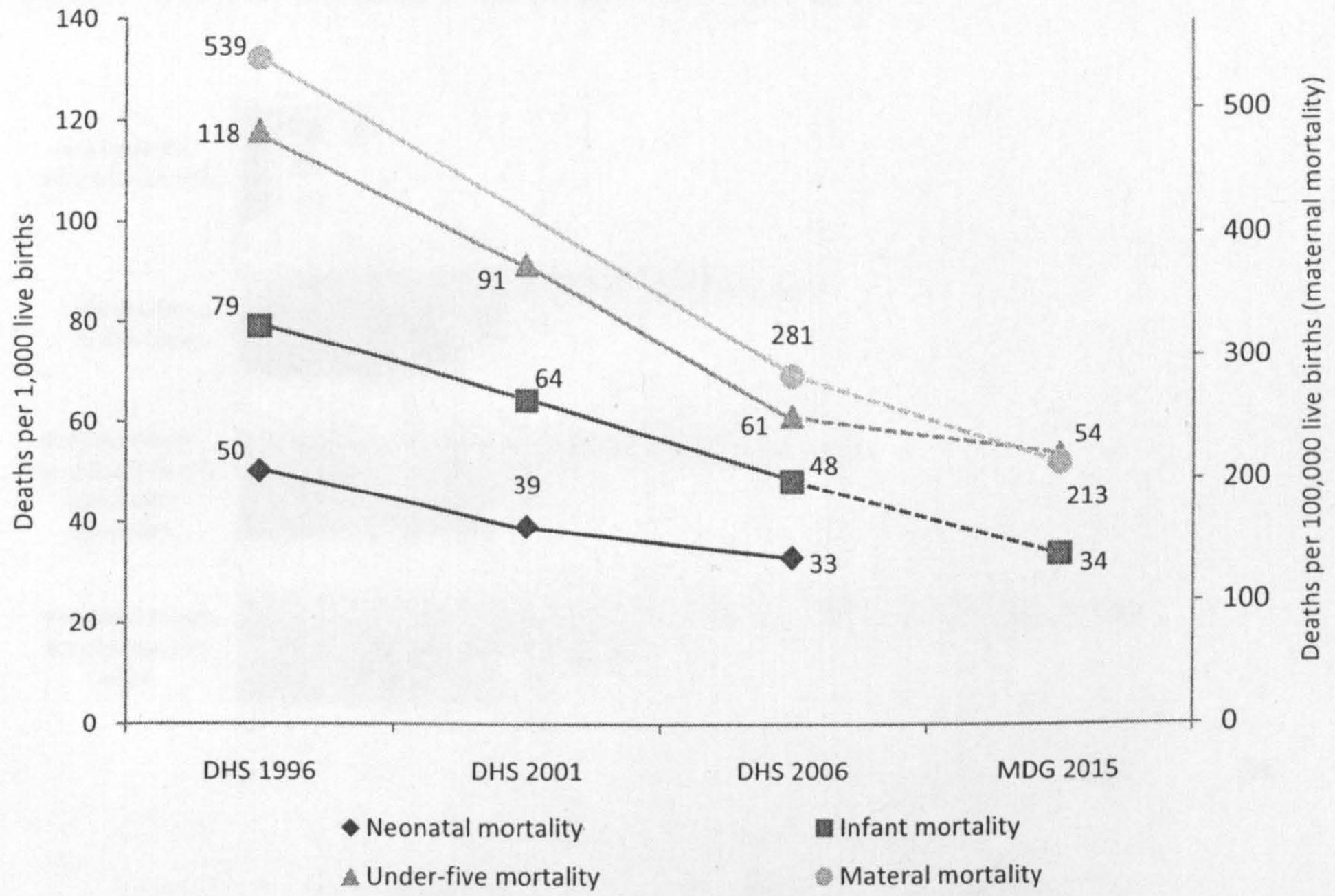
Source: World Development Indicators 2007

4.1.3 Health

Nepal has made remarkable progress in improving key health outcomes over the past decade. There have been substantial reductions in neonatal, infant and under-five mortality (Figure 4.3). It has also seen an equally impressive reduction in maternal mortality. Nepal is one of the few countries likely to meet both the fourth and fifth Millennium Development Goal in 2015. Life expectancy was most recently estimated at 60 years (Government of Nepal 2001).

The reasons behind these impressive reductions in mortality are not well understood, particularly given that they have happened during a period of widespread civil unrest. Although attribution is difficult, a descriptive study of maternal mortality in Nepal argues that the reduction is probably due to a combination of factors including the drop in fertility, improved access to maternal health services (antenatal care, delivery care and safe abortion services), and an improvement in socioeconomic conditions (reduction in poverty, improved education) (Pant, Suvedi et al. 2008).

Figure 4.3 Trends in under-five, infant, neonatal, and maternal mortality in Nepal

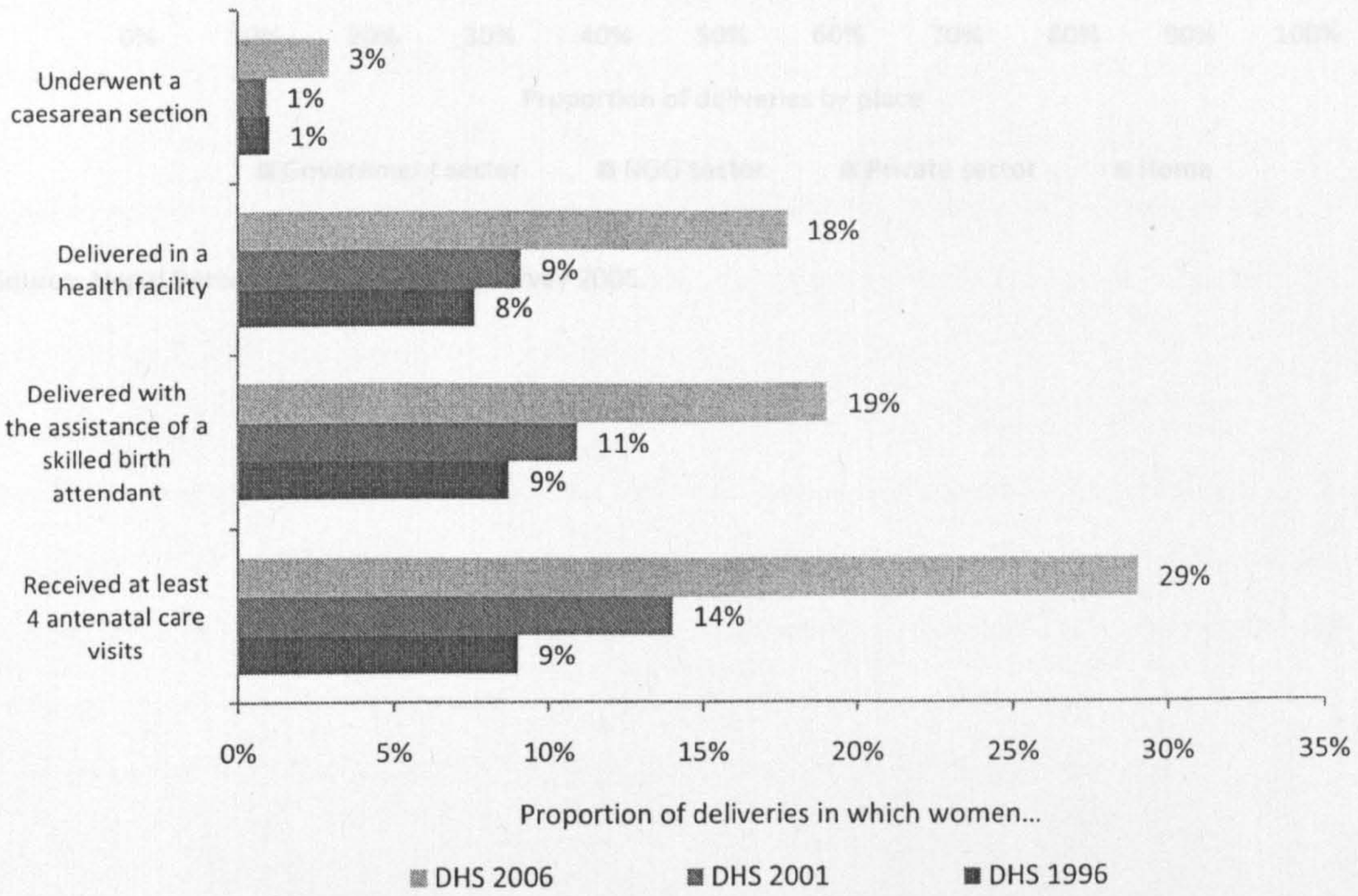


Notes: The graph is not to scale and therefore the dotted lines do not represent the required rate of reduction in mortality to reach the MDGs. Maternal mortality refers to the scale on the second y-axis and was not measured in 2001. DHS = Demographic and Health Survey. MDG = Millennium Development Goal.

Doubts have been expressed over the magnitude of the reduction in maternal mortality, given the wide confidence intervals around each point estimate and the small reduction in early neonatal mortality. The impressive reductions in under-five mortality, however, are not contested. The coverage of key child health interventions has improved over the period 1996-2006 (UNICEF 2008), which is likely to have contributed to the reduction in child mortality.

Access to maternal health services has increased over the past decade with most of the improvement occurring over the period 2001-2006 (Figure 4.4). While the trends are encouraging, there is still a long way to go to meet the Government of Nepal's target of 60 percent of deliveries attended by a skilled health worker (Government of Nepal 2005). It remains the case that over 80 percent of women do not deliver in a health facility or with a doctor, nurse or midwife in attendance. The caesarean section rate has increased, but most of the rise was in private health facilities and there is anecdotal evidence that elective surgery is becoming more common (Pant, Suvedi et al. 2008).

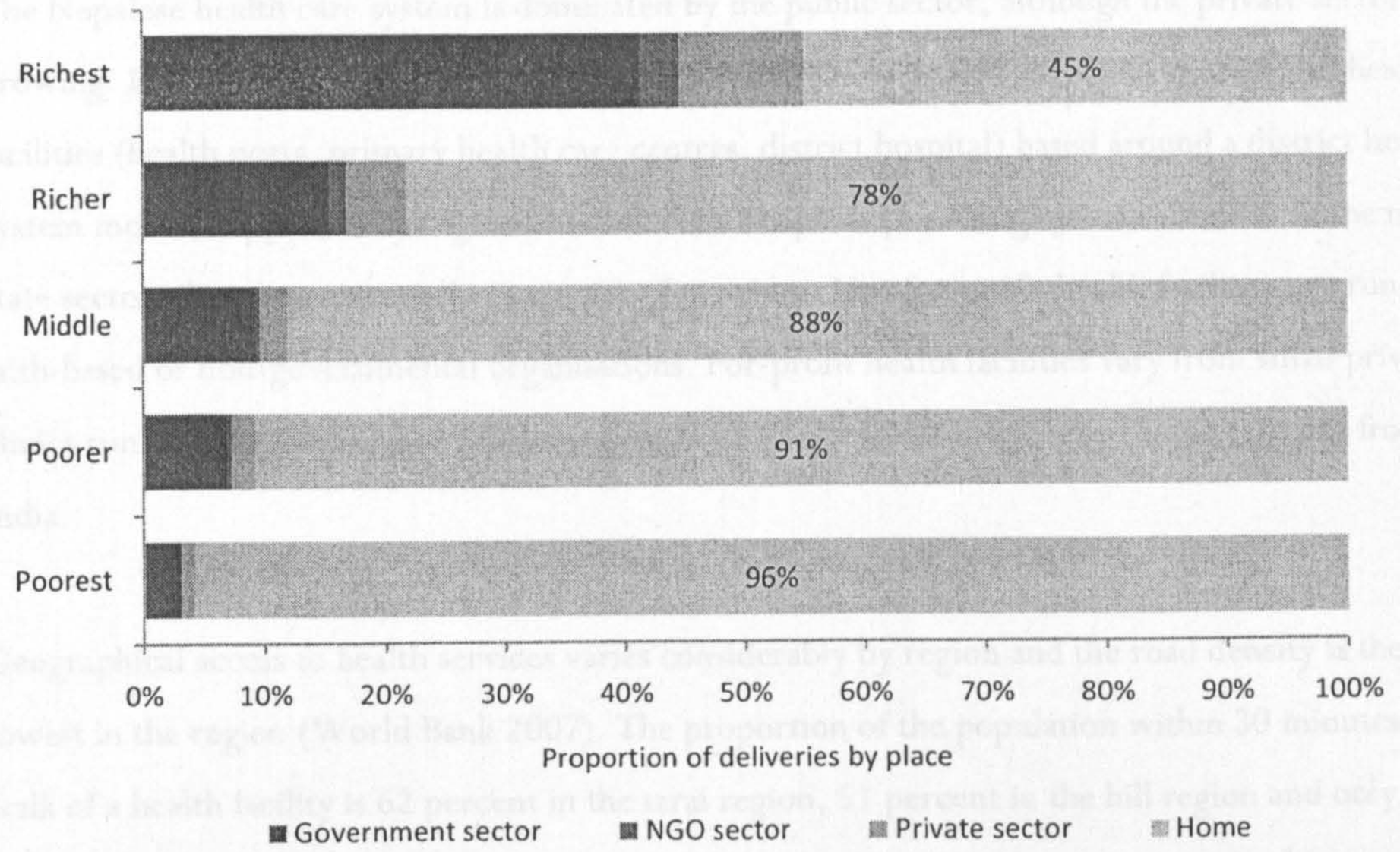
Figure 4.4 Trends in utilisation of maternal health services in Nepal



Source: Nepal Demographic and Health Surveys 1996, 2001, 2006.

There are large inequalities in access to maternity services (Figure 4.5). Over 50 percent of women in the richest quintile deliver in a health facility, while only 4 percent of women in the poorest quintile receive institutional delivery care. The poorest 60 percent of women in particular are unable to access maternity services and the disparity between the rich and poor in utilisation of institutional delivery care has widened over the past decade (Johnson and Bradley 2008). Women who do reach health facilities typically use the public sector. Abortion was legalised in Nepal in 2002 and the number of safe abortions has risen rapidly (Pant, Suvedi et al. 2008).

Figure 4.5 Place of childbirth by wealth quintile in Nepal, 2006



Source: Nepal Demographic and Health Survey 2006.

4.2 Financing and provision of maternal health services

The Nepalese health care system is dominated by the public sector, although the private sector is growing. In the public sector, maternal health services are delivered through a network of health facilities (health posts, primary health care centres, district hospital) based around a district health system model, supported by regional and national hospitals providing specialised care. In the non-state sector, there are essentially two types of provider. Not-for-profit health facilities are run by faith-based or non-governmental organisations. For-profit health facilities vary from small private clinics run by a doctor to large private medical colleges, typically supported by investment from India.

Geographical access to health services varies considerably by region and the road density is the lowest in the region (World Bank 2007). The proportion of the population within 30 minutes walk of a health facility is 62 percent in the tarai region, 51 percent in the hill region and only 37 percent in the mountain region (Government of Nepal 2004). Female community health volunteers, present in 97 percent of villages, act as a bridge between the community and government health services (New Era 2008).

Health expenditure in Nepal is low by international standards, estimated most recently at US$ 20 per capita (WHO 2009). This is equivalent to 5.2 percent of GDP. The government spends 10 percent of its total budget on health, suggesting that there is a reasonable commitment on the part of the government. External resources from donors account for 15 percent of total health expenditure, but it is unlikely all off-budget projects are included in this estimate.[29]

Until very recently, user charges were levied for public health services and exemptions for the poor have not been implemented well (Borghi, Ensor et al. 2004). Moreover, social security and risk pooling are both almost non-existent (WHO 2009). It thus comes as no surprise that out-of-pocket expenditure by households is the predominant source of financing for health, contributing over 50 percent to total health expenditure. With no financial protection, a relatively high proportion of households (6 percent) incur catastrophic health expenditures (van Doorslaer, O'Donnell et al. 2007).

[29] Another report estimates that donors fund 51 percent of the national health budget (RTI International 2007)

Health workers skilled in delivery care, working within a supportive environment that provides an adequate system for referral and emergency obstetric care, are vital to reduce maternal mortality (Campbell and Graham 2006). The density of health workers in Nepal is low, with two doctors per 10,000 population and five nurses or midwife per 10,000 population (WHO 2009).[30] UNICEF estimates that 46 percent of the population has access to basic emergency obstetric care (UNICEF 2008). A quarter of primary health care centres are able to provide basic emergency obstetric care, while half of district hospitals provide basic emergency obstetric care and a further 20 percent provide comprehensive emergency obstetric care (Pant, Suvedi et al. 2008).[31]

[30] Moreover, Department of Health figures show that there is a critical shortage of health workers, with 47 percent of doctor positions, 22 percent of staff nurse positions and 9 percent of auxiliary nurse midwife positions vacant.
[31] Basic emergency obstetric care comprises six specific procedures such as manual removal of placenta, assisted vaginal delivery and removal of retained products. Comprehensive emergency obstetric care includes, in addition to the six procedures, blood transfusion and caesarean section.

4.3 Study districts

The data used in this thesis cover two different geographical areas, as described in chapter 3. The Survey of Women was carried out in six districts of Nepal that include Morang, Rupandehi, Myagdi, Achham, Jumla and Sankhuwasabha. There is a considerable amount of variation among the districts, judging by the indicators shown in Table 4.2. This is to be expected given the stratified sampling strategy.

Table 4.2 Characteristics of the sample districts in the Survey of Women

District	Region (sub-region)	GDP per capita (US$)[a]	Infant mortality (per 1,000 births)[b]	Female literacy (%)[b]	HDI rank (out of 75)[a]
Morang	Tarai (Eastern)	297	45	50	20
Rupandehi	Tarai (Western)	249	56	55	24
Myagdi	Hills (Western)	222	56	71	11
Achham	Hills (Far-Western)	141	74	35	62
Jumla	Mountain (Mid-Western)	203	97	35	41
Sankhuwasabha	Mountain (Eastern)	231	45	67	23
Nepal	-	240	48	55	-

Note: [a] UNDP report 2004 (higher HDI rank means more developed). [b] DHS report 2006. Sub-regional estimates are given in the absence of district-level data. The stratified sampling strategy was based on region. GDP = gross domestic product. HDI = human development index

Table 4.3 compares a set of available indicators relating to education, access to media and ownership of household possessions between the study sample and the nationally representative sample used in Nepal Demographic and Health Survey (2007). These indicators are consistently defined in the two samples, although there are slight differences in the selection of individual households and the timing of the two surveys.

On the basis of these indicators, the two samples appear to be similar, particularly in terms of education and the ownership of key assets such as land. It suggests that findings from analysis of this dataset may be broadly representative of the country as a whole. Issues concerning the generalisability of the findings are discussed in more detail in chapter 9.

Table 4.3 Comparison of the study population and a nationally representative sample

Variable	Study sample	Nepal sample
Education		
Husband has no education	19%	18%
Woman has no education	46%	53%
Access to media by the woman		
Reads newspaper at least once a week	12%	10%
Listens to radio at least once a week	59%	61%
Watches TV at least once a week	46%	38%
Household possessions		
Electricity	61%	50%
Radio	66%	64%
TV	41%	30%
Mobile phone	28%	5%
Fridge	5%	4%
Bicycle	51%	39%
Motorcycle	7%	5%
Land	72%	72%
Livestock	81%	83%

Note: The study sample includes only households in which a woman has given birth in the previous three years. The sample in the Nepal Demographic and Health Survey 2006 includes only households with a woman aged 15-49. The two surveys were conducted two years apart.

The Community Surveillance System data come from Makwanpur district, which lies to the south of Kathmandu in the hill region of Nepal. The topography of Makwanpur varies greatly, as it includes both hill (pahaad) and plain (tarai) areas. The population of approximately 400,000 is mostly engaged in agriculture (Government of Nepal 2001). While there are over fifteen ethnic groups in the district, the majority are Tamang, a largely Buddhist, Tibeto-Burman group, followed by Brahmin-Chhetri. The district is ranked 31st out of a total of 75 districts in terms of the Human Development Index (United Nations Development Programme 2004). The main urban centre in Makwanpur is Hetauda, which has reasonably good transport links to Kathmandu and towns in neighbouring regions. The district hospital in the municipality of Hetauda provides antenatal, delivery and postnatal care. Under the district hospital, the district health system is made up of a network of four primary health care centres and 10 health posts.

4.4 Background to the Safe Delivery Incentive Programme

4.4.1 Policy development

How the SDIP came to be has been documented by individuals who were involved in the process (Ensor, Clapham et al. 2009). They contend that the effective dissemination of research findings supporting the notion of financial incentives and, at the same time, a convergence of political interests were influential in the development of the SDIP and the rapid adoption of the policy by the government.

A study by Borghi et al. (2006) sought to understand why so few women deliver in a health facility in Nepal. It found that the household cost of seeking care at childbirth was prohibitively high and the majority of expenditures were made outside of the health facility on transport. A normal delivery was estimated to cost US$ 71 and a caesarean section US$ 152. Although broadly expected, the results alarmed Ministry of Health officials. Concurrently, women's health was high on the agenda of the various political parties in the coalition government. Together these two factors led to the convening of a technical working group by the Minister of Health to explore policy options for improving maternal health, out of which emerged a consensus to provide cash assistance to women to encourage them to deliver in a health facility.

A number of proximate factors were found to influence the policy adoption. First, the results were communicated effectively to policymakers by project staff close to the government. Second, a bilateral donor – under pressure from the Government of Nepal – was willing to fund the SDIP. Third, there was a political champion in the form of the Prime Minister's wife. Fourth, there was a convergence of political interests among a fragile coalition looking to secure votes and gain approval from both domestic and international constituencies. Political expediency probably explains why a pilot programme was ruled out despite concerns raised by the donor. The policy development process advanced rapidly and the Government of Nepal launched the SDIP nationwide in 2005.

4.4.2 Critical appraisal of programme design

The SDIP marks a departure from past government policy that tended to focus on service provision only. While it is not intended to act as a social safety net – it is more orientated towards behavioural change – it still shares many of the same characteristics as conditional cash transfer

programmes. The intention of the programme was never to cover the full cost of health care. Available data suggest that this is indeed the case. The demand-side incentives represent 14 percent of the total household cost of delivery care in tarai districts, 16 percent in hill districts, and 47 percent in the mountain districts.[32] Clearly, the financial package of benefits is considerably greater in the mountain region than the other two regions. Even with the incentives, there remain substantial costs to households of seeking care at childbirth.

Policy documents claim that the SDIP is focused on helping the poor.[33] However, given that the government chose to provide a universal financial benefit, driven by the desire to gain political popularity, there is clearly no targeting of the poor (Ensor, Clapham et al. 2009). Notwithstanding the condition regarding parity, the demand-side incentives are available to everyone. Thus, on a priori grounds, a large proportion of the demand-side incentives can be expected to be captured by relatively better-off families who already use public maternity services.

It is not clear from the description of the policy formulation process how the health provider incentive came to be included in the SDIP. There was certainly no empirical evidence in Nepal to support its inclusion. Despite being well-intentioned to cater for women delivering at home, the provider incentive is not consistent with the policy objective of encouraging more women to deliver with professional care. The effect of the supply-side incentives may be ambiguous, possibly encouraging more home deliveries.[34] Moreover, the incentive may encourage unskilled attendants at delivery because it is available to numerous cadres of health worker who have no formal training in delivery care. In this sense, the policy reflects the compromise required to make the programme workable in a country where human resources in health are scarce.

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[32] As a proportion of the transport cost, the conditional cash transfer represents 43 percent in tarai districts, 28 percent in hill districts, and 48 percent in mountain districts. Percentages are calculated using household cost data from Borghi et al. (2004) and Borghi et al. (2006). The household costs include those incurred in the health facility, transport costs and other costs related to health seeking borne outside of the facility.

[33] An information pamphlet, for example, explains that "more benefits reach to [the] poor, disadvantaged and marginalised women" and "the [SDIP] contributes to mitigate the barrier in seeking care, provides relief to the poor families..." (Government of Nepal 2006).

[34] The extent to which health workers can attend both deliveries at home and deliveries at the health facility depends on whether there is slack in the labour supply. If there is indeed a trade-off, how the incentive influences behaviour of the health worker will then depend, in part, on the income that would be forgone (both the provider incentive and the user fee from the patient) by not being present to attend a delivery in the health facility. A related concern is that health workers attending a home delivery, worried that they could forgo the provider incentive, might be reluctant to refer women to a health facility when required.

The final point concerns the use of cash rather than a voucher system, which means money has to be transferred from the district health office to the health facility and, once there, securely kept. In many health centres with no accountant or bank account, this implies the handling of large sums of cash by hundreds, if not thousands, of health workers. The fiduciary risk of such a system is surely high, without even considering issues of corruption and public security in the country.

4.4.3 Fidelity in implementation

Information on the extent to which the SDIP was implemented as planned is shown in Table 4.4 and Table 4.5. Fidelity in implementation is assessed by aggregating specific examples of practices into broader categories that can be mapped against the stated policy. Data come from the qualitative study in the first phase of the evaluation of the SDIP (Powell-Jackson, Morrison et al. 2009).

Table 4.4 Fidelity in the implementation of the demand-side incentives

Policy	Practice
1. Conditional cash transfer to women	
Women who deliver in a public health facility – hospital, primary health centre or health post – are entitled to a cash payment if they have no more than two living children or an obstetric complication. The cash is given at the time of discharge. If referred, the woman is to receive the cash from the referring facility.	▪ Cash given to women delivering at home ▪ Cash given to women delivering in sub-health posts ▪ Cash given to all women, and not limited to those with no more than two living children or an obstetric complication ▪ Reduced amount of cash given to women, because the health institution did not have sufficient funds and equally divided the money among the eligible women ▪ Cash amount deducted from the patient's bill in the absence of any cash to hand over to the woman ▪ Cash given on a first come first served basis or selectively due to insufficient funds ▪ Cash not given at time of discharge but at a later time ▪ Cash given to the relatives of women on proof of identity ▪ Cash given to women with abortion complications (not in the policy) ▪ Cash given to women by the referral hospital, rather than the referring facility ▪ No cash given
2. Free delivery care to women	
Women eligible for the cash incentive and resident in a low human development district are also entitled to free delivery care. The health institution is reimbursed 1,000 NRS for each case of free delivery care given	▪ Free delivery provided to all women, and not limited to those with no more than two living children or an obstetric complication ▪ Health facility not reimbursed for the free delivery

There were numerous practices in the implementation of the conditional cash transfer to the women (Table 4.4). There were variations in the interpretation of the eligibility criteria and the administration of the cash. The former included cases where health facilities simply ignored the eligibility criteria altogether, making the cash available to all women delivering in a public health facility. More serious deviations from policy were apparent when an entire district, for example, gave cash to women delivering at home.

Administration of the cash varied in terms of: the amount of cash given; to whom the cash was given; and the time at which the cash was given. The practice of giving cash to husbands was a particular concern to some respondents who were worried that the money might be misspent. Most commonly, women were given no money at all or given it at a later date after being discharged from the health facility. The free delivery care element of the policy was usually implemented as intended. Sometimes, respondents reported that the health facility had not been reimbursed by the government for the deliveries provided free of charge.

There has been substantial involvement of the central level in the implementation of the programme; the Ministry of Health is in charge of overall management of the programme and provides funds in instalments to each district and regional hospital. Implementation has been governed by a set of guidelines, developed at the central level then issued to districts, to explain the management of funds and the monitoring of activities, as well as the eligibility criteria for beneficiaries. There were variations in the management of funds at the district level, in the eligibility criteria applied to the conditional cash transfer, the payment mechanisms used, the promotion of the programme and the means of monitoring (Table 4.5).

Table 4.5 Fidelity in the implementation of operational procedures at the district level

Policy	Practice
1. Management of funds from D(P)HO to health facility level	
D(P)HO provides an advance to the health management committee of health facilities under their jurisdiction based on estimated utilisation of obstetric services. The health management committee provides incentives in accordance with regulations and sends an expenditure report to the D(P)HO, who clears the advance and, if required, provides a reimbursement. D(P)HO then sanctions the next advance amount	▪ Funds provided: as an advance and cleared on submission of expenditure report as per policy; and retrospectively on submission of claim forms – ie. not as an advance ▪ Funds provided: as cash to individual health workers or the in-charge of the health facility; as a cheque and put into the bank account of the health facility; and as cash to the account section in large hospitals ▪ Accountant refused to provide funds because of suspicions of misappropriation of moneys
2. Payment mechanism of cash to women	
The eligible woman fills out an application form to the health facility to claim for the incentive. The incentive is provided once the admission and discharge card are shown. A receipt is given along with the money.	▪ No receipt or proof of payment given to the women or retained by health institution (and the D(P)HO) ▪ Women sign maternity register on receipt of money as proof of payment ▪ No admission or discharge card required ▪ Additional conditions applied before claim and payment is authorised – eg. proof of eligibility from FCHV and VDC secretary or citizen certificate
3. Means of dissemination of information about the SDIP	
Local authorities and NGOs should support efforts to raise public awareness of both the incentives and safe delivery services	▪ Forums such as meetings of women's groups and health facility management committee ▪ Word of mouth: FCHVs going door to; health workers informing women; NGOs promoting SDIP ▪ Use of FM radio ▪ Health facilities organising special events
4. Means of monitoring and supervision of the SDIP	
Monitoring and supervision at the regional level is done by the regional Directorate of Health Services. At district level, monitoring and supervision will be carried out by the D(P)HO. The D(P)HO should send quarterly progress reports to the Department of Health Services in accordance with the specified monitoring format. Support will be sought from donors and NGOs	▪ Monitoring and supervision as per the policy ▪ Ad hoc monitoring in HMIS review meetings; monthly meeting of district health officials; monthly meeting of health staff in facilities to verify number of beneficiaries ▪ Follow-up by health professionals of complaints from the community about the incentive distribution process ▪ One-off supervision visits by central level health officials; INGO staff; and auditors asking about SDIP among other programmes

Note: D(P)HO = District (Public) Health Office. HMIS = health management information system. FCHV = female community health volunteer. VDC = village development committee. FCHV = female community health volunteer. (I)NGO = (international) non-government organisation.

Chapter 5. DEMAND FOR HEALTH CARE AT CHILDBIRTH

5.1 Introduction

The role of prices in the demand for health care has been well studied, typically in the context of the debate around user fees. There is now a large body of evidence from developing countries. Notwithstanding the methodological limitations of many of these studies, the broad consensus is that price does affect health seeking choices, but that demand is relatively price inelastic. Furthermore, price elasticities tend to fall with income such that the poorest would benefit most from any fall in user fees.

As the literature review highlighted, there are a number of reasons why it is worth revisiting the topic in this thesis. There remain few studies that have looked specifically at health seeking at childbirth and, in so much as the demand for maternity care may differ from other types of care, this provides one rationale for doing so here. Perhaps a more relevant reason relates to the Safe Delivery Incentive Progamme (SDIP), whose success depends to a large degree on how sensitive consumers are to the price of care at childbirth, a question which can explored through the estimation of a demand model. If households fail to respond to prices, the main theoretical mechanism underpinning the programme may be called into question.

In this sense, the analysis of demand for maternity care can be considered an ex-ante evaluation of the SDIP. The evaluation literature recommends the use of modelling to feed into the development of an intervention. While this analysis is too late to inform the design of the SDIP, it does give useful context to subsequent chapters on the performance of the programme and provides a benchmark against which to assess the plausibility of impact estimates. Furthermore, the findings will have relevance for policy debates around the removal of direct payments for health care that are currently ongoing in Nepal.

With the SDIP in mind, it is natural for the analysis in this chapter to focus on the effect of prices. At the same time, the household decision making process is complex and, as the literature review emphasised, many non-economic factors play an important role. There are a whole host of factors

that may influence health seeking choices and considerations of some of these determinants will be given.

The analysis in this chapter is made up of three parts. The first part examines the cost of seeking care at childbirth from the perspective of the patient, focusing in particular on the financial burden this places on the household budget. The second part estimates a demand model for maternity care, using a number of different empirical specifications to assess the robustness of results. In the third part, the model parameters are used to simulate the effect on utilisation of changing the values of individual explanatory variables. The analysis is limited to one area of Nepal, Makwanpur district.

Before describing the empirical methods, it is worth revisiting the predictions of the economic model in chapter 3. Prices can be expected to exert a negative influence on utilisation, which is greater among households of a lower income, all else being equal. Similarly, distance can be expected to have a negative effect on utilisation, regardless of whether it is captured as a price (opportunity cost of time and travel cost) or a time variable.

5.2 Empirical methods

5.2.1 Cost of care and financial burden

The definition of the cost of care used here is comprehensive, including both direct medical costs and other costs to the household associated with health care seeking. It encompasses the registration fee, delivery fee, fee for use of the operating theatre, drugs and supplies in the facility, tests in the facility, inpatient stay, drugs and supplies from outside, transport to and from facility, accommodation of family members, and food of accompanying family members.

Beyond simply estimating the cost of care, the analysis shows the financial burden of paying for delivery care at a health facility. The unit of analysis is the household, and financial burden is measured as the share of out-of-pocket (OOP) health spending for delivery care in total household consumption.[35] A common extension of this approach uses measures of catastrophic spending to estimate the effect of health care payments on household material living standards (Wagstaff and van Doorslaer 2003; Xu, Evans et al. 2003). Health spending is regarded as catastrophic if it exceeds a certain fraction of total household expenditure in any given time period. It is based on the premise that health spending is likely to displace consumption of other goods and services if it makes up a large proportion of total household resources.

Catastrophic payments have been defined in two ways. The first measures catastrophic payments as the share of health spending in total household consumption, while the second estimates health spending relative to household consumption net of spending on subsistence requirements, frequently proxied as non-food expenditure. This second measure reflects the view that non-discretionary expenditure may be a better indicator of a household's living standard or capacity to pay for health care (Wagstaff and van Doorslaer 2003; Xu, Evans et al. 2003). The threshold above which health spending is classified as catastrophic is essentially arbitrary (O'Donnell, van Doorslaer et al. 2008). The most common thresholds used are 10 percent in the case of the first measure of catastrophic payments and 40 percent in the second case. In addition, the concentration index is calculated for the incidence of catastrophic expenditure to quantify the degree of inequality in the indicator (Kakwani, Wagstaff et al. 1997). Results are stratified by type of delivery since spending on normal deliveries and caesarean sections is expected to diverge widely.

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[35] It is otherwise referred to as the out-of-pocket health care budget share.

5.2.2 Model of health care seeking

Analytical framework

As presented in chapter 3, a woman faces a number of J health care options when considering where to give birth. The choice of alternatives depends on individual and household characteristics, health provider characteristics and non-health consumption. In order to operationalise the framework for empirical estimation, a functional form must be assumed. Starting with the most simple linear model (Akin, Guilkey et al. 1985; Mwabu and Mwangi 1986), yields the following:

$$U_{ij} = \omega_{1ij} h_{ij} + \omega_{2ij} c_i + \varepsilon_{ij}$$

where $h_{ij} = \boldsymbol{\alpha_{1ij}}' \boldsymbol{x_i} + \boldsymbol{\alpha_{2i}}' \boldsymbol{z_j}$. For the time being, it is assumed that individual characteristics are entered additively to the health provider characteristics, such that returns to health from a particular provider do not, for example, depend on the woman's level of education. With reparamaterisation, the indirect utility function is given by:

$$V_{ij} = \boldsymbol{\alpha_{1ij}}' \boldsymbol{x_i} + \boldsymbol{\alpha_{2i}}' \boldsymbol{z_j} + \alpha_{3ij} c_i + \varepsilon_{ij}$$

An analysis of the responsiveness of demand for maternity care to the price requires alternative specific costs. This is incorporated by taking account of the budget constraint, such that consumption is no longer treated as exogenous and is instead entered as the difference between exogenous income and the price of health care at provider j:

$$V_{ij} = \boldsymbol{\alpha_{1ij}}' \boldsymbol{x_i} + \boldsymbol{\alpha_{2i}}' \boldsymbol{z_{ij}} + \alpha_{3ij} y + \alpha_{4i} p_{ij} + \varepsilon_{ij}$$

However, as demonstrated by Gertler et al. (1987) and Gertler and van der Gaag (1990), income in the model above has no effect on the choice of provider, which means the responsiveness of demand to price is independent of income. The functional form of the conditional utility function must not impose a constant marginal rate of substitution and must allow the utility to be concave in consumption. To address this problem, they proposed a specification in which utility is a linear function of health and a quadratic function of consumption, where:

$$U_{ij} = \omega_{1ij} h_{ij} + \omega_{2ij} c_i + \omega_{2ij} c_i^2 + \varepsilon_{ij}$$

which gives:

$$V_{ij} = \boldsymbol{\alpha}'_{1ij} \boldsymbol{x}_i + \boldsymbol{\alpha}_{2i}{}' \boldsymbol{z}_{ij} + \alpha_{3ij} y_i^2 + \alpha_{4ij} y_i + \alpha_{5i} p_{ij}^2 + \alpha_{6i} p_{ij} + \alpha_{7i} y_i \cdot p_{ij} + \varepsilon_{ij}$$

Simplification of the notation gives:

$$V_{ij} = \boldsymbol{\alpha}'_{ij} \boldsymbol{x}_i + \boldsymbol{\gamma}_i{}' w_{ij} + \varepsilon_{ij} \qquad \text{where } w = (\boldsymbol{z}, p, y, y^2, p^2, y.p)$$

This model is referred to as the 'basic model' hereafter and is the basis for the first set of model results. In some studies, researchers have imposed constraints on the parameters in this basic model. For example, Gertler et al. (1987) constrain the coefficients on the price and income-related variables to be equal across alternative providers and further impose the constraint $\alpha_5 = -2\alpha_7$. In contrast, Dow (1995) proposes a 'flexible behavioural model' that relaxes a number of assumptions. First, the assumption of additive separability in the utility function is relaxed, which in practice means the coefficients on price and interactions with price are allowed to vary by alternative. Second, Dow (1999) relaxes the restriction placed on the relationship between the coefficients α_5 and α_7. Third, cross-prices are introduced into the utility function for each provider, with the theoretical justification of forward-looking behaviour by individuals (Dow 1995). The specification then takes the form:

$$V_{ij} = \boldsymbol{\alpha}'_{1ij} \boldsymbol{x}_i + \boldsymbol{\alpha}_{2ij}{}' \boldsymbol{z}_{ij} + \alpha_{3ij} y_i^2 + \alpha_{4ij} y_i + \alpha_{5ij} p_{ij}^2 + \alpha_{6ij} \boldsymbol{p}_i + \alpha_{7ij} y_i \cdot p_{ij} + \varepsilon_{ij}$$

where $\boldsymbol{p} = [p_1, \ldots, p_J]$

Inferences about the relative importance of the determinants of demand for health care are made using discrete choice models and full information maximum likelihood estimation techniques. The individual is assumed to know all attributes of the provider and to choose the one that maximises her (indirect) utility. The observed choice is determined by the difference in utility (ie. net utility), not the levels of utility *per se*. Multinomial models are required when dependent variables are discrete and can take unordered multinomial outcomes. They are motivated by McFadden's (1981) random utility model and provide relative probabilities with respect to a base alternative.

Two assumptions regarding the distribution of the error terms are be made, yielding a particular empirical specification (Bolduc, Lacroix et al. 1996) and these are described below.

Multinomial logit

First, following most studies on the demand for medical care prior to Gertler et al. (1987), it is assumed that the demand functions take on a multinomial logit (MNL) form, for example see Heller (1982).[36] When data consist of both case- and alternative-specific variables, the appropriate model is (for the basic model):

$$\prod_{ij} = \frac{\exp\left(\bar{\alpha}_{ij}'x_i + \gamma_i'\bar{w}_{ij}\right)}{\sum_{l=1}^{K}\exp\left(\bar{\alpha}_{il}'x_i + \gamma_i'\bar{w}_{il}\right)}$$

An important property of the multinomial logit model is the independence of irrelevant alternatives (IIA) assumption. It means that the odds of choosing one alternative over another is independent of the other alternatives and arises from the assumption that the errors are independently and identically distributed. The IIA assumption implies that if a new alternative is introduced all absolute probabilities will be reduced proportionately and further imposes the restriction that cross-price elasticities are the same across all alternatives. Many authors have argued that IIA is too restrictive and implausible in the context of health seeking behaviour, particularly when there are choices between close substitutes. Bolduc et al. (1996), for example, conclude that there is little reason to believe the independence implied by the multinomial logit has any justification and that it may be inappropriate to formulate policy recommendations based on this model.

The IIA assumption can be tested to assess whether the logit specification is appropriate. Hausman and McFadden (1984) suggest that if a choice is irrelevant with respect to the other alternatives, omission of the choice from the multinomial logit estimates will still lead to consistent estimates. Hausman's (1978) test can therefore be used to compare estimates of the full choice set and a subset as a test for IIA.

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[36] When modelling both case- and alternative-specific variables, strictly speaking the appropriate model is the conditional logit, which is a special case of the multinomial logit model. To maintain consistency with other studies, the term "multinomial logit model" is used in this chapter.

Multinomial probit

A less restrictive of model, but computationally the most burdensome, is the multinomial probit specification. It allows correlation between all alternatives and assumes that the error terms are identically normally distributed with covariance matrix Ω. Following Bolduc et al. (1996), the probability of a woman choosing provider K is given by:

$$\prod_{iK} = \int_{-\infty}^{v_1} \int_{-\infty}^{v_2} \dots \int_{-\infty}^{v_{K-1}} \varphi(U; \sum) dU$$

where $v_j = (\bar{w}_{ij} - \bar{w}_{ij})\gamma_i + x_i(\bar{\alpha}_j - \bar{\alpha}_K)$, U is a (K × 1) zero mean vector, $\varphi(\cdot)$ is a multivariate normal density function and $\sum$ is the covariance matrix of the different error terms from the normalised utility equations of each alternative. The integral must be approximated because it has no closed form using the maximum simulated likelihood approach (Train 2003).

As a final point on the empirical strategy, there has been much discussion in the demand for health care literature about sample selection bias that arises when information on recent bouts of illness is self-reported by individuals, see for example Akin et al. (1998). It suffices to note that in this study inclusion in the sample is not based on subjective measures of self-reported illness, but rather an objective fact regarding whether the woman gave birth.[37]

Price elasticities and simulation exercises

Interpretation of the model coefficients on the respective price variables is complicated by the inclusion of the quadratic function and price – income interaction. In order to assess the effect of price on utilisation, the own-price elasticity of demand can be estimated. It shows for a given alternative the responsiveness of demand to a change in its price.[38] Price elasticities are estimated for various specifications using the multinomial logit model to show whether the estimates differ according to whether the basic specification or flexible behavioural specification is used. The price elasticity of alternative j with respect to the price of j is derived from the following expression, taken from Train (1986):

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[37] There is, however, the need to correct for selection bias in the measurement of price, a key variable in this analysis of demand, as explained in the next section.

[38] Strictly speaking, the most appropriate term for the parameter of interest is price elasticity of probability since the study is concerned with the probability of a woman seeking care at each provider and not the number of visits (Greene 2008).

$$E_{jP} = \left(\frac{\delta U_j}{\delta P_j}\right) P_j(1 - Prob_j)$$

Elasticities are computed by averaging the values of individual observations. The average across the sample can be driven by single observations that have extreme values giving unrealistic values. Greene (2008), therefore, recommends calculating the elasticity once at the sample mean of the variables to ensure extreme values are averaged out. It is found, however, that this method makes little difference to the price elasticitiy estimates. Price elasticities are shown by wealth quintile given the theoretical predictions of the demand for maternity care.

The influence of the other explanatory variables on the choice of provider can be gauged by carrying out simulation exercises in which the marginal effects depend on the level of all X. In the base scenario, the actual values for each observation are used and the probability of use at each alternative is computed by the model. In each simulation, the values of one variable are altered, while retaining the actual values of all other variables, to give the probability of use at each alternative. The simulated probabilities are then compared with the base scenario probabilities to show the change in health seeking behaviour as a result of the change in the explanatory variable. For simplicity, only the results of the flexible behavioural model are presented in the simulation exercises.

5.3 Data

5.3.1 Data sources

The main source of data used in the analysis is from the Community Surveillance System in the rural areas of the district of Makwanpur. It contains complete data on 8,874 deliveries. It is supplemented by primary data on the price of care collected on a subsample of women who sought care at a public health facility in Cost of Delivery Survey. The price data for this subsample are used to impute prices for the entire sample. However, given that no price data were available on deliveries in private health facilities or public health posts, these observations had to be dropped. In any case, only 0.94 percent of the sample sought delivery care privately and 0.37 percent in a public health post, leaving 8,758 observations with complete records. A more detailed description of the two data sources is given in chapter 3.

5.3.2 Definition of variables

There are four categories of the dependent variable which reflect the health seeking alternatives at childbirth. The explanatory variables are categorised according to attributes of the provider and attributes of the individual or household. Their definitions are described in Table 5.1.

Dependent variables

The four categories of the dependent variable represent alternative places of delivery, including the home, primary health care centre (PHCC), district hospital, or regional hospital. These three types of health facility are government-run. Delivery at home is the comparison group in the analysis and is analogous to self-treatment in the demand for health care literature. There are a couple of reasons why the place of delivery, as opposed to the type of birth attendant or a combination of place and type of attendant, was chosen to define the dependent variables. First, the major decision a household must make when seeking care is where to go, if anywhere. It seems plausible that the type of health worker in attendance is more a reflection of a health facility's quality of care – a consequence of deciding where to deliver – rather than a separate choice a household is faced with. Moreover, by not using the type of delivery attendant to define the dependent variable, a quality variable can be constructed using information on who was present at the delivery. Second, delivery with a doctor, nurse or midwife is almost synonymous

with giving birth at a health facility ensuring that the choice set is essentially in line with international policy that focuses on skilled birth attendance.

Table 5.1 Definition of variables

Variable	Description
Choice of provider at childbirth	
Home	= 1 if woman delivers at home; = 0 otherwise
Regional hospital	= 1 if woman delivers at a regional hospital; = 0 otherwise
District hospital	= 1 if woman delivers at the district hospital; = 0 otherwise
Primary health care centre	= 1 if woman delivers at a primary health care centre; = 0 otherwise
Attributes of the provider	
Price	Price of alternative j, where price is total expenditure on care
Time price	Opportunity cost of time using alternative j
Skilled birth attendant	Probability of skilled attendant at delivery in alternative j
Attributes of the individual and household	
Asset score	Asset wealth index of household constructed using PCA
Household members	Number of persons living in household
Age	Age of woman at childbirth
School grade	School grade attained by the woman
Marginalised	= 1 if caste of the household is marginalised; = 0 otherwise
Road access [a]	= 1 if village of the household has road access; = 0 otherwise
Women's group	= 1 if household located in women's group intervention area; 0 otherwise
Severe bleeding	= 1 if woman had severe bleeding prior to or during labour; 0 otherwise
Convulsions	= 1 if woman had convulsions during labour; 0 otherwise
Obstructed labour	= 1 if woman had an obstructed labour; 0 otherwise
Severe fever	= 1 if woman had a fever or severe sickness prior to or during labour; 0 otherwise

Note: [a] Only used in the imputation of prices, not in the estimation of the demand model.

Explanatory variables

There are two types of explanatory variable reflecting the distinction between individual characteristics and attributes of the health provider (Akin, Guilkey et al. 1998). The former remain the same, irrespective of provider, while the latter vary by provider. The selection of explanatory variables is informed by the literature review in chapter 2 and limited by the available data.

The price comprises two components, the price of care and opportunity cost of time spent seeking care. The price of care is out-of-pocket expenditure on care seeking at childbirth; it matches the definition given previously. For a home delivery, the price captures the fee to the

attendant, gift to the attendant, drugs and supplies, food to the attendant, safe delivery kit, and materials to wash the baby. The opportunity cost encompasses time spent seeking health care by the woman (travel time, waiting time and time given care), as reported by each respondent. It was calculated as the product of the time spent seeking care and the wage rate. Since over 90 percent of households work in farming, the mean agricultural wage rate of 73.9 NRS per day, obtained from the Cost of Delivery Survey, was used to value time. The price is hypothesised to have a negative effect on utilisation.

Income is proxied by a wealth index, constructed using principal components analysis on information regarding ownership of household assets (Filmer and Pritchett 1998). The asset index is re-scaled, maintaining the identical distribution, to give values between 0 and 100, with zero representing the poorest household in terms of asset ownership. Wealth is interacted with price and included in the model as a variable to explore whether responses to price vary across wealth groups.[39] The expectation is that delivery care is a normal good – that is, wealth has a positive effect on demand. Women with more household members are expected to have a preference for home deliveries, since an increase in family size, for a given level of household wealth, will reduce per capita wealth.[40]

Quality of care is measured by the probability of a woman being attended by a skilled attendant at delivery. A skilled birth attendant is defined as a doctor, nurse or midwife. Each observation is assigned the value for the trimester in which the woman gave birth to reflect variation in staffing levels over time by type of provider. An increase in the quality of any alternative is hypothesised to increase demand. Individual characteristics reflecting preferences for quality are age of the woman, and educational attainment. The expected influence of age on demand could be argued both ways. Older women are likely to be at greater risk and therefore may have a preference for care at higher level hospitals (Lewis 2007); at the same time it is well documented that women giving birth for the first time (ie. younger women) prefer to give birth in a health facility (Government of Nepal 2007). It is expected that better educated women are more inclined to use

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[39] The inclusion of an interacted term requires the asset index to take on only positive values to avoid the problem of multiplying two negative values (the imputed price has negative values for some observations) to give a positive value of the interacted variable. This explains why the asset index is re-scaled.

[40] Family size may also operate through an alternative mechanism, in which women in larger households prefer to deliver at home because there are more dependents to look after and more household members to assist during childbirth.

care at a facility (and higher levels of facility), since they are more productive in their use of health care (Grossman 2000).

The caste of a household determines whether it is marginalised, as indicated by a dummy variable. Individual castes reported by the household are grouped into broader caste categories based on Bennett et al. (2008). Caste of a household provides a broad measure of socioeconomic status and is highly correlated with education status and household wealth (Bennett, Dahal et al. 2008). In the context of health seeking at childbirth, indicators of marginalisation – particularly once other socioeconomic factors are controlled for – may provide a measure of the woman's decision making power. Needless to say, marginalised women are hypothesised to have a lower chance of using maternity services.

The "road" dummy variable indicates whether the village where the household is located has a road. Availability of a road would be expected to influence choice of provider by reducing geographical barriers to access. However, since it is reflected in the time and financial cost faced by a household seeking to reach a health facility, there is no need to include it as a separate determinant of provider choice. Instead, it is used in the hedonic price and time equations for predicting missing values, as explained below.

A dummy variable indicates whether the household is located in a village which was selected to be an intervention area in the trial of women's groups. As a demand side intervention, the women's groups would be expected to raise utilisation of maternal health services. Indeed, available evidence suggests women's groups in the first phase of the trial had a positive impact on utilisation of maternity services (Manandhar, Osrin et al. 2004).

The last four variables are a set of dummy variables, reflecting maternal complications prior to or during childbirth, used to proxy severity of disease, as reported by the woman. These indicators are not objective measures of disease status – nor are they meant to be since it is perceptions that drive health seeking decisions. Of the major problems that were self-reported by the woman, only the ones that occur prior to or during childbirth are included in the model since problems occurring after childbirth cannot be determinants of health seeking for delivery. Women who report a maternal complication during labour are expected to turn away from self care at home to health facility care.

5.3.3 Imputation of prices

A person with ill health is faced with a menu of prices and levels of quality of care offered by available health providers. Discrete choice models require values of these variables for all alternative health care providers. However, ex-post price information is available only for the provider from whom the individual chose to receive delivery care. Estimates of the price and opportunity cost must be imputed using hedonic price equations, since only the price of the chosen provider can be observed (Gertler, Locay et al. 1987). Selection bias may be present as the observed distribution of prices paid will not be representative of the ex-ante distribution of prices across all individuals, who are likely to choose lower price options. Put another way, the price faced by an individual choosing a given alternative may not be representative of those faced by the average individual. Methods to correct for selection bias have been developed, following from the initial insight of Heckman (1979).

The situation is an example of a limited dependent variable. The two-part model can be estimated by a logit or probit model for the probability of an individual giving birth at each of the alternatives, along with ordinary least squares on the sub-sample of positive observations. In the case where there are a number of health-seeking choices, a two part model can still be used but selectivity is modelled as a multinomial logit rather a univariate probit, as in the Heckman model. The first step is to estimate a reduced form multinomial logit model, compute the predicted probability and generate a set of selection correction terms for each individual. The predicted selection correction terms are then included as regressors in the hedonic price equations. These selection correction terms are consistent estimators of expected values of the residuals derived from the multinomial logit model. While a number of bias correction methods are available, the most flexible, developed by Bourguignon et al. (2007), is used.

In the dataset, there are two sets of missing data on prices. First, among those seeking care at each provider, there are individuals for whom price information was not collected. Price data are available only for 11 percent, 24 percent and 27 percent of individuals who sought care at a regional hospital, the district hospital and a primary health centre respectively.[41] In this instance,

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[41] The Cost of Delivery Survey ran for only six months and therefore does not provide price data on all women captured in the Community Surveillance System who delivered in a health facility during the two-year period (July 2005 – June 2007).

price values are predicted using a simply OLS regression since there is no reason for selection bias. The equation specifies price to be a function of age, road access, self-reported complications prior to childbirth (bleeding, obstructed labour, convulsions, and severe fever) and the probability of a skilled birth attendant in each provider (home, regional hospital, district hospital, and primary health centre). The descriptive statistics are shown in Table 5.2. Wealth is excluded to avoid attributing higher prices to wealthier households who may have purchased higher quality of care within each provider category. In public hospitals, for example, there is often a choice between general wards and paying wards, where there are likely to be marked differences in the interpersonal aspects of care. Since education, marginalisation, and household size are highly correlated with wealth, these variables are also omitted.

Table 5.2 Summary statistics of variables used the hedonic price and time regressions

Variable	Observations	Mean	Std Deviation
Dependent variable			
Price of care at Regional Hospital (rupees)	47	9032.45	7933.06
Price of care at District Hospital (rupees)	143	4655.45	5496.05
Price of care at PHC (rupees)	103	1080.24	1343.65
Time seeking care at Regional Hospital (days)	47	6.17	5.18
Time seeking care at District Hospital (days)	143	2.46	3.86
Time seeking care at PHC (days)	103	1.59	2.83
Independent variable			
Age	300	23.30	4.86
Road access	300	0.69	0.46
Bleeding	300	0.07	0.26
Obstructed labour	300	0.23	0.42
Convulsions	300	0.03	0.17
Severe fever	300	0.03	0.17
Prob. seen by SBA at Home	300	0.01	0.00
Prob. seen by SBA in Regional Hospital	300	0.97	0.02
Prob. seen by SBA in District Hospital	300	0.99	0.01
Prob. seen by SBA in PHC	300	0.91	0.07

Note: PHC = primary health care centre; SBA = skilled birth attendant

Second, price values are missing for those providers which the individual did not visit. In this instance, the two-step model that corrects for selection bias is required to predict missing values. In the first step, a multinomial logit model is estimated by maximum likelihood to generate a set of correction terms for each individual which are then included as regressors in the hedonic price equations. Imputation is based on the actual price data and not the predicted values from the previous regression. In the multinomial logit, the choice of provider is modelled as a function of

age, household size, marginalisation (by caste), wealth, education level, women's group intervention area, perceived severe problems prior to childbirth (bleeding, obstructed labour, convulsions, and severe fever) and the probability of a skilled birth attendant in each provider (see Table 5.3).

In the second step, the same OLS regression above is used, except this time with the inclusion of the selection correction terms. An identical procedure is used to impute missing values for the time taken to seek care (see Table 5.4). The opportunity cost of time is then calculated as the product of the imputed time values and the agricultural wage rate in the district. The goodness of fit is high in the case of the regional hospital and primary health care centre for both sets of hedonic equations.

Consistency of the two-part model for the model parameters rests on strong assumptions. Nonetheless, if the aim is simply to predict conditional means as it is here and not to make inferences about individual parameters, then the two-part model may perform reasonably well (Duan, Manning Jr et al. 1983). On that basis, the model will often be adequate, for example, when the objective is simply to predict medical expenditure conditional on a vector of individual and market characteristics (O'Donnell, van Doorslaer et al. 2008).

Table 5.3 Hedonic price regressions with selection correction terms

	Regional hospital price		District hospital price		Primary health centre price	
Independent variable	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Constant	3844778	0.58	-32338	-0.06	-116184	-2.74
Age	956	1.59	176	1.36	-1	-0.03
Road access	1139	0.30	-138	-0.12	-541	-1.07
Severed bleeding	1569	0.28	524	0.31	470	0.79
Obstructed labour	2629	0.67	1963	1.42	160	0.40
Convulsions	9003	0.64	602	0.19	951	1.20
Severe fever	-8374	-0.44	-832	-0.26	-1948	-2.21
Prob. seen by SBA at home	(dropped)		3258766	0.28	605640	1.25
Prob. seen by SBA in regional hospital	1077441	1.68	172338	0.20	-23774	-0.52
Prob. seen by SBA in district hospital	-1319405	-1.71	5191	0.01	158885	2.52
Prob. seen by SBA in PHC	-214902	-1.35	-186600	-0.25	-26128	-0.90
Home selection term	-14392	-1.06	-2218	-0.49	402	0.33
Regional hospital selection term	15340	1.78	8746	0.97	-3149	-1.15
District hospital selection term	-42565	-1.98	-346	-0.25	-1776	-1.40
PHC selection term	-76222	-1.68	-17887	-1.75	1115	1.43
R^2	0.2237		0.0549		0.3906	

The price of a home delivery was not available from the Cost of Delivery Survey. The mean cost to the household is taken from Borghi et al. (2004), using values from similar hill districts in Nepal. The price is adjusted for inflation using the national consumer price index to give a mean of 575.9 NRS in 2007 prices. The opportunity cost of giving birth at home is assumed to be zero.

Table 5.4 Hedonic time regressions with selection correction terms

	Regional hospital time		District hospital time		Primary health centre time	
Independent variable	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Constant	335	0.97	534	1.78	7	0.09
Age	-0.4	-1.26	0.2	1.92	0.2	3.02
Road access	2	0.77	-0.3	-0.39	3	3.04
Severed bleeding	6	1.94	0.0	0.02	13	12.03
Obstructed labour	8	3.79	2	1.89	0.5	0.63
Convulsions	-8	-1.05	1	0.51	-0.5	-0.34
Severe fever	-3	-0.32	0.5	0.24	-5	-3.12
Prob. seen by SBA at home	(dropped)		-29964	-4.29	330	0.39
Prob. seen by SBA in regional hospital	-198	-0.59	-2215	-4.33	-66	-0.81
Prob. seen by SBA in district hospital	-211	-0.53	171	0.74	52	0.46
Prob. seen by SBA in PHC	86	1.03	1869	4.21	-4	-0.09
Home selection term	-10	-1.44	2	0.61	-4	-1.65
Regional hospital selection term	-1	-0.20	9	1.68	5	1.11
District hospital selection term	-5	-0.44	-0.1	-0.13	-4	-1.71
PHC selection term	35	1.46	-8	-1.24	0	-0.28
R^2	0.4986		0.3077		0.6517	

5.3.4 Estimation of wealth

The dataset contains no information on the income and expenditure of households. A widely used alternative is an asset index, constructed using principal components analysis from information on asset ownership and housing characteristics. It has been argued that the asset index, as a proxy for economic status, performs as reliably as more conventional income and expenditure measures (Filmer and Pritchett 1998). In practice, the data are relatively easy to collect and may be less susceptible to measurement errors as many of the assets or housing characteristics can be observed by the interviewer.[42]

The analysis includes only assets that are observable to the interviewer (land may be the only exception) so as to reduce measurement error. The qualitative categorical variables are recoded

[42] Contrary to this, Onwujekwe et al (2006) provide evidence suggesting the data used to derive asset indices can be unreliable, leading to the possibility of misclassification when using wealth quartiles.

into binary variables. When running the principal components analysis, the correlation matrix is used since data are not standardised or expressed in the same unit. It is assumed the first principal component is a measure of wealth. The eigenvalue of the first principal component is 4.1. Each variable of asset ownership, with the exception of house ownership, is associated with higher wealth, as indicated by the positive factor score (result not shown). Access to infrastructure facilities including water and sanitation is associated with higher wealth. Broadly speaking, the more costly types of housing materials and cooking fuels have higher factor scores. The asset index generated by the principal components analysis has a mean of zero. To ensure that there are no negative values, the index is re-scaled to give values between 0 and 100.

Table 5.5 assesses the robustness of the asset index, providing the mean value of socioeconomic indicators by asset index decile.[43] The distribution of the asset index is skewed to the right, as is also typical with household consumption data. There is little difference in the asset index for a large proportion of the sample, suggesting a certain degree of homogeneity across the sample.

Table 5.5 Socioeconomic variables by asset decile

Asset decile	Asset index	Literacy	School grade	Household members	Farmer	Marginalised caste
1	4.57	0.09	0.58	6.25	0.91	0.96
2	7.95	0.10	0.61	6.75	0.94	0.95
3	10.04	0.14	0.92	7.01	0.96	0.92
4	12.22	0.15	0.94	7.36	0.96	0.92
5	14.41	0.17	1.14	7.30	0.92	0.89
6	17.85	0.28	1.83	7.43	0.94	0.83
7	23.31	0.33	2.18	7.29	0.88	0.78
8	30.18	0.38	2.62	7.18	0.90	0.67
9	39.97	0.56	4.22	7.72	0.87	0.49
10	58.02	0.77	6.60	7.96	0.78	0.36

Note: Estimates based on entire sample of deliveries (N=8,874).

A substantial proportion of women in the highest decile remain illiterate, and the average number of years of schooling represents only a completed primary education. This suggests that the socioeconomic status of the entire sample is low, unsurprisingly for a rural population. In accordance with expectations, the proportion of marginalised households decreases with higher asset deciles. Broadly, household size increases with higher asset deciles. Within a relatively

[43] Note that correlation between the asset index and annual household consumption (in the subsample with both these variables) is relatively low at 0.272. A correlation coefficient between 0.2 and 0.4 is commonly found in the literature (O'Donnell, van Doorslaer et al. 2008).

homogenous rural sample, it seems reasonable that larger households with potentially more productive members can afford to purchase more assets.

5.3.5 Descriptive statistics

Table 5.6 provides descriptive statistics on the dependent variable of the demand model. By far the most common place of delivery is at home, with 87 percent of women reporting to have given birth there. A further 4 percent, 5 percent and 3 percent of women reported to have delivered in a regional hospital, district hospital and primary health centre respectively. Although not reported in the table, it is worth noting that while the majority of women in the sample had a normal delivery, a substantial proportion of those giving birth in a regional hospital required vacuum extraction (27 percent), the use of forceps (11 percent), or a caesarean section (23 percent). In the district hospital and primary health centres, 50 percent of women were given a vacuum extraction.

Table 5.6 Descriptive statistics on the dependent variable in the demand model

Variable	Observations	Mean	Std Deviation
Home	8758	0.873	0.332
Regional hospital	8758	0.042	0.201
District hospital	8758	0.052	0.222
Primary health care centre	8758	0.032	0.177

The price of care varies markedly by type of provider (Table 5.7). The higher the level of care, the higher the price faced by the household.[44] In part, this reflects the opportunity cost of greater travel and treatment time, but also probably better quality of care and severity of cases. The price of seeking care at a regional hospital is almost double that at the district hospital, which in turn is almost three times the price incurred at a primary health care centre. Almost all those delivering in a health facility did so with a skilled birth attendant, in contrast to home deliveries where only 1 percent of women had a doctor, nurse or midwife present.

The mean age of women at childbirth is 25.5 years. Women receive little education, two years on average, which explains why over 70 percent of the sample are illiterate (not reported). Almost 80 percent women come from castes considered marginalised. The average household size is over

[44] The price of care at home is the same for all observations; hence the standard deviation is zero.

seven members and most families live in an area where women's groups are active. Women report a number of obstetric complications prior to childbirth. The incidence ranges from 2 percent to 6 percent depending on the nature of the problem. Of the four self-reported obstetric complications, obstructed labour is the most common.

Table 5.7 Descriptive statistics on the independent variables in demand model

Variable	Observations	Mean	Std Deviation
Home price	8758	575.9	0.0
Regional hospital price	8758	9085.4	6574.4
District hospital price	8758	4554.7	2890.4
PHCC price	8758	1737.3	1161.4
Prob. of SBA at home	8758	0.010	0.002
Prob. of SBA at regional hospital	8758	0.986	0.018
Prob. of SBA at district hospital	8758	0.993	0.007
Prob. of SBA at PHCC	8758	0.946	0.050
Wealth	8758	21.357	15.849
Education grade	8758	2.106	3.216
Household members	8758	7.212	3.236
Age	8758	25.476	6.225
Marginalised by caste	8758	0.782	0.413
Attended women's group	8758	0.760	0.427
Severe bleeding	8758	0.029	0.167
Convulsions	8758	0.019	0.136
Obstructed labour	8758	0.059	0.236
Severe fever	8758	0.035	0.185

Note: Prices are imputed and include the cost of health care seeking and the opportunity cost of time. PHCC = primary health care centre. SBA = skilled birth attendant.

5.4 Results

5.4.1 Cost of maternity care

Table 5.8 shows that cost of maternity care to the household can be substantial, particularly in the case of emergency surgery. The mean cost of a normal delivery was found to be 4,042 NRS (US$ 63.2), compared with 22,780 NRS (US$ 356.2) incurred by those with a caesarean section. For both types of delivery, facility-based charges and the additional costs of goods and services purchased outside of the health facility together account for around two-thirds of the overall cost. Payments made to the health provider are retained at facility level, and placed under the control of the health management committee (if in place). Clearly, delivery care can be a potentially important source of revenue for health facilities. Outstanding debts to service providers remain a sizable share of the total cost suggesting households, particularly those with women requiring a caesarean section, struggle to find any means to pay their bills at the time the service is received. The transport cost associated with a caesarean section is almost double that of a normal delivery, presumably because families need to travel further and more urgently to hospitals sufficiently specialised to carry out surgery. The SDIP's cash incentive, worth 1,000 NRS, is sufficient to cover one quarter of the cost of a normal delivery or one twentieth of the cost of a caesarean section.

Table 5.8 Household costs of facility delivery care by cost category

Cost category	Normal (n=271)	95% CI	%	C-section (n=29)	95% CI	%
Facility-based charges	1492	(1191 – 1793)	36.9	7913	(5675 – 10150)	34.7
Additional charges	1185	(1040 – 1330)	29.3	7071	(4777 – 9405)	31.1
Transport costs	669	(565 – 773)	16.5	1415	(845 – 1985)	6.2
Debt to service provider	697	(474 – 920)	17.2	6362	(2995 – 9730)	27.9
Total	4042	(3522 – 4562)	100	22780	(17045 – 28516)	100

Note: Data come from the Cost of Delivery Survey. All monetary values are in Nepalese rupees. A normal delivery is defined as a vaginal delivery. It is not known whether the debt to the health provider was paid by the household. CI = confidence interval.

Table 5.9 shows that OOP payments for normal delivery care account for 3.6 percent of total annual household consumption, while those for a caesarean section account for a much higher 19.3 percent. Spending on a caesarean section places a considerable strain on the household budget. The concentration indices of OOP budget shares for both types of delivery are negative indicating that better-off families spend a smaller fraction of total household resources on delivery care. The quintile means also show a similar pattern, although the gradient is less steep in the case

of caesarean sections. Given that this sample covered only households seeking delivery care, it is perhaps to be expected that the OOP budget share decreases with household resources. The proportion of households that incur catastrophic spending is considerable. Using a 10 percent threshold, the incidence of catastrophic spending is 7.4 percent for normal delivery care and 72.4 percent for caesarean sections.

Table 5.9 Financial burden of out-of-pocket spending on facility care

OOP delivery care spending as % of total household consumption	Normal delivery	C-section
Mean	3.6%	19.3%
Quintile mean		
Poorest 20%	5.1%	22.9%
Poorer 20%	5.6%	18.9%
Middle 20%	2.7%	22.1%
Richer 20%	2.5%	16.3%
Richest 20%	1.9%	16.2%
Concentration index	-0.23	-0.058
Incidence of catastrophic spending (>10%)	7.4%	72.4%
OOP delivery care spending as % of household non-food consumption		
Mean	9.9%	35.9%
Concentration index	-0.21	-0.075
Incidence of catastrophic spending (>40%)	2.6%	41.4%

Note: Normal deliveries (N = 271); caesarean section (N=29). A normal delivery is defined as a vaginal delivery. Out-of-pocket spending does not include debt owed to the health provider.

The mean OOP budget share of non-food expenditure offers an alternative measure of the disruptive effect of OOP payments on living standards. The mean share rises considerably to 9.9 percent for normal deliveries and 35.9 percent for caesarean sections reflecting the large fraction of household resources devoted to food (basic necessities) in the sample. Again, the concentration indices are negative suggesting that richer households spend a smaller fraction of their discretionary resources on delivery care. The incidence of catastrophic spending, as defined by a 40 percent threshold, is 2.6 percent in the case of normal delivery care and 41.4 percent for caesarean sections.

5.4.2 Model results

Basic model

Table 5.10 gives the results from the basic model using a multinomial logit, and multinomial probit specification. The Hausman test for IIA gives a $\chi^2(22)$ value of -23.88 ($P>\chi^2 < 0.65$). The null hypothesis of assumed independent and identical distribution of the error terms of the multinomial logit is not rejected, implying the multinomial probit model is not necessarily the more appropriate specifications.[45] Overall, the results of the different specifications are similar, with the direction of parameter estimates and, for the most part, their statistical significance the same. Parameter estimates are reported with home delivery as the base alternative.

Two of the price related variables are significant implying price does have an influence on the choice of any given alternative (Table 5.10). The coefficient on the price variable interacted with wealth is significant suggesting that responsiveness to a change in price varies across different wealth groups.

Quality of care, as measured here, has a significant effect on the choice of place of delivery. Women are more likely to choose a health provider at childbirth when the probability of being seen by a skilled birth attendant is higher. Wealth has a nonlinear effect on use of all types of health facility. Education is an important determinant of health seeking at health facilities. Women with higher educational attainment are more likely to reject a home delivery in favour of an institutional delivery.

Women living in larger households are more likely to give birth at home. Younger women have a higher chance of delivering in the district hospital or a primary health care centre than at home. On the other hand, older women are more likely to deliver in a regional hospital than at home. This pattern may reflect the fact that older women, who are at greater risk of complications during childbirth, have a greater need for more specialised care that can be provided by a regional hospital. Households from marginalised castes have a lower probability of delivering in a regional hospital than at home. There is weaker evidence to support a similar finding in the case of primary

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[45] The correlation matrix of the multinomial probit model suggests the unobserved characteristics of the regional hospitals are strong correlated with the district hospital choice. There is also a reasonably strong correlation between those of the district hospital and primary health centres (result not shown).

health centres, but there appears to be no suggestion that being marginalised influences health care seeking at the district hospital.

The effect of the women's group participatory intervention appears to be very sensitive to the choice of model and no consistent interpretation is possible from the results. Women reporting severe bleeding or obstructed labour have a higher chance of going to a health facility than deliver at home. Women with convulsions are more likely to deliver in a hospital than at home, but there was no statistically significant effect on the use of primary health centres. Severe fever or sickness appears to have little influence on choice of provider at delivery.

Flexible behavioural model

The flexible behavioural model allows the coefficients on price-related variables and quality of care to vary by alternative. It also includes cross-prices. The model is estimated using a multinomial logit and the results are presented in Table 5.11. Three hypotheses – the price related coefficients are equal to zero, the cross-price coefficients are equal to zero, and the coefficients on own price are across alternatives – are strongly rejected, suggesting that the flexible behavioural model is appropriate.

Before discussing the effect of price, a number of points are worth making. The results with respect to quality of care, wealth, education, household size, age and obstructed labour are largely consistent with those generated from the various specifications of the basic model. The effects of other characteristics of the individual, however, do not appear to be robust between the basic and flexible behavioural models. Being marginalised has a negative effect on the district hospital alternative. The women's group intervention appears to have a positive effect on utilisation of regional hospitals but a negative effect for primary health centres. Bleeding and convulsions encourage use of the regional hospital and primary health centre alternatives but discourage use of the district hospital. Finally, severe fever seems to deter utilisation of regional hospitals but encourage visits to maternity services at the district hospital.

Table 5.10 Parameter estimates from the basic model of demand for maternity care

Variable	Coefficient	Std error	Coefficient	Std error
	Model A Multinomial logit		Model B Multinomial probit	
Price	-0.00004	0.00003	-0.00002	0.00001
Price^2 ('000000)	-0.005***	0.002	-0.002***	0.001
Price x Wealth ('000)	0.0012**	0.0005	0.0006**	0.0003
Probability of SBA	3.565***	1.355	2.093*	1.124
Regional hospital				
Constant	-8.192***	1.402	-5.399***	1.096
Wealth	0.055***	0.013	0.038***	0.009
Wealth^2	-0.0004**	0.0002	-0.0002*	0.0001
Education grade	0.195***	0.020	0.135***	0.014
Household members	-0.075***	0.019	-0.044***	0.013
Age	0.043***	0.013	0.021**	0.010
Marginalised caste	-0.392***	0.145	-0.254***	0.091
Women's group area	-0.404***	0.129	-0.189	0.122
Severe bleeding	1.191***	0.263	0.783***	0.156
Convulsions	0.877***	0.330	0.530***	0.202
Obstructed labour	3.087***	0.166	2.222***	0.147
Severe fever	-0.359	0.321	-0.003	0.182
District hospital				
Constant	-8.119***	1.403	-5.136***	1.338
Wealth	0.087***	0.012	0.053***	0.012
Wealth^2	-0.0006***	0.0001	-0.0003***	0.0001
Education grade	0.182***	0.018	0.129***	0.024
Household members	-0.075***	0.017	-0.049***	0.014
Age	-0.040***	0.013	-0.020***	0.009
Marginalised caste	-0.002	0.130	-0.097	0.088
Women's group area	0.618***	0.139	0.274	0.168
Severe bleeding	0.929***	0.245	0.674***	0.171
Convulsions	0.723**	0.303	0.516***	0.200
Obstructed labour	3.303***	0.148	2.271***	0.357
Severe fever	-0.212	0.313	-0.091	0.161
Primary health centre				
Constant	-5.753***	1.351	-3.803**	1.807
Wealth	0.060***	0.014	0.038*	0.022
Wealth^2	-0.0005***	0.0002	-0.0003	0.0002
Education grade	0.158***	0.021	0.099*	0.054
Household members	-0.101***	0.021	-0.062**	0.031
Age	-0.044***	0.014	-0.027*	0.016
Marginalised caste	-0.219	0.148	-0.145	0.125
Women's group area	-0.932***	0.130	-0.524*	0.271
Severe bleeding	0.658**	0.298	0.456	0.312
Convulsions	0.111	0.420	0.051	0.284
Obstructed labour	1.520***	0.207	1.039	0.639
Severe fever	0.369	0.298	0.174	0.217
Log likelihood	-3302.92		-3298.61	

Note: *** denotes significance at 1%, ** at 5%, and * at 10%. Home delivery is the base alternative. SBA = skilled birth attendant.

Table 5.11 Parameter estimates from the flexible behavioural model of demand for maternity care

	Regional hospital			District hospital			Primary health centre		
Variable	Coefficient	Std error	Z stat	Coefficient	Std error	Z stat	Coefficient	Std error	Z stat
Constant	-43.361***	4.906	-8.84	-36.058***	13.920	-2.59	-9.836***	1.634	-6.02
Price (regional hospital)	-0.00023***	0.00004	-5.65	0.00022***	0.00003	6.54	-0.00135***	0.00014	-9.57
Price (district hospital)	0.00011***	0.00001	7.34	0.00130***	0.00014	8.97	0.00078***	0.00016	4.99
Price (PHC)	-0.00006***	0.00002	-3.43	0.00015***	0.00003	4.23	0.00044	0.00026	1.65
Own price^2	-1.73E-09	1.56E-09	-1.10	-1.29E-07***	1.18E-08	-10.88	-1.69E-07***	5.72E-08	-2.95
Own price x wealth	1.15E-06**	5.44E-07	2.12	2.33E-06*	1.23E-06	1.90	-1.03E-05***	3.58E-06	-2.88
Probability of SBA	39.032***	4.903	7.96	29.194**	13.864	2.11	6.679***	1.625	4.11
Wealth	0.052***	0.014	3.70	0.065***	0.014	4.68	0.068***	0.015	4.41
Wealth^2	0.0001	0.0002	-0.66	-0.001***	0.0002	-3.35	0.0003	0.0002	-1.57
Education	0.217***	0.020	10.89	0.141***	0.020	7.17	0.165***	0.021	7.85
HH size	-0.067***	0.019	-3.44	-0.020	0.019	-1.05	-0.101***	0.022	-4.60
Age	0.104***	0.015	6.89	-0.111***	0.015	-7.46	-0.025	0.016	-1.55
Caste marginalised	-0.173	0.148	-1.17	-0.354**	0.141	-2.51	-0.089	0.153	-0.58
Women's group area	0.582***	0.168	3.48	0.049	0.173	0.28	-0.555***	0.157	-3.53
Bleeding	3.474***	0.365	9.52	-0.785**	0.359	-2.19	1.612***	0.357	4.52
Convulsions	2.359***	0.397	5.94	-0.547	0.372	-1.47	0.824*	0.471	1.75
Obstructed labour	4.395***	0.236	18.61	1.794***	0.228	7.85	2.000***	0.249	8.02
Fever	-3.516***	0.483	-7.28	1.706***	0.429	3.98	-0.459	0.422	-1.09
Price related coefficients = 0 (χ^2)			173.52						
($P > \chi^2$)			<0.001						
Cross price coefficients = 0 (χ^2)			295.47						
($P > \chi^2$)			<0.001						
Coefficients on own price equal across alternatives (χ^2)			107.06						
($P > \chi^2$)			<0.001						
Log likelihood			-3141.24						

Note: *** denotes significance at 1%, ** at 5%, and * at 10%. Home delivery is the base alternative. SBA = skilled birth attendant. PHC = primary health centre

The effect of price on the demand for maternity care is more easily interpretable through the calculation of price elasticities. Following Lindelow (2005), Table 5.12 provides estimates of the own-price elasticity by wealth quintile for four different models based on the multinomial logit specification. The estimates are clearly highly sensitive to the model used. The price elasticity estimates are greatest in the most flexible model and smallest in the most constrained model. In all models, however, the price elasticity increases with the level of care, such that the largest estimates are for the regional hospital alternative. Not surprisingly the estimates in model 1 do not vary much between wealth quintile. Greater variation between wealth quintiles is seen in the other models. For the regional hospital and district hospital alternative, the price elasticities start off lowest in the poorest quintile and then rise before falling again in the richest quintile. In general, the middle wealth quintiles (quintile three and four) seem to be most sensitive to price and the richest the least sensitive with regards to these two types of health provider.

Table 5.12 Own-price elasticities by wealth quintile using a multinomial logit model

Model 1	Regional hospital	District hospital	Primary health centre
Poor	-0.66	-0.32	-0.14
Poorer	-0.70	-0.32	-0.13
Middle	-0.71	-0.35	-0.13
Richer	-0.76	-0.36	-0.12
Richest	-0.68	-0.33	-0.14
Model 2	**Regional hospital**	**District hospital**	**Primary health centre**
Poor	-1.34	-0.38	-0.10
Poorer	-1.43	-0.35	-0.08
Middle	-1.41	-0.37	-0.07
Richer	-1.45	-0.33	-0.05
Richest	-1.04	-0.21	-0.01
Model 3	**Regional hospital**	**District hospital**	**Primary health centre**
Poor	-1.16	-0.40	0.01
Poorer	-1.22	-0.32	-0.02
Middle	-1.21	-0.62	-0.10
Richer	-1.24	-0.55	-0.20
Richest	-0.97	-0.41	-0.78
Model 4	**Regional hospital**	**District hospital**	**Primary health centre**
Poor	-2.24	-1.09	-0.83
Poorer	-2.36	-1.01	-0.82
Middle	-2.36	-1.51	-0.91
Richer	-2.41	-1.50	-1.00
Richest	-1.93	-1.35	-1.75

Note: Model 1 includes own price only and its coefficient is constrained to be equal across alternatives. Model 2 includes own price, price squared, price – wealth interaction and coefficients are constrained to be equal across alternatives. Model 3 includes own price, price squared, price – wealth interaction and coefficients are not constrained to be equal across alternatives. Model 4 includes own price, price squared, price – wealth interaction and coefficient, cross-prices and coefficients are not constrained to be equal across alternatives.

These results simply show a bivariate relationship between wealth and an individual's sensitivity to price and it is likely wealth is correlated with other factors that may also be driving these estimates. For example, the poorest households may not have good geographical access to health services, limiting the effect that price has on this group. This means the results are not necessarily inconsistent with the theoretical framework which predicts that wealthier individuals, all else being equal, can be expected to be less sensitive to price.

5.4.3 Simulations

Prices and other policy variables

Simulations in this section are based on plausible policy scenarios in Nepal.[46] In the base scenario, when all variables are at their actual values, 4 percent of the sample is predicted to give birth at a regional hospital, 5 percent at the district hospital, 3 percent at a primary health care centre and 87 percent at home (Table 5.13).

Table 5.13 Simulated effects of a change in the price of care on place of delivery

	Regional Hospital	District Hospital	PHCC	Home
Sample proportion	4.2%	5.2%	3.2%	87.3%
Price of regional hospital reduced 50%	9.5%	2.9%	3.8%	83.9%
Relative change	(124.5%)	-(44.9%)	(17.0%)	-(4.0%)
Price of district hospital reduced 50%	3.1%	6.6%	2.5%	87.8%
Relative change	-(26.2%)	(26.7%)	-(22.7%)	(0.5%)
Price of PHCC reduced 50%	10.6%	2.3%	4.1%	83.0%
Relative change	(151.6%)	-(56.4%)	(26.9%)	-(5.0%)
Price of all facilities reduced 50%	14.7%	1.2%	3.4%	80.7%
Relative change	(247.9%)	-(76.6%)	(5.8%)	-(7.6%)
Price of care of all facilities set to 0 and opportunity cost compensated for	35.8%	0.0%	1.9%	62.3%
Relative change	(746.8%)	-(99.7%)	-(39.6%)	-(28.7%)

Note: All simulations are based on the parameter estimates computed for the flexible behavioural model using a multinomial logit specification. The relative change is shown in parentheses and is calculated as the percentage difference between the baseline estimate and the simulated estimate. NRS = Nepalese rupees. PHCC = primary health care centre.

In the first set of simulations, the effect of a 50 percent reduction in the price of care is modelled, one type of health facility at a time. As Table 5.13 shows, the reduction in price at a regional

[46] No policymaker, for example, is contemplating increasing the price of maternity care.

hospital increases utilisation by over 100 percent. This rise in demand is compensated by a fall in use of the district hospital and deliveries at home. Reducing the price of care in the district hospital by 50 percent increases the probability of delivery there by 27 percent. The increase is made possible through a decrease in the use of regional hospitals and primary health centres. Reducing the price of care at a primary health centre by half increases demand by 27 percent, or 4.1 percentage points. A reduction by half in the price of all health facilities increases utilisation most in regional hospitals and leads to a 7.6 percent fall in home deliveries.

In the next row of Table 5.13, care in all health facilities is provided free of charge and the opportunity cost is compensated for with, say a conditional cash transfer. This is a policy option that has been very much on the table in recent years in Nepal. Removing all charges lead to at least a seven-fold increase in the probability of women delivering at a regional hospital. The reduction in the cost of care is proportionately much greater in regional hospitals, explaining why the increase in utilisation is most pronounced for that option. Such a policy decision can be expected to lead to a 29 percent fall in home deliveries and an increase in the rate of institutional delivery care to almost 40 percent.

Another set of policy simulations assesses the influence of quality on health seeking at childbirth, as measured by the probability of being seen to by a skilled attendant (Table 5.14). Given the already high probability of a skilled birth attendant being available at each provider and the little room for improvement, it is not surprising that increasing the quality of care with this measure results in little change in the demand for delivery care. This serves mainly to highlight the inadequacy of this measure of quality of care and offer few insights into whether the quality of care in a broader sense affects health seeking behaviour.

Table 5.14 Simulated effects of a change in the quality of care on place of delivery

	Regional Hospital	District Hospital	PHCC	Home
Sample proportion	4.2%	5.2%	3.2%	87.4%
Probability of SBA in regional hospital set to 1	4.4%	5.1%	3.2%	87.3%
Relative change	(5.1%)	-(1.8%)	-(0.4%)	-(0.1%)
Probability of SBA in district hospital set to 1	4.1%	5.3%	3.2%	87.4%
Relative change	-(1.0%)	(2.0%)	-(0.4%)	-(0.1%)
Probability of SBA in PHCC set to 1	4.1%	5.1%	3.7%	87.1%
Relative change	-(1.2%)	-(1.9%)	(15.5%)	-(0.4%)
Probability of SBA in all facilities set to 1	4.3%	5.1%	3.7%	87.0%
Relative change	(2.8%)	-(1.7%)	(14.6%)	-(0.6%)

Note: All simulations are based on the parameter estimates computed for the flexible behavioural model using a multinomial logit specification. The relative change is shown in parentheses and is calculated as the percentage difference between the baseline estimate and the simulated estimate. NRS = Nepalese rupees. PHCC = primary health care centre.

Characteristics of the patient

The characteristics of women are typically not amenable to change by policymakers, at least in the short to medium term. In other words, they do not represent a set of policy instruments available to the government. Modelling the effects of changes in certain individual or household attributes does, however, demonstrate how sensitive utilisation is to these factors and can indirectly inform policy. Table 5.15 shows the simulation results for changes in background characteristics of the woman and her household.

If the education of all women is set at least to primary level, the probability of using a regional hospital increases by almost 50 percent, the probability of care at the district hospital increases by 21 percent, the probability of care at a primary health centre increases by 47 percent and the probability of a home delivery is reduced by 5.3 percent. If women have at least a secondary education, these changes become even more marked.

Raising the wealth of households by 50 percent increases the probability of care in all three types of health facility. The greatest increase is seen at the regional hospital (83 percent), followed by primary health centres (16 percent) and then regional hospitals (6 percent). The proportion of deliveries at home would fall by 5 percent. Utilisation is not very sensitive to whether women are marginalised in terms of caste. When the indicator is set to zero for all women, the model

predicts a modest increase in the use of delivery care at regional hospitals and the district hospital. A household's caste has almost no influence on health seeking at primary health centres.

Table 5.15 Simulated effects of a change in individual characteristics on place of delivery

	Regional Hospital	District Hospital	PHCC	Home
Sample proportion	4.2%	5.2%	3.2%	87.4%
Education at least primary completed	6.3%	6.3%	4.7%	82.7%
Relative change	(48.8%)	(21.2%)	(46.5%)	-(5.3%)
Education at least secondary completed	10.0%	7.8%	7.0%	75.2%
Relative change	(137.0%)	(49.9%)	(117.3%)	-(13.9%)
Wealth increased 50%	7.7%	5.5%	3.7%	83.0%
Relative change	(82.7%)	(5.6%)	(16.3%)	-(4.9%)
Wealth increased 100%	12.6%	5.0%	3.9%	78.5%
Relative change	(199.3%)	-(4.9%)	(20.9%)	-(10.1%)
Marginalised set to 0	4.4%	5.9%	3.3%	86.4%
Relative change	(4.2%)	(14.1%)	(2.5%)	-(1.1%)
Marginalised set to 1	4.1%	4.8%	3.2%	88.0%
Relative change	-(3.9%)	-(8.6%)	-(0.6%)	(0.7%)

Note: All simulations are based on the parameter estimates computed for the flexible behavioural model using a multinomial logit specification. The relative change is shown in parentheses and is calculated as the percentage difference between the baseline estimate and the simulated estimate. Completed primary education is grade 6 or above. Completed secondary education is grade 10 or above. PHCC = primary health care centre.

The simulation exercises suggest self-reported health problems have an enormous influence on a family's decision of where to give birth (Table 5.16). Of the various problems, obstructed labour stands out as the most important. A scenario in which the dummy variable for obstructed labour is set to one lowers the expected probability of a home delivery by 51 percent, with the majority of the increase in institutional deliveries being taken up by regional hospitals. If the dummy variable for severe bleeding is set to one, the probability of a home delivery falls by almost 31 percent. Convulsions appear to influence decision making to a lesser degree but still substantially.

Table 5.16 Simulated effects of a change in self-reported obstetric complications on place of delivery

	Regional Hospital	District Hospital	PHCC	Home
Sample proportion	4.2%	5.2%	3.2%	87.4%
Bleeding set to 0	3.9%	5.5%	3.1%	87.5%
Relative change	-(7.1%)	(6.2%)	-(4.0%)	(0.1%)
Bleeding set to 1	31.9%	1.3%	6.2%	60.6%
Relative change	(655.0%)	-(74.8%)	(93.3%)	-(30.7%)
Convulsions set to 0	4.0%	5.4%	3.2%	87.4%
Relative change	-(4.3%)	(2.9%)	-(1.1%)	(0.1%)
Convulsions set to 1	19.2%	2.2%	4.5%	74.1%
Relative change	(354.9%)	-(57.7%)	(39.4%)	-(15.2%)
Obstructed labour set to 0	3.1%	5.1%	3.1%	88.7%
Relative change	-(25.6%)	-(1.7%)	-(4.4%)	(1.5%)
Obstructed labour set to 1	44.0%	7.5%	5.7%	42.8%
Relative change	(940.6%)	(44.6%)	(76.2%)	-(51.0%)
Severe fever set to 0	5.3%	5.0%	3.2%	86.5%
Relative change	(25.4%)	-(3.1%)	-(2.0%)	-(1.0%)
Severe fever set to 1	0.3%	15.9%	1.9%	81.9%
Relative change	-(92.6%)	(205.4%)	-(41.7%)	-(6.2%)

Note: Note: All simulations are based on the parameter estimates computed for the flexible behavioural model using a multinomial logit specification. The relative change is shown in parentheses and is calculated as the percentage difference between the baseline estimate and the simulated estimate. NRS = Nepalese rupees. PHCC = primary health care centre.

5.5 Discussion

5.5.1 Interpretation of findings

Utilisation estimates indicate that 87 percent of women in rural Makwanpur deliver their baby at home. This compares with a national estimate of 86.5 percent in the rural population (Government of Nepal 2007). Household OOP expenditures associated with giving birth in a health facility are large and represent a substantial proportion of annual household consumption. The OOP budget share is 4 percent and 19 percent for a normal delivery and a caesarean section respectively. Clearly, the costs of a caesarean section place an enormous financial burden on the household budget. This sample was made up of women who did manage to seek care and it can only be assumed that the financial burden would be even greater for the remaining women, were they to give birth in a health facility.

A hasty interpretation of this first set of findings, and one made in much of the literature, is that the low utilisation of maternity services can be attributed to the high financial cost of giving birth in a health facility. The results from the demand model provide some support for this argument. Price is found to be a significant determinant of health seeking behaviour and has a reasonably large effect on utilisation. The price elasticity estimates are, if anything, slightly higher than those reported in the rest of the literature (Gertler and Hammer 1997). As the simulations showed, the provision of free maternity care at health facilities would raise the proportion of women delivering in a health facility to almost 40 percent.

Variation in the price elasticities across wealth indicates that price tends to have the largest effect on utilisation of regional and district hospital maternity services for households in the middle wealth quintiles (quintiles three and four). Price elasticity estimates for these health providers, however, do not vary much across the poorest four-fifths of the sample and any government intervention to subsidise maternity services can be expected to have the greatest impact on these families.

Other factors appear to be influential in the decision-making process. The effect of self-reported problems on the utilisation of maternity services is positive, a result found in many other studies. However, what is so striking is the magnitude of the effect. Women who report having experienced serious maternal complications are considerably more likely to deliver in a health

facility. A couple of quotes from women during the qualitative component in the second phase of the evaluation reflect the sentiments of many who were interviewed and throw some light on the issue of obstetric needs and health seeking choices (Powell-Jackson, Neupane et al. 2008):

> "I had difficulties during childbirth, otherwise why would I go to the hospital? When I thought I was going to die I asked my family to take me there. There are so many people in hospital, I am scared of them. It's not the money why I don't want to go to hospital."

> "I don't want to deliver my baby in the hospital because women suffer there and my family is not confident of the hospital's service... that is the reason I don't want to go there. During the delivery the labour pain is there but I still prefer to deliver at home. Only if there is an emergency do I choose to go to hospital."

Interpretation of this finding is not straight forward. As suggested by the quotes, it may be that perceptions of the quality of care are such that women only go to a health facility as a last resort, in the case of a dire emergency. In the absence of a problem, they prefer the default option of delivering at home, but when faced with a severe complication they must seek care and have no alternative but to go to a health facility.

Alternatively, the finding may be indicative of an information failure. The value of institutional delivery care as a preventive intervention may not be well recognised, ensuring the option is given little consideration when there is no obstetric need. After all, the health benefits from curative care are more tangible and certain than those associated with the prevention of a future health problem. In support of this interpretation is the fact that, when asked why they did not deliver in a health facility, 73 percent of Nepalese woman in a national survey felt it was not necessary (Government of Nepal 2007). A further 17 percent of women said it was not customary, suggesting cultural factors may also be influential.

Quality of care was found to be positively associated with utilisation of maternity services. The narrowness of the quality of care measure, however, explains why the magnitude of the effect was so small. Wealth and education also had a positive effect on utilisation, consistent with expectations and other findings from the literature. This implies that maternity care is a normal good. Educated women may put a greater value on health improvements, are more cognisant of the risks of childbirth or have more autonomy in making decisions within the household.

5.5.2 Limitations

Some of the limitations of the analysis are statistical, while others are more substantive. On the statistical side, a number of limitations pertain to the model specification. First, as already noted in the methods section, the IIA assumption required in the multinomial logit model may be overly restrictive. The multinomial probit model is more flexible and does not rest on the assumption of IIA. The Hausman test suggests that the IIA assumption holds. In any case, the results are fairly robust to different assumptions regarding the distribution of the error terms. The functional form of the model appears to be much more important for the results. The flexible behavioural model, proposed by Dow (1995), yields estimates of price elasticity that are much greater than those derived from the more restrictive models.

More substantively, the model includes no empirical measures of many factors that are likely to affect health seeking behaviour at childbirth. The qualitative study conducted as part of the evaluation of the SDIP found factors such as trust in health providers, fear of hospitals, women's empowerment, cultural taboos, social pressure and embarrassment are important in influencing health seeking choices (Powell-Jackson, Neupane et al. 2008). These concepts are difficult to define let alone quantify for the purposes of statistical analysis and, for this reason, are more amenable to qualitative research methods. Omission of these potentially important determinants may bias parameter estimates.

The analysis is based on a theoretical model that hugely simplifies health seeking behaviour. This manifests itself in several ways. The dependent variable is the place of childbirth, when in fact care seeking patterns can be much more complex. Women may seek care at multiple health providers, including traditional providers, who are likely to exert their own influence on the subsequent referral pattern. The circumstances that surround any particular childbirth often influence health seeking decisions, yet they are highly unpredictable and rarely measured. For instance, the same qualitative study quoted above found that the availability of physically helpful persons at the time of childbirth was critical in getting the women to a health facility (Powell-Jackson, Neupane et al. 2008).

A set of limitations concern some of the measures of the independent variables. First, the quality of care measure, as already noted, is inadequate. The probability of there being a skilled birth attendant in each alternative reflects only the availability of staff. The model not only fails to

capture other structural measures of quality of care, it includes nothing on the process and interpersonal aspects of care (Donabedian 1988). While information on many of these aspects of quality of care was available from the Health Provider Survey, the focus on just one district meant that there was insufficient variation in quality of care across observations to perform the econometric analysis.

A second concern relates to the measures of maternal health. From the perspective of understanding health seeking choices, self-reported measures of obstetric problems are relevant since perceptions drive decisions. However, from a public health perspective it is important to know whether individuals seek health care when they are ill. Given the unreliability of self-reported measures of illness (Sen 2002), objective measures are required to know whether women deliver in a hospital when they have a genuine obstetric need. Moreover, if self-reported measures are correlated with wealth, they will be endogenous.

The analysis suffers from a lack of exogenous variation in prices, a problem frequently encountered in this literature (Gertler and Hammer 1997). Given the small geographical coverage of the study, variation in prices is likely to be correlated with characteristics of the household, such as distance to the health facility and socioeconomic status, leaving open the possibility that the effect of price is confounded by factors unobserved to the researcher. In addition, imputed prices may not be a good proxy for ex-ante prices. Given the unpredictability of health care needs at childbirth, actual prices may not coincide with perceptions of the price at each type of provider. Conceivably, uncertainty over the price is itself a determinant of health care choices. Greater certainty over the price of a home delivery may lead some families to shy away from the financial uncertainty of delivering in a health facility.

With a view to understanding more about the likely impact of the SDIP, there is a question over the generalisability of these findings, given that the study was limited to rural areas of one district in Nepal. On the supply-side, there may not be much heterogeneity in the provision of services in the public sector, at least outside of the capital city, Kathmandu. In addition, the exclusion of private health facilities in the analysis may not matter since the public sector dominates the provision of maternal health care in most of the country. On the demand side, particularly in terms of the characteristics of individuals, there are large variations across the country suggesting generalisation beyond the sample may be unreliable. For instance, in the mountain region of

Nepal, physical access to health facilities is much more difficult and it is not obvious that price would have the same effect in the two settings. Certainly, the findings have relevance for Makwanpur district and perhaps rural settings in other hill districts. Generalisations beyond that, however, should be made with caution.

5.5.3 Conclusion

This chapter finds that the price of health seeking at childbirth has a reasonably large and statistically significant effect on the utilisation of maternity services. Women from the middle wealth households (quintiles three and four) tend to be more sensitive to changes in the price. Based on the findings of the simulation exercises, the demand-side incentives of the SDIP are expected to have a modest impact on health seeking behaviour at childbirth, at least in rural settings where the provision of services and the characteristics of the population are similar to the study setting. Demand-side incentives are likely to have the greatest effect on health seeking behaviour among households in the poorest four-fifths of the population. Other factors, in particular self-reported obstetric problems prior to childbirth, appear to exert a much greater influence than price on health seeking choices.

Chapter 6. IMPLEMENTATION OF THE SAFE DELIVERY INCENTIVE PROGRAMME

6.1 Introduction

The popularity of demand-side incentive programmes has grown in recent years and, while there is a wealth of evidence regarding the impact of these programmes, little has been documented about their implementation. This may be because there were few problems during implementation or the interest of policymakers was on outcomes. As countries in South Asia adopt similar policies, there are understandable concerns about government capacity to implement these programmes at scale, making it all the more important to study not just the impact but also the process.

Investigating implementation is an important part of assessing a programme's performance, for without reasonable uptake in the target population there can be little expectation of an impact on outcomes. Process indicators, in other words, are important in informing our expectations of the programme's impact, but also in providing answers to some of the questions around feasibility and policy design. In-depth analysis of the process indicators can be useful in several ways. First, it can shed light on which groups have been reached by the programme and thus whether the programme can be expected to impact on such groups. Second, it is important in understanding the constraints to implementation in order to develop ways in which uptake of the programme can be improved.

This chapter is concerned with a number of key indicators of implementation processes that emerge from the theoretical model of the programme's causal pathway. The empirical analysis is based on data from the Survey of Women. The rich dataset provides an opportunity to assess, for example, the determinants of programme uptake that may not be possible if relying on administrative data from a monitoring database. A particular focus of the analysis is on socioeconomic factors that may have influenced participation in the Safe Delivery Incentive Programme (SDIP). Certainly, the rhetoric of national policymakers suggests that the programme

was intended to reach the poor or marginalised sections of society and it is pertinent to analyse to what extent this is indeed true.

The quantitative analysis of processes in this chapter seeks to understand who has been reached by the SDIP and is thus largely descriptive. Qualitative data regarding implementation of the programme were also collected during the first phase of the evaluation. The qualitative study highlights a number of problems that are likely to have limited uptake of the programme. Combining both the quantitative and qualitative results allows for a more causal interpretation of what factors helped or hindered implementation. This is done in the discussion section of the chapter.

The chapter is structured as follows. Section 6.2 is about the methods, providing a description of the framework behind the analysis, the process indicators, and the analytical methods used. Section 6.3 provides a description of the data. Section 6.4 presents the results and section 6.5 gives a discussion of the interpretation of the results and the limitations of the study.

6.2 Methods

6.2.1 Elements of the process evaluation

A process evaluation aims to generate understanding of what is happening during the implementation of the programme and why (Sanders and Haines 2006). It comprises a number of elements (Saunders, Evans et al. 2005). First, it describes the programme, including its purpose, the design, the underlying theory and the expected impacts as the basis for a critical assessment of the programme as it was conceived. Second, it describes in more detail what the complete and acceptable delivery of the intervention would entail (Bartholomew, Parcel et al. 1998). Third, it assesses fidelity, that is, the extent to which the programme was implemented as planned. Fourth, it assesses the uptake or reach of the programme. Finally, it seeks to understand how contextual factors influence implementation.

This chapter focuses on the fourth and fifth elements. The description of the SDIP in chapter 4 sought to address the other elements of the process evaluation. The discussion at the end of this chapter brings together all these elements and, in addition, draws on evidence from the qualitative study in the first phase of the evaluation (Powell-Jackson, Morrison et al. 2009).

6.2.2 Intermediate steps

The conceptual model of how the SDIP is expected to change health seeking behaviour and ultimately improve maternal health was presented in chapter 3. It showed the intermediate steps involved in reaching programme outcomes: the SDIP is promoted; households with pregnant women hear about the financial incentives offered by the SDIP; households perceive the offer of the demand-side incentives as credible; women give birth in a health facility; and receive the demand-side incentives. Any shortcomings at an earlier stage of the chain will result in failure in later achievements and will dampen the impact of the programme on health seeking behaviour. Thus, an analysis of processes provides the basis for interpreting results regarding the impact of the programme. For example, a lack of programme impact despite the successful completion of intermediate processes may suggest that the theoretical mechanism – the demand-side incentives – rather than implementation is at fault.

A number of these stages warrant further elaboration to conceptualise more clearly the process by which individuals participate in the SDIP. As a public programme, the actions of government

officials and health providers are likely to be influential in determining who finds out about the SDIP and who receives the demand-side incentives. In other words, characterisation of participation must go beyond the individual decision making process of whether to participate, particularly given that exposure to information about the SDIP is, from the woman's perspective, a passive process.

The process in which individuals find out about the SDIP and its benefits is informed by the various sources of information. These include mass media (radio, television, newspaper, billboards); information materials (leaflets, posters); health workers (facility-based staff, community health volunteers); community forums (women's groups, health facility management committees) and word of mouth (friends, neighbours, colleagues etc). With the exception of word of mouth, these represent channels of communication through which the government and its partners can disseminate information about the SDIP.

In contrast, access to information concerning the programme at each source is determined by predisposing factors at the individual level. An illiterate woman, for example, is unlikely to learn about the programme from a newspaper but may have good access to the female community health volunteer. Together these two sets of factors interact to determine who finds out about the programme, with important implications for equity. Broadly, inequality is expected to be greatest where the cost required to access the information is greatest for the individual. For instance, the cost of obtaining information from a facility-based health worker is reasonably high and will mean information is accessed in this way by richer households who are more likely to use health services.

Similarly, there are potentially two sets of factors that determine whether women receive the demand-side incentives. These include the administrative competence of the government and predisposing factors of the individual. Specifically, access to the financial benefits can be expected to be influenced by the official eligibility criteria, discrimination by health workers, the cost of returning to the health facility to collect the money (if required), and the woman's ability both to complete the administration process and advocate for her right to the cash.

6.2.3 Process indicators

The various intermediate steps are assessed through the analysis of a number of corresponding process indicators. Together, these indicators provide a measure of success in the implementation of the programme and can indicate where problems may have arisen along the programmatic pathway. Data required for the process indicators should ideally be available on a regular basis at a disaggregated level in order that problems in the implementation of the programme can be identified and responded to quickly by programme managers. Administrative data of this sort is typically collected through a monitoring system that is set up at the time of the programme's launch. Problems in the SDIP's monitoring system meant that an important objective of the Survey of Women was to collect information on the process indicators. While costly, the availability of household level data provided an opportunity to delve deeper into some of the determinants of programme uptake than administrative data might allow. Table 6.1 summarises the key measures of process.

Table 6.1 Summary of key process indicators

Process	Indicator
1. Promotion of the SDIP	Of women who knew about the SDIP, % of deliveries by source of information (Activities to disseminate information about the SDIP by the central government, district government and government partners) [a]
2. Knowledge of the SDIP	% of deliveries in which the woman knew about the SDIP prior to childbirth
3. Credibility of the demand-side incentives	% of deliveries in which the woman had heard about the SDIP prior to childbirth *and* knew of someone who received the conditional cash transfer
4. Administration of payment system	% of deliveries in a government health facility in which the woman received the conditional cash transfer % of deliveries in a government health facility in which the woman was given maternal care free of charge [b]

Note: Data to measure the process indicators come from the Survey of Women. The unit of analysis (ie. the denominator) is a delivery. [a] Although not an indicator, data from the qualitative study in the first stage of the evaluation provide useful information on activities to promote the programme. [b] This indicator corresponds to the 25 least developed districts (2 districts in the Survey of Women) in which delivery care is given free of charge in addition to the conditional cash transfer.

How people heard about the SDIP provides an indication of the extent to which different channels of communication were used. This indicator is complemented by information about the activities undertaken by the government and its partners to promote the programme.

Knowledge of the SDIP prior to childbirth is the most appropriate indicator to assess the extent to which the programme has reached the target population. The time dimension to the indicator is critical because the programme can only influence the health seeking behaviour of women who had knowledge of the financial benefits prior to delivery. The indicator captures the knowledge of the woman *and* the household decision-maker to reflect the fact that only 20 percent of married women in Nepal make decisions regarding their own health care (Government of Nepal 2007). In the survey interview, the question about knowledge was addressed to both the woman and the mother-in-law (or in her absence, the husband). If either person had knowledge of the SDIP, a positive reply was recorded by the interviewer.[47] In the next chapter, these individuals will make up the treatment group with which to assess the impact of the programme. For simplicity, the expression "the woman's knowledge of the SDIP" is maintained throughout the chapter, but this should be interpreted as the family's knowledge of the SDIP.

The expectation of receiving the demand-side incentives is proxied using the proportion of women who both knew about the programme and had heard of someone else receiving the conditional cash transfer. The underlying premise is that an individual's expectation of receiving the demand-side incentives is heavily influenced by the experience others have had with administration of the payment of cash.

Finally, administration of the demand-side incentives is measured using two indicators, as shown in Table 6.1. No data were available to assess administration of the provider incentive, since the household respondents would not have known whether the health worker attending their delivery ever received the incentive.

6.2.4 Empirical analysis

The analysis is framed around the intermediate steps required for the programme to impact on health seeking behaviour. Bivariate analysis is used to explore associations between the process indicators and key characteristics, with mean values and frequencies reported for each indicator by subgroup categories. For instance, knowledge of the SDIP is reported by each wealth quintile. The analysis is performed one variable at a time and the p-value is provided for the test of the hypothesis that the means of the subgroups are similar to each other.

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[47] However, there were few instances in which knowledge of the SDIP differed between the two respondents.

Since bivariate analysis is unable to control for the influence of other variables, a multivariate setup is used to explore in more depth the determinants of knowledge about the SDIP, credibility and receipt of the conditional cash transfer. In all three instances, the dependent variable reflects a binary choice and is therefore modelled using a probit regression estimated by maximum likelihood methods. The probit model predicts the probability of a positive outcome for given values of the explanatory variables. Owing to the difficulty of interpreting the coefficients of the probit models, the marginal effects at the sample means of each dependent variable are presented instead. The marginal effect quantifies the change in the probability of being exposed to information about the SDIP or receiving the conditional cash transfer arising from a one unit change in the explanatory variable and is calculated at the mean value of the independent variables. The marginal effect of dummy variables is for a discrete change from 0 to 1. All the models are subject to a number of diagnostic checks that are performed to identify specification problems.

To reiterate, the multivariate analysis is descriptive in nature, seeking to understand inequalities in uptake of the programme at each step in the implementation process. It only when these results are combined with the qualitative findings that a more causal interpretation of what factors facilitated or hindered implementation is taken.

Modelling access to information about SDIP

The unit of analysis is a delivery. The dependent variable takes a value of 1 if the woman had knowledge of the SDIP prior to childbirth and 0 otherwise. The probability of knowing about the SDIP is a function of individual and household predisposing factors (age of woman, household wealth, education of woman, occupation of woman, ethnicity of woman, urban household), access to health services (time to the nearest health facility, previous delivery during the SDIP), access to media (frequency of radio use, frequency of newspaper readership), village level factors (availability of women's groups, level of activity of female community health volunteer) and district-level fixed effects. The model thus has the form:

$$y_{ivk} = \beta_1 X_{i1} + \beta_2 X_{i2} + \beta_3 X_v + \gamma_k + \varepsilon_{ivk}$$

where y_{ivk} is the SDIP knowledge variable for each delivery, X_{i1} is the vector of predisposing factors of individual i, X_{i2} is the vector of access to media variables, X_v is vector of village-level factors, γ_k are the district-level and year fixed-effects and ε_{ivk} is a random disturbance term. Since access to the radio and newspapers are directly controlled for, the predisposing factors reflect access to information from the remaining contact points. Note that the coefficients on the media, access to health services and village-level variables will only be significant if information about the SDIP is actually available from these contact points. Therefore, implicitly they measure access to *available* information. The district dummy variables soak up unexplained district-level variation. They capture, inter alia, promotion of the programme by the district health office. Year dummy variables, measuring the length of time since the start of the SDIP, reflect the dissemination of information over time.

A number of model specifications are considered. In the first instance, model 1 includes a full set of regressors with wealth specified in terms of wealth asset quintile dummy variables. In model 2, wealth enters the regression as the logarithm of the asset score variable. Finally, insignificant variables are excluded to give the restricted model 3. This is the preferred model as it fits the data well, is the most parsimonious and remains consistent with the behavioural model.

Modelling credibility of the demand-side incentives

The unit of analysis is a delivery. The analysis performed on the subsample of deliveries in which the woman had heard about the SDIP during pregnancy. The dependent variable takes a value of 1 if the woman knew of at least one other person who had received the cash incentive and 0 otherwise. The probability of knowing an incentive recipient is a function of individual and household predisposing factors (age of woman, household wealth, education of woman, occupation of woman, ethnicity of woman, urban household), access to health services (time to the nearest health facility, previous delivery during the SDIP), village level factors (availability of women's groups, level of activity of female community health volunteer) and district-level fixed effects. The model thus has the form:

$$y_{ivk} = \beta_1 X_{i1} + \beta_2 X_v + \gamma_k + \varepsilon_{ivk}$$

where y_{ivk} is the SDIP knowledge variable for each delivery, X_{i1} is the vector of predisposing factors of individual i, X_v is vector of village-level factors, γ_k are the district-level and year fixed-effects and ε_{ivk} is a random disturbance term. The district dummy variables soak up unexplained district-level variation. They capture, inter alia, effective disbursement of the financial incentives to women. Year dummy variables, measuring the length of time since the start of the SDIP, reflect the dissemination of information about recipients of the cash incentive over time.

Modelling receipt of the conditional cash transfer

The model setup is similar with the dependent variable specified as receipt of the conditional cash transfer. The subsample comprises only deliveries at a government health facility and the unit of analysis is a delivery. The dependent variable takes a value of 1 if the woman received the conditional cash transfer at any time after her delivery and 0 otherwise. The probability of receiving the cash is a function of individual predisposing factors (woman has less than two living children during pregnancy – one of official eligibility criteria, household wealth, education of the woman, ethnicity of the woman, accessibility to the nearest health facility, knowledge of the SDIP prior to childbirth), place of delivery, and district-level fixed effect. The model takes the form:

$$y_{ijk} = \beta_1 X_i + \beta_2 X_j + \gamma_k + \varepsilon_{ijk}$$

where y_{ijk} is receipt of the cash after each delivery, X_i is the vector of predisposing factors, X_j is the place of delivery reflecting administration of the cash payment system, γ_k are the district-level and year fixed-effects and ε_{ijk} is a random disturbance term.

Education is a measure of the woman's ability to complete the administrative process and to advocate for the cash. Ethnicity reflects the possibility of discrimination by health workers. Accessibility to the nearest health facility is a measure of the cost associated with having to return to the facility to collect the cash if it is not available at the time of childbirth. The type of government facility and district-level fixed-effects reflect the administrative competence of the respective government institutions. Two dummy variables for the year of implementation reflect variation in the administration of the conditional cash transfer over time. They are likely to reflect a number of major procedural changes pertaining to the disbursement of SDIP funds agreed

between the government and the donor. Two models are estimated (model 6 and model 7); the former specifies wealth in terms of quintile dummy variables and the latter as its logarithm.

Inequality in knowledge indicator

While variations in each indicator by wealth quintile provide a crude means of identifying socioeconomic inequality, this issue is explored further using concentration curves in the analysis of programme uptake. Concentration curves provide a more complete picture than bivariate analysis by mapping knowledge of the SDIP over the entire distribution of the household living standard. A concentration curve shows the share of knowledge of the SDIP accounted for by cumulative proportions of individuals in the population ranked by the poorest first (Wagstaff, van Doorslaer et al. 1991; Kakwani, Wagstaff et al. 1997). The wealth index is used as the measure of living standard to rank individuals. The line of equality, shown by a 45-degree line, implies that the women, whatever their living standard, are equally as likely to have heard about the SDIP.

A concentration curve that lies below (above) the 45 degree line implies that the knowledge indicator takes lower (higher) values among poorer individuals. Moreover, the further a concentration curve is below (above) the line of equality the more concentrated knowledge of the SDIP is among wealthier (poorer) individuals. A concentration curve that lies above the 45 degree line at all points along the line it is said to dominate. A more formal test that takes account of sampling variability in the survey data is able to conclude whether dominance is statistically significant. It requires the computation of standard errors at various points along the concentration curve.[48]

An extension of the concentration curve is the concentration index, which quantifies the degree of socioeconomic-related inequality in the knowledge variable and therefore allows comparisons between the different sources of information. The concentration index is twice the area between the concentration curve and the line of equality, such that a positive (negative) value indicates that the curve lies below (above) the line of equality and there is inequality in the knowledge indicator in favour of richer (poorer) households. The concentration index is defined as:

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[48] This analysis uses the multiple comparison approach (Dardanoni and Forcina 1999) based on the decision rule that the null hypothesis of nondominance is rejected if there is at least one significant difference between the curve and the 45 degree line in one direction and no significant difference in the other direction. Following O'Donnell (2008), differences are tested at 19 evenly spaced points from 0.05 to 0.95 along the x-axis.

$$C = \frac{2}{n\mu}\sum_{i=1}^{n} y_i R_i - 1$$

where y is the knowledge variable, μ is the mean, n is the number of observations and R_i is fractional rank in the socioeconomic distribution of individual i.[49] When the variable of interest is measured on a ratio scale with zero or positive values, the concentration index is bounded between -1 and 1. In this chapter, however, the knowledge variable is binary, which means the bounds depend on the mean. Wagstaff (2005) shows that, in large samples, the lower bound is given by $\mu - 1$ and the upper bound by $1 - \mu$. When making comparisons in inequality between the different sources of information, the concentration index is normalised to give the concentration index as a proportion of the bound. The standard error of the concentration index is robust to heteroskedasticity of unknown form and is corrected for within-cluster correlation.[50]

Regression diagnostics

A number of econometric problems can arise during multivariate analysis. Some of these are the result of the survey design, while others relate to violations of the basic assumptions of probit regression analysis. Most commonly, they include: data clustering, specification errors, heteroskedasticity, outliers, and multicollinearity.

The two-stage, stratified, cluster survey sampled women from primary sampling units using systematic sampling with probability proportional to size. The clustering of observations within enumeration areas implies that observations are not independent for there is likely to be more homogeneity within clusters than across the whole population. The `svy` command in Stata is used to correct for within-cluster correlation and to apply district weights due to variations in the district populations.

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[49] Implicit in the concentration index is a set of value judgements about inequality aversion. In the standard computation of the concentration index (as defined above), the inequality aversion parameter is set at 2. This implies that the poorest individual's share of the knowledge indicator is weighted by a value close to 2, decreasing incrementally until it reaches almost zero for the wealthiest individual.

[50] It would be informative to decompose the causes of inequality in knowledge of the SDIP but to do so require a non-binary outcome variable, suitable for OLS regression.

Omitted variables or an incorrect functional form can lead to specification errors. These can be detected using a link test that includes the square of predicted values as an explanatory variable in the regression and tests for its statistical significance. None of the models come close to failing the link test, suggesting there are no specification errors. In the analysis of programme coverage, the coefficient on the square of the predicted values was approximately 0.9 in each model ($p=0.35$) and, in the analysis of access to the conditional cash transfer, 0.74 ($p=0.46$).

The problem of multicollinearity between two or more variables was evaluated in terms of the degree of tolerance, a measure of how much collinearity a regression can tolerate. It is calculated as 1 minus the R^2 from a regression of the other variables on the variable of interest. Hence, a tolerance value close to zero indicates the variable is not orthogonal to the other variables. In all models, the diagnostic test suggested there was no problem with multicollinearity.

Outliers that could potentially influence the regression results can be identified by plotting the deviance residuals against the predicted probabilities. Since the intention of a probit regression is to minimise the sum of deviance residuals, observations with a high value are cause for concern. The plots revealed no obvious outliers in any of the models. Moreover, the exclusion of the five observations with the highest deviance residual had no impact on the regression results, suggesting none of these observations were influential.

Heteroskedasticity occurs when the error terms do not have a constant variance and causes inconsistent estimators and an inappropriate covariance matrix (Greene 2008). A likelihood ratio test of the similarity between a full model with heteroskedasticity and a homoskedastic model provides the diagnostic test and can be obtained using the `hetprob` command in Stata. There was no evidence of hetroskedasticity in any of the models.

Finally, the goodness-of-fit of each model is assessed using the Hosmer-Lemeshow chi-squared test. It ranks observations by their predicted probability, groups them into deciles and computes the chi-squared from the observed and predicted frequencies. The null hypothesis states that model fits the data better than the intercept-only model. The Hosmer-Lemesher chi-square statistics presented in the results section are unable to reject the null hypothesis, suggesting the models fit the data reasonably well.

6.3 Data

6.3.1 Data sources

Data come from the Survey of Women, administered in six district of Nepal (see chapter 3 for more details). The sample is limited to those deliveries taking place after the SDIP had been officially launched in July 2005. It includes complete data on 5,483 deliveries. Analysis of receipt of the conditional cash transfer is based on a subsample of 730 deliveries in which the woman delivered in a government health facility. Information on the activities of the government and its partners to promote the SDIP come from the qualitative study in the first phase of the evaluation.

6.3.2 Variable definitions and descriptive statistics

Table 6.2 reports the summary statistics for the independent variables used in the analysis of the determinants of knowledge of the SDIP and credibility of the SDIP. The mean age of women in the sample is 26 years. The ownership of assets is used as the basis for measuring a household's wealth asset score. With no information on household consumption, it provides the most appropriate measure of household living standard. The wealth asset score is derived by principal components analysis to give an index that is increasing in household wealth (Filmer and Pritchett 1998). The method has been described in more detail in chapter 5. In order to test for non-linearity, a polynomial function of wealth is included in the analysis, but to do so requires that all values are positive. For this reason, the wealth index is re-scaled to give values between 1 and 100 that then transformed into its logarithm. The logarithm of wealth has a mean value of 3.27. Using the same variable, observations can be categorised into quintile groups to generate wealth asset quintile dummy variables.

Completed years of education are used to establish the following education categories: no education (0 grades completed); some primary (1-4 grade); primary or some secondary (5-9 grade); and secondary or higher (10 or higher grade). Almost 50 percent of women have no education, while only 15 percent of women have completed secondary education. Almost 60 percent of women work in agriculture. Individual castes or ethnicities are grouped into categories based on those established by experts in this field in Nepal (Bennett, Dahal et al. 2008). Over 30 percent of women belong to the Brahmin / Chhetri group, castes considered as socioeconomically advantaged in Nepal. Janajati, Dalit and Muslim are considered more disadvantaged caste groups and collectively account for 36 percent of all women.

Table 6.2 Descriptive statistics on the variables used in the analysis of knowledge of the SDIP prior to childbirth

Variable	Definition	Mean	Std Deviation
Age	Age of woman	25.75	5.55
Log of wealth	Logarithm of re-scaled wealth asset score	3.27	0.66
No education	1 if woman has no education	0.46	0.50
Primary education	1 if woman has some primary education	0.13	0.33
Secondary education	1 if woman has primary or some secondary education	0.26	0.44
Higher education	1 if woman has secondary or higher education	0.15	0.36
No work	1 if woman does not work	0.21	0.41
Agriculture work	1 if woman works in agriculture	0.58	0.49
Salaried work	1 if woman is salaried or government worker	0.02	0.13
Small business	1 if woman has small business	0.07	0.25
Waged worker	1 if woman is a waged worker	0.12	0.33
Other work	1 if woman has other work	0.00	0.05
Brahmin & Chhetri	1 if woman is Brahim / Chhetri	0.33	0.47
Terai & Madeshi	1 if woman is Terai & Madeshi Other Castes	0.09	0.28
Dalit	1 if woman is Dalit	0.09	0.28
Newar	1 if woman is Newar	0.03	0.17
Janajati	1 if woman is Janajati	0.23	0.42
Muslim	1 if woman is Muslim	0.04	0.19
Other Castes	1 if woman is Other Castes	0.20	0.40
Newspaper daily	1 if woman reads newspaper daily	0.03	0.17
Newspaper weekly	1 if woman reads newspaper weekly	0.09	0.29
Newspaper < weekly	1 if woman reads newspaper less than weekly	0.20	0.40
No read newspaper	1 if woman does not read newspaper	0.68	0.47
Radio daily	1 if woman listens to radio daily	0.40	0.49
Radio weekly	1 if woman listens to radio weekly	0.18	0.39
Radio < weekly	1 if woman listens to radio less than weekly	0.17	0.38
No listen to radio	1 if woman does not listen to radio	0.24	0.43
Walk to facility < 1hr	1 if household can walk to health facility < 1hr	0.22	0.41
Walk to facility 1hr < 4 hr	1 if household can walk to health facility 1hr < 4 hr	0.57	0.50
Walk to facility 4hr < 1 day	1 if household can walk to health facility 4hr < 1 day	0.15	0.36
Walk to facility > 1 day	1 if household can walk to health facility > 1 day	0.06	0.24
Urban	1 if household is urban	0.15	0.36
Previous delivery in SDIP	1 if woman had a previous delivery during SDIP	0.06	0.24
Active FCHV	Index of female community health volunteer activity	0.08	0.10
Women's groups	1 if village has active women's groups	0.26	0.44
Morang	1 if district is Morang	0.44	0.50
Sankhuwasabha	1 if district is Sankhuwasabha	0.11	0.31
Myagdi	1 if district is Myagdi	0.07	0.26
Rupandehi	1 if district is Rupandehi	0.07	0.25
Jumla	1 if district is Jumla	0.23	0.42
Achham	1 if district is Achham	0.08	0.27
SDIP year 1	1 if 1st year of SDIP in which delivery took place	0.35	0.48
SDIP year 2	1 if 2nd year of SDIP in which delivery took place	0.43	0.49
SDIP year 3	1 if 3rd year of SDIP in which delivery took place	0.22	0.42

Note: Sample includes 5,483 deliveries, all of which took place after the start of the SDIP (July 2005). Sample weights are applied. FCHV = female community health volunteer

In the survey, women were asked about their exposure to various forms of media. Only 30 percent of women ever read a newspaper, but access to the radio is much greater with 75 percent of women listening at least occasionally (and 40 percent listening daily). The time it takes to walk to the nearest health facility is categorised into four groups. Just over 20 percent of women live with one hour's walk of a health facility, while the majority (57 percent) live between one and four hours from a facility. The majority of the sample is rural, with only 15 percent of households located in areas labelled urban in the most recent national census. Less than 10 percent of women had a previous delivery during the period in which the SDIP was operating.

The determinants include two village level variables. The level of activity of the female community health volunteer is an index that ranges between possible values of 0 to 1. The indicator provides a measure of how active the female community health volunteer in each village is in disseminating information about the SDIP to the community. It is calculated as the proportion of women in a village who found out about the SDIP through the female community health volunteer. Each observation takes the mean value of the village. The mean value indicates that almost 10 percent of women in each village found out about the SDIP through the female community health volunteer. The women's group variable is binary and indicates whether the village in which the woman lives has women's group meetings. Almost 30 percent of women live in villages with women's groups operating. The district and regional dummy variable mean estimates show that the sample across these geographical dimensions is reasonably evenly spread. The regional dummy variables represent not only different topography but also variations in the package of financial benefits provided under the SDIP. The time dummy variables indicate the year in which the delivery took place.

Table 6.3 reports the summary statistics for the independent variables used to explore factors associated with receipt of the conditional cash transfer. The sample is limited to those deliveries taking place in a government hospital after the start of the SDIP and many of the independent variables are the same as those used in the analysis of knowledge of the programme. Over 80 percent of women had less than two living children at the time of pregnancy making them automatically eligible to receive the conditional cash transfer. The vast majority delivered in a government hospital.

Table 6.3 Descriptive statistics on the variables used in the analysis of receipt of the conditional cash transfer

Variable	Definition	Mean	Std Deviation
Parity<2	1 if woman had < 2 living children at pregnancy	0.86	0.35
Log of wealth	Logarithm of re-scaled wealth asset score	3.73	0.51
No education	1 if woman has no education	0.20	0.40
Primary education	1 if woman has some primary education	0.09	0.28
Secondary education	1 if woman has primary / some secondary education	0.33	0.47
Higher education	1 if woman has secondary or higher education	0.38	0.49
Brahim / Chhetri	1 if woman is Brahim / Chhetri	0.44	0.50
Terai & Madeshi	1 if woman is Terai & Madeshi Other Castes	0.05	0.23
Dalit	1 if woman is Dalit	0.04	0.20
Newar	1 if woman is Newar	0.04	0.21
Janajati	1 if woman is Janajati	0.22	0.42
Muslim	1 if woman is Muslim	0.02	0.13
Other Castes	1 if woman is Other Castes	0.18	0.38
Walk to facility < 1hr	1 if household can walk to health facility < 1hr	0.38	0.49
Walk to facility 1hr < 4 hr	1 if household can walk to health facility 1hr < 4 hr	0.49	0.50
Walk to facility 4hr < 1 day	1 if household can walk to health facility 4hr < 1 day	0.12	0.32
Walk to facility > 1 day	1 if household can walk to health facility > 1 day	0.01	0.09
Delivery in govt hospital	1 if woman delivered in a govt hospital	0.80	0.40
Delivery in govt PHCC	1 if woman delivered in a govt PHCC	0.17	0.37
Delivery in health post	1 if woman delivered in a govt health post	0.03	0.17
Morang	1 if district is Morang	0.67	0.47
Sankhuwasabha	1 if district is Sankhuwasabha	0.06	0.24
Myagdi	1 if district is Myagdi	0.05	0.21
Rupandehi	1 if district is Rupandehi	0.02	0.15
Jumla	1 if district is Jumla	0.19	0.39
Achham	1 if district is Achham	0.004	0.06
SDIP year 1	1 if 1st year of SDIP in which delivery took place	0.30	0.46
SDIP year 2	1 if 2nd year of SDIP in which delivery took place	0.44	0.50
SDIP year 3	1 if 3rd year of SDIP in which delivery took place	0.26	0.44

Note: Sample includes 730 deliveries, all of which took place after the start of the SDIP (July 2005) in a government health facility. Sample weights are applied. PHCC = primary health care centre.

6.4 Results

6.4.1 Promotion of the SDIP

Table 6.4 provides a summary of activities undertaken by the government and non-state actors to promote the SDIP during the study period. The central level did very little to promote the SDIP. It sent out guidelines to district health offices and regional hospitals but with the primary purpose of guiding implementation, not promoting the programme. The central level was reluctant to initiate a national information campaign and devoted no resources to either this or a broader communication strategy over the study period.

At the district level, there were more examples of the government making efforts to publicise the programme but these were done in an ad hoc manner and were not part of any concerted strategy. The typical means of communication was via word of mouth through the health workers and community health volunteers. The activities of non-state partners were similarly sporadic and limited to those areas where the organisations were operating.

Table 6.4 Activities undertaken by the government and its partners to promote the SDIP

Central level actions	District level government	District level non-state actors
▪ Programme guidelines given to district health offices and regional hospitals ▪ Information kit given to district officials involved in implementation	▪ Programme guidelines given to government health providers ▪ Health staff and community health volunteers encouraged to publicise via word of mouth ▪ FM radio – eg. broadcast of list of recipients ▪ Special events – eg. an awareness camp on the SDIP	▪ Community forums – women's groups, safe motherhood emergency fund committee ▪ Printing of information posters ▪ Health staff encouraged by NGOs to promote SDIP during antenatal care visits

Note: Data come from the qualitative study in the first phase of the evaluation, which was conducted in 10 districts of Nepal (including the six districts sampled in the Survey of Women). NGO = non-governmental organisation.

The most common means by which women first found out about the SDIP was through friends and family, accounting for 45 percent of the total (Table 6.5). Female community health volunteers and professional health workers were the source of information for approximately 20 percent of women respectively. Media (television, radio and newspaper) accounted for just 6.5 percent of the total. Women's groups were the source of information for 5.9 percent of women. The fact that the mass media accounted for such a small proportion of those informed is consistent with there being no concerted information campaign by the government.

Table 6.5 Percentage distribution of deliveries by source of information, according to district

	Morang	Sankhuwasabha	Myagdi	Rupandehi	Jumla	Achham	Total
Word of mouth							
Friends / relatives (%)	54.9	49.3	41.2	55.0	30.8	43.3	50.2
FCHV (%)	15.0	23.8	15.3	14.7	37.4	18.2	18.0
Health worker (%)	22.7	18.5	20.8	20.7	13.1	25.4	20.7
Women's group (%)	2.5	1.0	11.3	4.2	8.6	7.8	4.3
TBA (%)	0.5	0.6	0.4	0.3	2.0	0.7	0.6
Mass media							
Radio (%)	3.0	6.5	7.8	3.0	8.2	2.6	4.7
Newspaper (%)	0.7	0.0	0.7	0.6	0.0	1.0	0.6
Television (%)	0.5	0.0	1.3	0.9	0.0	0.3	0.6
Other sources (%)	0.2	0.2	1.1	0.6	0.0	0.3	0.4
Don't know (%)	0.0	0.0	0.0	0.0	0.0	0.3	0.03
Total (%)	100	100	100	100	100	100	100
Number of obs	401	491	451	333	452	307	2435

Note: The denominator is the number of deliveries in which the woman knew about the SDIP at the time of the survey. Sample weights are applied in estimation of the total. FCHV = female community health volunteer. TBA = traditional birth attendant.

The importance of each source of information varied between districts (Table 6.5). Relatively large differences between districts are apparent in the case of female community health volunteers, women's groups and radio – all channels which could be used by district officials to disseminate information. The variation may suggest some districts were more successful or willing than others in making use of these channels.

6.4.2 Knowledge of the SDIP

Table 6.6 provides estimates of the mean knowledge of the SDIP prior to childbirth, according to various background characteristics. Only 24 percent of women had knowledge of the SDIP when pregnant. In other words, three-quarters of women did not know about the SDIP when they and their families made the decision of where to give birth. The level of knowledge within the broader target population of women of childbearing age may have been lower since the survey respondents are more likely to have come into contact with the health system where they may have found out about the SDIP.

Table 6.6 Percentage of deliveries in which the woman had knowledge of the SDIP prior to childbirth, according to background characteristics

Background characteristic	%	p-value	N
District			
Morang	22.2	< 0.001	964
Sankhuwasabha	39.6		893
Myagdi	30.6		795
Rupandehi	17.9		911
Jumla	33.6		961
Achham	20.0		959
Wealth			
Poorest	16.2	< 0.001	1,108
Poorer	26.9		1,096
Middle	23.5		1,077
Richer	21.4		1,100
Richest	28.3		1,102
Education			
No education	15.7	< 0.001	3049
Primary education	25.5		675
Secondary education	28.2		1184
Higher education	42.3		575
Caste			
Brahmin / Chhetri	33.4	< 0.001	2,364
Madheshi	21.8		410
Dalit	21.8		742
Newar	40.6		129
Janajati	20.9		1,074
Muslim	4.3		127
Other castes	16.8		631
Accessibility to health facility			
Walk < 1hr	31.3	< 0.001	918
Walk 1hr < 4 hr	25.0		3185
Walk 4hr < 1 day	17.7		900
Walk > 1 day	8.9		480
Type of dwelling			
Urban	28.9	0.2704	517
Rural	23.4		4966
Year of implementation			
1st year of the SDIP	18.4	< 0.001	2037
2nd year of the SDIP	24.3		2327
3rd year of the SDIP	33.5		1116
Total	24.3		5,483

Note: Using an adjusted Wald test, the p-value is provided for the test of the hypothesis that the means of the subgroups are similar to each other. Sample weights are applied and standard errors are adjusted for clustering and stratification.

Women in the district of Rupandehi were least likely to know of the SDIP during pregnancy, while those in Sankhuwasabha were most likely to have heard of the programme. Knowledge

varied by household wealth, with women in the poorest quintile less likely to have heard of the SDIP that those in the wealthier quintiles. The higher the level of education, the higher the probability that the women were to have heard of the SDIP. Women of castes regarded as the most advantaged (Brahmin, Chhetri and Newar) were most likely to have been exposed to information about the SDIP. A clear pattern is observed by access, with households living closer to a health facility more likely to have heard of the programme. Similarly, urban households have a higher chance of knowing about the SDIP than rural households, although the difference was not significant. Finally, over each year of implementation, there has been a steady improvement in exposure to information about the programme.

Table 6.7 provides a variety of measures to assess socioeconomic inequality in terms of who found out about the SDIP during pregnancy. The cumulative shares by wealth quintile indicate inequality in favour of wealthier households. The poorest 40 percent of households, for example, accounted for 37 percent of knowledge, significantly less than its population share. Inequality in the knowledge of the SDIP across the different sources of information is most easily quantified using the concentration index.

Table 6.7 Inequality in knowledge of the SDIP prior to childbirth, by source of information

Cumulative share of knowledge of SDIP during pregnancy	All sources (%)	Friend or relative (%)	FCHV (%)	Health worker (%)	Radio (%)	Women's group (%)
Poorest 20%	17.7**	14.1**	22.2	12.7**	20.9	22.8
(standard error)	(0.93)	(0.93)	(1.95)	(1.46)	(4.04)	(4.16)
Poorest 40%	37.1**	30.4**	42.0	31.4**	51.5**	49.5
	(1.19)	(1.21)	(2.33)	(2.02)	(4.95)	(4.97)
Poorest 60%	54.7**	47.5**	63.5	47.6**	70.0**	64.0
	(1.19)	(1.29)	(2.27)	(2.15)	(4.53)	(4.76)
Poorest 80%	72.9	67.2**	82.4	69.5**	76.7	83.4
	(1.04)	(1.16)	(1.79)	(2.00)	(4.16)	(3.69)
Test of dominance against 45° line	–	–	+	–		
Concentration index	0.082**	0.181**	-0.056	0.165**	-0.060	-0.096
(standard error)	(0.026)	(0.026)	(0.054)	(0.037)	(0.073)	(0.098)
Normalised concentration index	0.109	0.231	-0.061	0.182	-0.062	-0.098

Note: ** denotes shares are significantly difference from population share at the 5 percent level. 45° line that dominates (lies above) the concentration curve is indicated by a negative sign. 45° line that is dominated (lies below) by the concentration curve is indicated by a positive sign. Blank cell indicates no dominance. Sample weights are applied and standard errors are adjusted for clustering. FCHV = female community health volunteer.

For some sources of information – female community health volunteers, radio and women's groups – there is no statistically significant inequality. Women's groups are associated with the

least inequality in knowledge of the SDIP. In contrast, where women heard about the SDIP through friends or relatives and health workers, the results suggest there was inequality in favour of wealthier households. Estimates of the normalised concentration index reveal no substantive differences from the unadjusted estimates because the means of each indicator are so low.

Visual inspection of the concentration curves in Figure 6.1 largely confirms the previous findings. However, the corresponding tests of dominance shown in Table 6.7 are not entirely consistent with the concentration index estimates. The concentration index in the case of female community health volunteers, for example, is not statistically different from zero while the test of dominance suggests that the concentration curve lies above the line of equality. The reason for this result lies in the particular decision rule used in the test of dominance, illustrating why it is important to refer to findings from all the various ways of assessing inequality. Overall the findings are largely consistent with expectations. Those information sources that are the most costly to access appear to be associated with the greatest inequality.

Figure 6.1 Concentration curves for knowledge of the SDIP prior to childbirth, by source of information

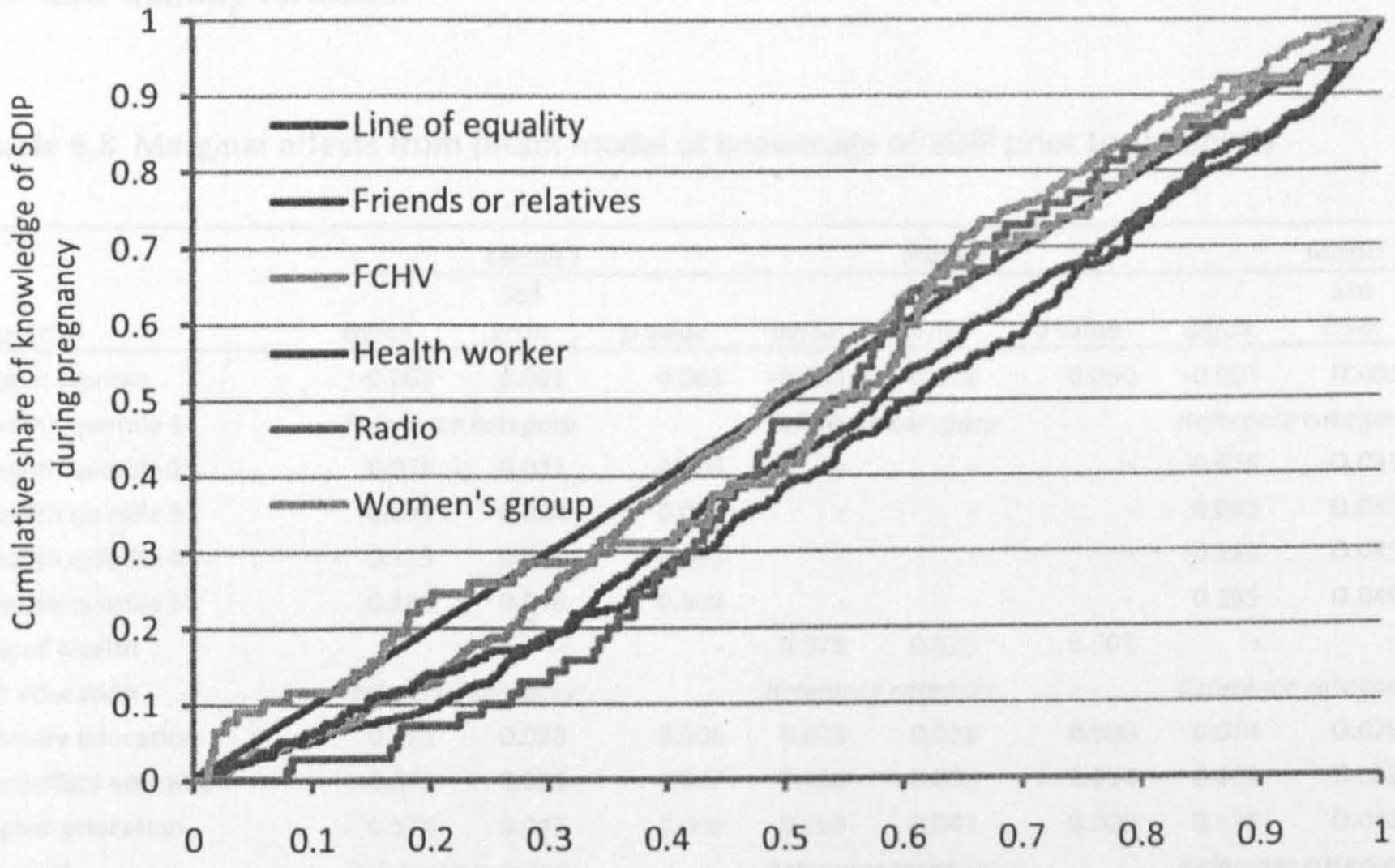

Table 6.8 summarises the results from three probit models with knowledge of the SDIP prior to childbirth as the dependent variable. It gives the marginal effect, standard error and p-value for the coefficient of each independent variable. All the models fit the data reasonably well, as

indicated by the low Hosmer-Lemeshow chi-square test statistic, and regardless of how it is specified, wealth has a significant positive influence on knowledge of the SDIP. In the preferred specification, model 3, the restrictions result in a set of explanatory variables that are almost all significant predictors of variation in knowledge of the SDIP.

Younger and more educated women are more likely to have knowledge of the SDIP during pregnancy. Women from wealthier households have a higher chance of being exposed to information about the SDIP, while women belonging to Janajati or Muslim castes are less likely than the reference group (Brahmin / Chhetri) to have knowledge of the programme. Exposure to newspapers and the radio appears to be positively associated with knowledge of the SDIP. Women living closer to a health facility are more likely to have heard of the programme, as are women living in villages with active female community health volunteers. If a woman gave birth to a previous baby during the SDIP, she is more likely to know of the programme. Women from the districts of Sankhuwasabha, Myagdi, Rupandehi and Achham have a higher chance than Morang of knowing about the SDIP while they were pregnant. Lastly, as the programme has matured, exposure to information on the programme has increased, as indicated by the effect of the time dummy variables.

Table 6.8 Marginal effects from probit model of knowledge of SDIP prior to childbirth

	Model 1			Model 2			Model 3		
Variable	dy/dx	Std Error	p value	dy/dx	Std Error	p value	dy/dx	Std Error	p value
Age of woman	-0.003	0.001	0.065	-0.003	0.001	0.050	-0.003	0.001	0.066
Wealth quintile 1	*Reference category*			*Reference category*			*Reference category*		
Wealth quintile 2	0.079	0.031	0.006	-	-	-	0.079	0.031	0.006
Wealth quintile 3	0.083	0.034	0.009	-	-	-	0.083	0.035	0.011
Wealth quintile 4	0.125	0.045	0.003	-	-	-	0.123	0.045	0.004
Wealth quintile 5	0.160	0.046	0.000	-	-	-	0.155	0.049	0.001
Log of wealth	-	-	-	0.078	0.023	0.001	-	-	-
No education	*Reference category*			*Reference category*			*Reference category*		
Primary education	0.073	0.028	0.006	0.073	0.028	0.006	0.074	0.029	0.006
Secondary education	0.071	0.033	0.027	0.069	0.033	0.034	0.070	0.032	0.023
Higher education	0.174	0.043	0.000	0.159	0.042	0.000	0.176	0.043	0.000
No work	*Reference category*			*Reference category*			*Reference category*		
Agriculture work	0.028	0.021	0.201	0.031	0.021	0.149	-	-	-
Salaried work	0.040	0.053	0.429	0.044	0.053	0.371	-	-	-
Small business	0.012	0.038	0.760	0.009	0.038	0.800	-	-	-
Waged worker	0.027	0.042	0.507	0.032	0.042	0.429	-	-	-
Other work	-0.008	0.116	0.947	-0.002	0.120	0.989	-	-	-
Brahmin & Chhetri	*Reference category*			*Reference category*			*Reference category*		
Terai & Madeshi	-0.009	0.027	0.745	-0.005	0.027	0.866	-0.011	0.026	0.675
Dalit	-0.041	0.024	0.108	-0.039	0.025	0.128	-0.043	0.023	0.080
Newar	-0.012	0.039	0.759	-0.012	0.040	0.775	-0.014	0.039	0.720

Table continued...

Variable	Model 1 dy/dx	Model 1 Std Error	Model 1 p value	Model 2 dy/dx	Model 2 Std Error	Model 2 p value	Model 3 dy/dx	Model 3 Std Error	Model 3 p value
Janajati	-0.064	0.022	0.004	-0.061	0.022	0.007	-0.067	0.021	0.003
Muslim	-0.148	0.025	0.000	-0.144	0.026	0.000	-0.151	0.024	0.000
Other Castes	-0.027	0.027	0.318	-0.022	0.027	0.437	-0.027	0.027	0.319
Newspaper daily	*Reference category*			*Reference category*			*Reference category*		
Newspaper weekly	-0.096	0.033	0.013	-0.089	0.034	0.022	-0.099	0.033	0.010
Newspaper < weekly	-0.094	0.038	0.025	-0.082	0.038	0.051	-0.097	0.037	0.018
No read newspaper	-0.119	0.057	0.027	-0.103	0.056	0.055	-0.122	0.055	0.018
Radio daily	*Reference category*			*Reference category*			*Reference category*		
Radio weekly	-0.063	0.017	0.000	-0.062	0.017	0.001	-0.064	0.017	0.000
Radio < weekly	-0.077	0.016	0.000	-0.076	0.016	0.000	-0.077	0.016	0.000
No listen to radio	-0.057	0.023	0.018	-0.057	0.023	0.018	-0.058	0.023	0.016
Walk to facility < 1hr	*Reference category*			*Reference category*			*Reference category*		
Walk to facility 1hr < 4 hr	-0.057	0.032	0.061	-0.057	0.032	0.064	-0.059	0.027	0.022
Walk to facility 4hr < 1 day	-0.115	0.028	0.000	-0.115	0.028	0.000	-0.117	0.024	0.000
Walk to facility > 1 day	-0.151	0.024	0.000	-0.151	0.024	0.000	-0.152	0.022	0.000
Urban	0.025	0.038	0.502	0.017	0.037	0.650	-	-	-
Previous delivery in SDIP	0.054	0.026	0.029	0.055	0.026	0.024	0.055	0.027	0.029
Active FCHV	0.790	0.081	0.000	0.797	0.081	0.000	0.775	0.08	0.000
Women's groups	0.028	0.020	0.161	0.028	0.020	0.156	0.028	0.020	0.149
Morang	*Reference category*			*Reference category*			*Reference category*		
Sankhuwasabha	0.289	0.046	0.000	0.302	0.045	0.000	0.289	0.050	0.000
Myagdi	0.231	0.047	0.000	0.238	0.046	0.000	0.226	0.048	0.000
Rupandehi	0.194	0.057	0.000	0.203	0.055	0.000	0.197	0.060	0.000
Jumla	0.043	0.030	0.144	0.036	0.030	0.219	0.043	0.029	0.131
Achham	0.215	0.061	0.000	0.217	0.061	0.000	0.216	0.063	0.000
SDIP year 1	*Reference category*			*Reference category*			*Reference category*		
SDIP year 2	0.062	0.019	0.001	0.062	0.019	0.001	0.062	0.019	0.001
SDIP year 3	0.173	0.022	0.000	0.173	0.022	0.000	0.173	0.023	0.000
N obs	5483			5483			5483		
Pseudo R^2	0.1583			0.1583			0.1576		
Log likelihood	-2558			-2558			-2560		
LR χ^2	1031.3			1022.0			941.0		
Prob > χ^2	0.000			0.000			0.000		
Hosmer-Lemeshow χ^2	11.500			9.840			11.74		
Prob > χ^2	0.1750			0.2767			0.1631		

Note: Sample weights are applied and standard errors are adjusted for clustering. FCHV = female community health volunteer.

In terms of magnitude, some of the district variables appear to have the greatest impact on the probability of women being exposed to information about the SDIP (Table 6.8). Women living in Sankhuwasabha, for example, are over 30 percentage points more likely to be exposed to information about the SDIP than those in Morang at the sample mean of the independent variables. The effect on exposure to information on the SDIP is also large for higher educated women, wealthier families, households with poor access to the nearest health facility, women belonging to the Muslim caste group and women who gave birth in the third year of programme implementation. With respect to the continuous variables, the level of activity of the female

community health volunteer has a large effect on knowledge of the programme. A 10 percentage point increase in the index measuring the level of activity of the village's female community health volunteer (index ranges from 0 to 1) increases the probability of being aware of the SDIP by 7.8 percentage points.

6.4.3 Credibility of the demand-side incentives

Table 6.9 reports estimates for the proxy indicator for credibility of the demand-side incentives – deliveries in which the woman knew of someone else who received the conditional cash transfer. Only 11 percent of the overall sample was reached by the programme in this sense. There were significant variations by level of education, caste group, accessibility to the nearest health facility and the year of the programme's implementation. The pattern of variation in estimates across subgroups was similar to those found in Table 6.6 for the indicator of knowledge of the programme. In the subsample of deliveries in which the women had knowledge of the SDIP prior to childbirth, the woman knew of someone who had received the conditional cash transfer in 47 percent of cases. There were significant variations in this indicator by district, wealth quintile, caste group, and accessibility to the nearest health facility.

Table 6.10 shows the results of multivariate analysis. There are some qualitative differences in the results according to whether wealth is specified as quintile groups or as a continuous variable. Knowing someone else who received the cash transfer (conditional on knowing about the SDIP) is consistently positively associated with wealth, waged labour, an active FCHV, and two of the districts (Sankhuwasabha, Achham). The dependent variable is consistently negatively associated with some caste groups (Newar, Muslim), and distance from the nearest health facility when more than one day's walk.

Whether knowledge of others who have received the conditional cash transfer is a good proxy for expectations of receiving the money is an important question. It must lead to a positive, however small, expectation of receiving the incentive. But an individual's expectations may be formed through various processes, of which only one is the experience of others in accessing the cash. An individual who finds out about the SDIP from a trusted and reliable source may be inclined to believe the promise of cash is credible. Similarly, health workers may have given the impression the demand-side incentives were being paid on time, purely because they have an incentive to encourage more women into health facilities.

Table 6.9 Percentage of deliveries in which the woman had knowledge of the SDIP prior to childbirth and knew of someone else who received the conditional cash transfer, according to background characteristics

Variable	Full sample			Sub sample of women with knowledge of SDIP		
	%	p-value	N	%	p-value	N
District						
Morang	10.2	0.1373	964	45.8	0.0249	214
Sankhuwasabha	19.9		893	50.3		354
Myagdi	12.7		795	41.6		243
Rupandehi	9.0		911	50.3		163
Jumla	11.0		961	32.8		323
Achham	12.2		959	60.9		192
Wealth						
Poorest	7.7	0.1806	1,108	47.8	0.0015	179
Poorer	9.7		1,096	36.1		300
Middle	9.8		1,077	41.6		340
Richer	12.1		1,100	56.3		337
Richest	13.0		1,102	45.8		333
Education						
No education	7.5	< 0.001	3,049	47.6	0.9096	603
Primary education	11.5		675	45.1		201
Secondary education	12.7		1,184	45.1		404
Higher education	20.4		575	48.2		281
Caste						
Brahmin / Chhetri / Newar	15.9	< 0.001	2,493	46.8	0.031	843
Madheshi	10.0		410	45.7		94
Dalit	10.5		742	48.1		176
Janajati	9.0		1,074	43.1		258
Muslim	0.5		127	11.4		7
Access to health facility						
Walk < 1hr	15.2	< 0.001	918	48.3	0.0056	359
Walk 1hr < 4 hr	12.1		3,185	48.4		913
Walk 4hr < 1 day	6.7		900	37.7		171
Walk > 1 day	2.3		480	25.5		46
Type of dwelling						
Urban	16.0	0.1401	517	55.4	0.0686	179
Rural	10.5		4,966	44.7		1,310
Year of implementation						
1st year of the SDIP	8.0	< 0.001	2,037	43.2	0.3029	462
2nd year of the SDIP	11.4		2,327	47.0		644
3rd year of the SDIP	16.5		1,116	49.4		383
Total	11.3		5,483	46.7		1,489

Note: Using an adjusted Wald test, the p-value is provided for the test of the hypothesis that the means of the subgroups are similar to each other. Sample weights are applied and standard errors are adjusted for clustering.

Table 6.10 Marginal effects from probit model of credibility of the conditional cash transfer

	Model 4			Model 5		
Variable	dy/dx.	Std Error	p value	dy/dx.	Std Error	p value
Age of woman	-0.003	0.004	0.506	-0.004	0.004	0.308
Wealth quintile 1	*Reference category*			*Reference category*		
Wealth quintile 2	-0.063	0.059	0.296	-	-	-
Wealth quintile 3	0.021	0.065	0.749	-	-	-
Wealth quintile 4	0.185	0.070	0.010	-	-	-
Wealth quintile 5	0.086	0.089	0.337	-	-	-
Log of wealth	-	-	-	0.122	0.060	0.043
No education	*Reference category*			*Reference category*		
Primary education	-0.053	0.063	0.402	-0.062	0.063	0.328
Secondary education	-0.071	0.059	0.226	-0.089	0.059	0.135
Higher education	-0.061	0.060	0.313	-0.120	0.060	0.051
No work	*Reference category*			*Reference category*		
Agriculture work	0.009	0.067	0.891	0.030	0.066	0.648
Salaried work	0.126	0.112	0.269	0.141	0.105	0.190
Small business	0.049	0.073	0.500	0.049	0.075	0.509
Waged workers	0.150	0.072	0.041	0.183	0.070	0.011
Other work	0.350	0.180	0.142	0.353	0.170	0.119
Brahim / Chhetri	*Reference category*			*Reference category*		
Terai & Madeshi	-0.060	0.093	0.528	-0.036	0.095	0.708
Dalit	0.020	0.069	0.767	0.016	0.070	0.816
Newar	-0.185	0.071	0.017	-0.182	0.075	0.024
Janajati	-0.066	0.048	0.173	-0.058	0.048	0.230
Muslim	-0.390	0.086	0.022	-0.377	0.089	0.019
Other Castes	-0.016	0.077	0.834	0.010	0.077	0.899
Walk to facility < 1hr	*Reference category*			*Reference category*		
Walk to facility 1hr < 4 hr	0.004	0.045	0.933	0.010	0.046	0.832
Walk to facility 4hr < 1 day	-0.117	0.070	0.109	-0.105	0.073	0.162
Walk to facility > 1 day	-0.210	0.082	0.025	-0.213	0.081	0.021
Urban	0.104	0.061	0.090	0.088	0.062	0.153
Previous delivery in SDIP	-0.069	0.050	0.172	-0.058	0.050	0.250
Active FCHV	0.474	0.214	0.026	0.518	0.216	0.016
Women's groups	0.058	0.045	0.194	0.058	0.043	0.179
Morang	*Reference category*			*Reference category*		
Sankhuwasabha	0.118	0.064	0.068	0.146	0.066	0.029
Myagdi	0.012	0.082	0.879	0.053	0.077	0.489
Rupandehi	-0.137	0.086	0.124	-0.133	0.089	0.148
Jumla	0.086	0.072	0.236	0.068	0.072	0.340
Achham	0.224	0.087	0.015	0.255	0.085	0.006
SDIP year 1	*Reference category*			*Reference category*		
SDIP year 2	0.059	0.042	0.161	0.050	0.042	0.229
SDIP year 3	0.078	0.047	0.100	0.085	0.046	0.066
N obs	1489			1489		
Pseudo R^2	0.0616			0.0542		
Log likelihood	-965.4			-973.1		
LR χ^2	103.35			78.42		
Prob > χ^2	0.000			0.000		
Hosmer-Lemeshow χ^2	7.21			6.76		
Prob > χ^2	0.5139			0.563		

Note: Sample weights are applied and standard errors are adjusted for clustering. FCHV = female community health volunteer.

6.4.4 Receipt of the demand-side incentives

The Survey of Women obtained information on the conditional cash transfer to find out whether the woman received it when discharged from the health facility, at a later date, as a deduction from the bill (ie. a price subsidy equivalent to the amount of cash), or not at all. Table 6.11 provides estimates for these indicators for various subgroups, using the number of women who delivered in a government health facility as the denominator, hereafter referred to as eligible women.[51]

The proportion of eligible women receiving the cash when discharged from the health facility was 20 percent. This indicator corresponds to the stated policy of giving the cash to the woman immediately after delivery. A further 10 percent of women received the cash from the health facility at a later date, and 7 percent of eligible women had the full cash amount deducted from their bill. This leaves over 60 percent of eligible women who did not receive the cash or an equivalent deduction in their bill. A large proportion of eligible women were clearly either never paid or paid late indicating that there have been problems in the administration of the conditional cash transfer.

There were significant variations in the proportion of eligible women who received the cash at the facility by district and year of implementation. Variation across districts ranged from 15 percent of eligible women receiving the cash on time in Sankhuwasabha to 51 percent in Jumla. Administration of the cash has improved substantially each year since implementation started. Over time, a greater proportion of eligible women received the cash and, in the third year, 35 percent of these cases were paid at discharge from the facility.

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[51] Estimates indicate that at least 90 percent of women who delivered in a government health facility were eligible to receive the cash, but it may be higher. 85 percent of women who delivered in a government health facility had less than two living children during pregnancy making them eligible to receive the cash. Of the remaining 124 women (15 percent), 29 were eligible on the basis of having reported a caesarean section or assisted delivery (indicative of an obstetric complication). It is not known if any of the remaining women had an obstetric complication.

Table 6.11 Percentage of deliveries at a government health facility in which the woman received the conditional cash transfer, according to background characteristics

Background characteristics	Woman received the conditional cash transfer: Immediately after childbirth (%)	p-value	At a later date (%)	p-value	As a deduction from the bill (%)	p-value	N
District							
Morang	18.2	0.0124	7.1	< 0.001	0.3	< 0.001	297
Sankhuwasabha	14.8		38.9		1.9		108
Myagdi	30.7		27.7		1.0		101
Rupandehi	20.9		3.3		33.3		153
Jumla	50.8		16.4		0.0		61
Achham	30.0		20.0		0.0		10
Type of health facility							
Hospital	20.5	0.8504	6.8	0.0731	7.8	< 0.001	604
Primary health centre	16.3		20.3		2.8		98
Health post	21.9		23.2		0.0		27
Accessibility							
Walk < 1hr	24.6	0.2555	11.4	< 0.001	4.3	0.5621	278
Walk 1hr < 4 hr	16.3		9.6		7.8		369
Walk 4hr < 1 day	19.5		4.2		9.6		76
Walk > 1 day	12.6		0.0		16.8		7
Ethnicity							
Brahmin, Chhetri	17.6	0.4515	10.6	0.0488	8.0	0.0006	473
Madheshi	25.6		6.2		11.6		38
Dalit	21.1		21.2		0.0		52
Janajati	15.9		6.6		8.6		155
Muslim	25.3		2.6		0.0		12
Education							
No education	9.8	0.514	1.2	0.2291	0.0	0.0205	154
Primary education	14.8		7.1		2.1		70
Secondary education	11.9		9.4		0.0		247
Higher education	6.3		7.2		0.0		259
Year of implementation							
SDIP 1st Year	9.2	< 0.001	8.2	0.6272	4.9	0.3268	240
SDIP 2nd Year	18.1		11.1		6.6		313
SDIP 3rd Year	34.9		8.7		8.9		177
Total	19.8		9.6		6.7		730

Note: Using an adjusted Wald test, the p-value is provided for the test of the hypothesis that the means of the subgroups are similar to each other. Sample weights are applied and standard errors are adjusted for clustering.

There were significant variations in the proportion of eligible women receiving the conditional cash transfer late across a number of subgroups. Of note, women living nearer to the health facility were more likely to receive the cash, albeit late, than those living further away, perhaps

because they were able to make more frequent visits to the health facility to demand the money. The practice of deducting the cash amount from the woman's bill was presumably a means to pass on the financial benefit of the conditional cash transfer in the absence of any cash. It was much more common in Rupandehi than other districts and the data suggest it avoided paying women late. This practice was also more common in hospitals than lower level health facilities.

Table A1 in Appendix A1 shows the average number of days that women were paid late when they received the conditional cash transfer. Estimates varied significantly across all subgroups. It ranged from a mean of just 1 day in Rupandehi to 185 days in Sankuwasabha. Delays appeared to be most lengthy in primary health care centres and shortest in hospitals. Women living more than 4 hours away from the nearest health facility experienced barely any delay, reflecting the fact that they never returned to the health facility to pick up the cash. The number of days has fallen dramatically each year since the start of the SDIP. Although interpretation of this finding should be cautious,[52] administration of the cash does appear to have improved over time. Amongst women who received the cash late (ie. excluding those women who received the cash on the day of discharge), the average delay was 149 days (data not shown), illustrating the difficulty in getting cash to women once they have left the health facility after childbirth.

In two of the study districts, women who were eligible to receive the conditional cash transfer could also be exempted from paying for the delivery care. Of the 187 deliveries that took place in a government health facility in these districts, 18 (9.6 percent) women did not pay for the services, suggesting implementation of this aspect of the policy has been poor (result not shown).

Table 6.12 presents the results of the probit model used to explore the factors that influence whether eligible women receive the conditional cash transfer. Since model 6 does not fit the data well, as indicated by the high Hosmer-Lemeshow chi-square test statistic, model 7 is the preferred model. A number of variables are found to affect the probability of an eligible woman receiving the cash.

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[52] These estimates refer to delays amongst women who were given the cash. The survey was conducted in the third year of implementation and insufficient time had elapsed to assess fully delays in that year.

Table 6.12 Marginal effects from probit model of receipt of conditional cash transfer

	Model 6			Model 7		
Variable	dy/dx.	Std Error	p value	dy/dx.	Std Error	p value
Living children < 2	0.314	0.031	0.000	0.315	0.031	0.000
Wealth quintile 1	*Reference category*			*Reference category*		
Wealth quintile 2	-0.216	0.029	0.001	-	-	-
Wealth quintile 3	-0.112	0.084	0.262	-	-	-
Wealth quintile 4	-0.138	0.094	0.210	-	-	-
Wealth quintile 5	-0.120	0.128	0.342	-	-	-
Log of wealth	-	-	-	0.044	0.052	0.391
No education	*Reference category*			*Reference category*		
Primary education	0.051	0.079	0.499	0.065	0.079	0.382
Secondary education	-0.097	0.060	0.121	-0.084	0.063	0.200
Higher education	-0.175	0.065	0.008	-0.166	0.071	0.027
Brahim / Chhetri	*Reference category*			*Reference category*		
Terai & Madeshi	0.006	0.093	0.949	0.015	0.096	0.877
Dalit	-0.073	0.079	0.417	-0.071	0.077	0.414
Newar	-0.030	0.068	0.669	-0.019	0.070	0.797
Janajati	-0.110	0.040	0.021	-0.108	0.040	0.024
Muslim	-0.067	0.104	0.564	-0.055	0.108	0.639
Other Castes	0.088	0.070	0.179	0.105	0.071	0.116
Walk to facility < 1hr	*Reference category*			*Reference category*		
Walk to facility 1hr < 4 hr	-0.127	0.053	0.013	-0.125	0.054	0.015
Walk to facility 4hr < 1 day	-0.106	0.058	0.096	-0.112	0.059	0.092
Walk to facility > 1 day	-0.211	0.032	0.003	-0.210	0.033	0.004
Delivery in govt hospital	*Reference category*			*Reference category*		
Delivery in govt PHCC	0.194	0.106	0.049	0.192	0.106	0.052
Delivery in health post	0.235	0.168	0.121	0.255	0.162	0.082
Morang	*Reference category*			*Reference category*		
Sankhuwasabha	0.477	0.088	0.000	0.461	0.097	0.000
Myagdi	0.618	0.065	0.000	0.612	0.071	0.000
Rupandehi	0.639	0.082	0.000	0.603	0.094	0.000
Jumla	0.044	0.073	0.535	0.041	0.073	0.567
Achham	0.403	0.155	0.009	0.427	0.141	0.003
SDIP year 1	*Reference category*			*Reference category*		
SDIP year 2	0.180	0.058	0.002	0.181	0.057	0.002
SDIP year 3	0.404	0.062	0.000	0.404	0.061	0.000
N obs	730			730		
Pseudo R^2	0.2503			0.2593		
Log likelihood	-331.5			-358.2		
LR χ^2	224.6			223.6		
Prob > χ^2	0.0000			0.0000		
Hosmer-Lemeshow χ^2	14.540			13.380		
Prob > χ^2	0.0687			0.0995		

Note: Sample weights are applied and standard errors are adjusted for clustering. PHCC = primary health care centre.

As expected, the official requirement to have less than two living children to receive the cash is highly significant. There is evidence that eligible women with secondary education were less likely to receive the cash compared with those with no education. Accessibility to the nearest health facility was found to be significant, suggesting that the cost associated with returning to the health

facility deters families from receiving the cash. The results suggest that primary health centres performed better in the administration of the cash than government hospitals. The coefficients on the district dummy variables show that eligible women in Sankhuwasabha, Myagdi, Rupandehi and Achham had a higher chance of receiving the cash than women in Morang. Finally, the year of implementation is highly significant, implying that changes made to financial management procedures between the donor and the government improved the chances of eligible women receiving the cash.

Dummy variables relating to the woman's parity, district and year of implementation have a substantial effect on the probability of an eligible woman receiving the conditional cash transfer, at the mean of all other variables. Women living in Myagdi and Rupandehi, for example, are over 60 percentage points more likely to receive the cash than those in Morang. The chances that women who delivered in the SDIP's third year of implementation received the cash are 40 percentage points higher than those delivering in the first year. Eligible women with higher education are 17 percentage points less likely to receive the cash than women with no education. Eligible women living more than an hour from the nearest health facility are between 11 and 21 percentage points less likely to receive the cash than those living closer. The probability of receiving the cash increases by 19 percentage points for women delivering in a primary health centre compared with a hospital.

6.5 Discussion

The purpose of the chapter was to assess implementation of the SDIP, as a starting point to then explore in subsequent chapters the impact of the programme on health seeking behaviour. The analysis was based on a framework in which the logic underlying the programme was separated out into a number of key steps which are required if the programme is to have an impact. The framework recognises explicitly the need to promote the programme and administer the demand-side incentives successfully if individuals are to benefit.

6.5.1 Interpretation of findings

The findings suggest that knowledge of the SDIP is low, primarily because the central government did little to publicise the SDIP or facilitate similar activities at the district level. Less than a quarter of women had heard of the programme prior to childbirth, implying that three-quarters of the target population were not reached by the programme. The channels of communication least costly to access were associated with reaching poorer households more effectively than others. They include the radio, women's groups and female community health volunteers.

Other findings suggest problems in the administration of the demand-side incentives. Only one fifth of the women who were meant to receive the conditional cash transfer at the health facility on discharge actually did so. The proportion of eligible women receiving free delivery care was even lower at 10 percent. Either health providers have been withholding these benefits or they did not have the cash available in the health facility to make payments.

The health seeking behaviour of those unaware of the demand-side incentives will not have been influenced by the SDIP. It also seems likely that the programme failed to reach a further 14 percent of the target population on the basis that they had low expectations of receiving the demand-side incentives. Together these findings dampen any expectation that the SDIP had a sizeable impact on utilisation of maternity services at the population level.

The bivariate and multivariate analyses show that those who knew about the SDIP tended to be wealthier, more educated, and from more advantaged castes. The implementation process has unintentionally favoured households that are, according to various measures, socioeconomically

better-off. This is to be expected given that there was no communication strategy to target the poorest and most marginalised sections of the population.

The district-level fixed-effects are significant in both the model of knowledge of the SDIP and receipt of the conditional cash transfer, suggesting unobserved factors probably linked to the action of the district health office are important. Similarly, time is significant in both models. In terms of knowledge of the SDIP, it is likely to reflect the natural process of dissemination of information. However, in the model of the conditional cash transfer, it almost certainly reflects a number of key improvements in financial procedures agreed between the donor and the central government.[53]

6.5.2 Reasons for poor uptake of the programme

The qualitative study in the first phase of the evaluation, involving key informant interviews and focus group discussions with policymakers at the central level and government health officials and health personnel at the district level, can shed more light on some of the reasons for the poor uptake of the SDIP. Unless stated otherwise, the following discussion draws on the findings from this qualitative study (Powell-Jackson, Morrison et al. 2009).

There was little evidence that any serious attempt had been made to inform the public about the SDIP and this is reflected in the low proportion of families that were exposed to information about the programme, particularly from mass media sources. The hesitancy of the central government in this regard was linked to a number of factors. First, central level policymakers had concerns that the programme might raise demand too quickly and overwhelm health services. An incremental process in which demand rises slowly may have been seen as a more desirable strategy.

Second, government officials were wary of raising public expectations owing to problems in the disbursement of funds to pay beneficiaries, which illustrates how one component of the programme can unduly influence another component. It seems entirely understandable that government officials did not want to publicise a programme that was not yet functioning smoothly. Indeed, these concerns proved to be valid with health staff reporting confrontations and

[53] More specifically, this included a relaxation of reporting requirements by the government to the donor to permit the disbursement of each tranche of funding.

angry exchanges with women demanding their cash. It took, in fact, over three years after the launch of the SDIP for programme managers at the central level to develop a communication plan and this was only after the donor had made a new funding commitment to allay fears that the programme might run out of money in a couple of years time. At the district level, managers complained that communication activities were hampered by having no budget or time allowance allocated. Moreover, they felt it difficult to disseminate information about a programme they themselves did not fully understand.

Poor administration of the demand-side incentives was closely linked to bureaucratic delays in the disbursement of funds further up the system. While bottlenecks were evident at every stage in the process, delays in the disbursement of funds were most acute between the donor and central government. Funds arrived at the Treasury approximately 8 months and 5 months late in the first and second fiscal year respectively. It seems that the financial management problem was complicated by the involvement of a donor, which can act outside the control of central government and is able to impose its own conditions on disbursement. There was anecdotal evidence of financial irregularities at lower levels, but due to the nature of the problem, this was impossible to quantify.

Beyond these problems at the central level, a number of factors explain why women did not receive the conditional cash transfer when they should have done. The finding that women with secondary education were less likely to receive the cash is perhaps surprising but is consistent with the qualitative evidence. Women in the community explained that the most educated were often embarrassed to take the cash, believing others were more deserving of the money. The positive relationship between accessibility to the nearest health facility and the probability of receiving the cash may reflect the cost of returning to pick up the money at a later date. This finding was consistent with the responses of health workers who acknowledged the difficulty of getting the cash to those living far away from the health facility. Women with knowledge of the SDIP were more likely to receive the cash, because they were in a position to advocate and put pressure on the health workers. The analysis finds some evidence that specific ethnic groups were discriminated against in the payment of the cash. In contrast, however, health workers and women in interview made no mention of discrimination against any particular groups, suggesting the process may have been quite subtle.

Given the context in which they were working, the actions of district level actors may be seen as coping strategies to overcome (or avoid) the problems imposed on them from above. Indeed, the significant coefficients on many of the district dummy variables allude to the varying success of these coping strategies and management practices. Those who attempted to deal with challenges were often driven by pressure to meet local needs. Inaction, however, was equally common and it is important to understand the motivations that influenced the two sets of actors.

The most important coping strategy, given the bureaucratic delays at the central level, may have been the decision by some district health offices and hospital managers to direct funds from other budget lines for the purposes of the SDIP. This practice allowed payment of beneficiaries earlier than would otherwise have been possible. But it also may have had (unknown) implications for other health programmes or health services. Where managers refrained from using funds from other sources, respondents noted government rules prohibiting such practices and concerns over the unpredictability of donor funding. It is also possible that this strict adherence to government regulations may have represented a reaction – particularly among those who had taken the time to develop careful plans for how to allocate the SDIP budget between health facilities – against the continued pressure from the central government to use funds from other budget headings.

The fear of having to deal with angry families demanding their money appeared to be a motivating factor behind a number of practices to manage the problem of unpredictable funding to health facilities. Health workers tried to appease mothers by providing money out of their own pocket, deducting an amount equivalent to the conditional cash transfer from the hospital bill or sharing what money they had among all those waiting. Another motivating factor may have been the widespread support for paying mothers, which resonated with the view that mothers tend to put funds to better use than men. In contrast, some simply sidestepped the problem altogether, putting the programme on hold so that no women could claim the cash.

Central to this question of why some district implementers took actions to deal with problems and others did not may be the widespread knowledge that the SDIP was donor-funded. One of the reasons donors provide funds directly to the recipient government's treasury is to promote national ownership of policy. Paradoxically, however, there appeared to be little ownership of the policy at the district level. The SDIP was perceived by many as a vertical "programme", whose activities were regarded as additional to the routine of government. Respondents maintained that

monitoring, supervision and communication of the programme could not be carried out using available resources and the fact that there was no budget provision or explicit time allocation for these tasks reinforced the idea that they should be done by external monitors from the central level or non-governmental organisations.

The findings are broadly suggestive of a lack of preparedness in the implementation of the SDIP. Political expediency to ensure the policy was adopted quickly (Ensor, Clapham et al. 2009) may have been the root cause of a lack of financial planning and piloting of procedures or systems. Respondents in the qualitative study frequently spoke about the inadequacy of funds and acknowledged that the means to verify the eligibility of women and monitor the programme had not been developed. Moreover, efforts by the central level to retain substantial control of the implementation process – by using an earmarked budget, providing prescriptive (yet unclear) guidance on the policy, and offering few opportunities for feedback – may have exacerbated problems and contributed further to the programme's low uptake.

6.5.3 Limitations

There were a number of statistical limitations in the analysis of the implementation processes. First, there may have been recall bias in responses given about the knowledge of the SDIP prior to childbirth, given that the recall period in some instances was almost three years. Over-reporting seems to be more likely than under-reporting (families report they knew about the SDIP prior to childbirth when in fact they found out about it subsequently), causing an upwards bias in estimates.

Second, women may not have known whether an equivalent amount to the conditional cash subsidy was taken off their hospital bill in the absence of cash to pay beneficiaries. In this instance, it is more likely women under-report the reduction in the bill, making administration of the demand-side incentives appear worse than it was. Third, the model of receipt of the conditional cash transfer used a relatively small sample of eligible women, which meant it may have lacked statistical power.

More substantively, the models pointed towards a set of factors at the district level that are unobserved and therefore not well understood. These are critical in explaining how some districts managed to cope with the problems imposed by the central government and achieve a reasonable

uptake of the SDIP. The qualitative data point towards a few important actions such as transferring funds from other budget lines to use to pay beneficiaries and ad hoc district promotion of the SDIP. However, there may be other important factors.

Similarly, at the individual level there may be factors not included in the models, which influence uptake of the programme. For instance, a family's access to social networks, or social capital, may be an important determinant of hearing about the SDIP. Other unobserved factors might include the mobility of family members, attendance at community groups or political activism.

6.5.4 Conclusion

Although there are indications of improvement over time, the findings imply that implementation of the SDIP has been weak. The majority of the target population was not reached by the SDIP, dampening expectations of a large impact on health seeking behaviour. Failures at the central level provide the most convincing explanation for why uptake of the programme was low and why the implementation process unintentionally favoured households of higher socioeconomic status. District and community level variables, however, are also important and serve to show that some areas were able to cope with the central level problems better than others. Information from the qualitative study throws light on some of these more complex issues. The focus now turns to the impact of the programme. The next two chapters explore the effect of the SDIP on health seeking behaviour at childbirth.

Chapter 7. IMPACT OF THE DEMAND-SIDE INCENTIVES

7.1 Introduction

This chapter assesses the impact of the Safe Delivery Incentive Programme's (SDIP) demand-side incentives on health seeking behaviour at childbirth in six districts of Nepal. The SDIP has attracted considerable interest from policymakers both in Nepal and internationally. More generally, various forms of results-based aid are growing in popularity among international aid agencies (Taskforce on Innovative International Financing for Health Systems 2009).

In Asia, evidence on the impact of demand-side incentives to improve health seeking behaviour is scarce. Available evidence comes mostly from countries in Latin America, where conditional cash transfer programmes, at least on a national scale, were first pioneered (Glassman, Todd et al. 2009). The most influential of these was the Mexican *Oportunidades* programme, introduced in 1997 to target poor households with cash transfers provided the children regularly attended school and made preventive health care visits (Gertler 2004). Many of the conditional cash transfer programmes were evaluated using randomised methods, providing a strong body of evidence that they can be an effective means to increase utilisation and, in some cases but certainly not all, improve health (Lagarde, Haines et al. 2007; Fiszbein, Schady et al. 2008).

The generalisability of these findings to countries such as Nepal is questionable, particularly when one considers the strength of the health system (WHO 2000) and the capacity of government (Kaufman, Kraay et al. 2009). Demand-side incentive programmes require health services to be in place and of an adequate quality. Moreover, they can be hugely complex, placing a considerable administrative burden on the government and particularly the public financial management system.

Expectations regarding the impact of the SDIP are informed by the results of the previous chapter, which showed low levels of programme uptake. The programme has clearly faced a whole host of implementation challenges, including funding problems and a reluctance on the part of government to promote it. This can only have dampened the potential impact of the SDIP over

the entire target population. Expectations are also informed by the results of the demand model in chapter 5, where there was evidence that the price of care had a statistically significant and reasonably large impact on utilisation of maternity services. However, the fact that those findings applied to only one district cautions against making too broad a generalisation. It is worth recognising that there is also the potential for the SDIP to have unintended consequences and a positive impact on utilisation should not be taken for granted. Qualitative evidence, for example, has found that community trust in health workers has suffered as a result of the SDIP (Powell-Jackson, Morrison et al. 2009).

The analysis in this chapter is based on the Survey of Women. Impacts are identified using propensity score matching methods. They correct for some of the selection bias inherent in single difference comparisons of mean outcomes by constructing and then weighting an appropriate comparison group for assessing the counterfactual. An important focus of the analysis is on studying the heterogeneity in impacts and whether expectations (credibility) of receiving the conditional cash transfer matter. The former is in response to the priorities of policymakers in Nepal, who stressed the need to understand to what extent the poorest families have been affected by the programme. Beyond looking at the impact of the programme on health seeking behaviour, the chapter also assesses socioeconomic inequality in access to the conditional cash transfer through benefit incidence analysis.

7.2 Empirical strategy

7.2.1 Links with conceptual framework

Defining treatment

Implicit in the archetypal evaluation problem with a binary treatment is a clear definition of the treatment status of each individual in the population of interest. Only then can a group of treated individuals and untreated individuals be established to estimate the effect of a programme. Treated units are those who participated in the programme and are thus able to benefit from it. A unit may refer to an individual or a cluster of individuals, the latter often defined by a geographical area.

The most common ways of defining treatment using enrolment status, eligibility status or geographical area are effectively ruled out in this study owing to the nature of the programme. Women were not required to enrol in the programme, as they are in, say, a health insurance programme, providing no means to identify non-participants. The programme was rolled out nationwide right from the outset, which rules out the possibility of using geographical placement to construct the comparison group. And finally, a comparison group of women ineligible to receive the conditional cash transfer (ie. women with more than two living children) is not valid because there is no way of knowing prior to childbirth whether they will have an obstetric complication – an event that would make them eligible to receive the money.

Instead, the study design is informed by the model of the programme's causal pathway. The participation process, as characterised in the conceptual framework, points towards knowledge about the SDIP prior to childbirth as a necessary condition for the programme to affect health seeking behaviour. It is this indicator which is used to define treatment. As previously argued, a family's decision of where to seek care may be influenced by its ex-ante expectation of the price of care. It thus follows that the SDIP's demand-side incentives will only influence the health seeking behaviour of those families who have knowledge of the programme's benefits before childbirth. The further condition that the offer of money is interpreted as credible is later used as the basis to construct an alternative treatment group, for the purposes of assessing the robustness of the basic results.

This definition of treatment implies that only the impact of the conditional cash transfer and free delivery care – and not the health provider incentive – can be assessed. The impact estimates, therefore, do not reflect the possible supply-side influence of the provider incentive on utilisation, although changes to the supply-side may have modified the impact of the demand-side incentive. The narrowing of scope has the advantage of ensuring consistency in the assessment of the effect of the demand side incentives against predictions of the economic model in chapter 3.

In summary, the basic analysis defines programme participants as those who knew about the SDIP prior to childbirth.[54] The control group comprises women who had never heard of the SDIP prior to childbirth. Further analysis is conducted to assess whether the credibility of the SDIP matters for health seeking. The treatment group is subdivided into two groups: 1) the "credible treatment" group contains women who knew about the SDIP *and* expected to receive the demand-side incentives; and 2) the "pseudo control" group contains women who knew about the SDIP but did not expect to receive the demand-side incentive.[55]

Test of hypotheses

The most basic prediction of the model is that the demand-side incentives of the SDIP increase utilisation of maternity services in government health facilities. Since the SDIP was limited to the public sector, women can be expected to switch from the home-based alternative and non-state health facilities (includes private for-profit and non-governmental not-for-profit) to government health facilities. To test this hypothesis, place of delivery will be compared between individuals reached by the SDIP and comparable individuals in the control group.

Differences in impacts are predicted by wealth and the size of the package of financial incentives relative to the cost of health seeking. Specifically, the SDIP can be expected to encourage greater use of government maternity services when women are poorer and located in regions where the financial benefits offered by the programme are greater relative to the total cost of care. These predictions are tested by analysing the subgroup impacts on utilisation according to these relevant characteristics.

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[54] The terms "the treated", "the participants" or "women reached by the SDIP" are used interchangeably to refer to this group of women.

[55] Needless to say, women who did not know about the SDIP prior to childbirth have a zero expectation of receiving the demand-side incentive.

Finally, the conceptual framework suggests that knowledge of the price change is necessary but not sufficient for behaviour change. There must also be a perception that the price change is credible. Thus, it is expected that the greater the expected probability of receiving the benefits of the programme, the greater the impact of the programme on utilisation. This is investigated by comparing the impact estimates from two analyses. In the first, the treatment effect is estimated by analysing the data from the credible treatment group (those who had heard of the SDIP and expected to receive demand-side incentives) and the control group. In the second, data from the pseudo control group (those who had heard of the SDIP but did not expect to receive demand-side incentives) and the control group are analysed as if the former were the treatment group. It is hypothesised that the average treatment effect on the treated will be positive in the first analysis and zero in the second analysis.

7.2.2 Measuring treatment

The method of eliciting the woman's knowledge of the programme was assessed rigorously in pre-testing and refined accordingly. Respondents were first given a brief description of the SDIP and the demand side incentives offered by the programme. They were asked whether they had ever heard of such a government programme and how they originally found out about it. A filter was then applied and only women currently aware of the SDIP were asked to think back to when they were pregnant and whether they knew about the SDIP at that time.

With this unusual indicator of treatment used in the study, there are perhaps concerns over its validity. As explained in chapter 6, the interview was carefully conducted to ensure the knowledge of the women and the household decision-maker was captured to reflect the fact that few married women in Nepal make decisions regarding their own health care.[56] There were further concerns that the SDIP might be confused with other health programmes and the use of ex post information on knowledge of the programme prior to childbirth might be susceptible to recall bias.

Thorough pre-testing of the survey tool and discussions with respondents after each interview provided reassurance that the validity of the measure was not compromised by these two

[56] Again to reiterate, the expression "the woman's knowledge of the SDIP" is maintained throughout the chapter, but this should be interpreted as the family's knowledge of the SDIP.

concerns. Women found the SDIP's offer of cash a highly distinctive feature. This meant that there was no risk of respondents confusing the SDIP with other health programmes since no other government programme offers cash to women. Furthermore, childbirth is a memorable event for women (whether the outcome is positive or negative) and the simplicity of the questions meant respondents were able to relate the timing of when they found out about the SDIP to the date of giving birth. With treatment measured in this way, the survey tool aimed to collect information on factors that would be expected to influence jointly exposure to information about the SDIP and health seeking behaviour at childbirth.

To assess credibility, the expectation of receiving the conditional cash transfer is proxied by whether the woman knew of anyone who had received it, the rationale being that a person's perception of the administration of the programme is more sensitive to the experiences of others in the community than the official policy line given by the government.[57]

7.2.3 Propensity score matching

General approach

The idea of propensity score matching (PSM) is to select a comparison group of non-participants that is as similar as possible to the treatment group in its observed characteristics. Individuals in the comparison group are selected on the basis of their propensity score, given by $P(Z) = \Pr(D = 1|Z)$ and $(0 < P(Z) < 1)$, where Z is a set of control variables unaffected by programme participation (Rosenbaum and Rubin 1983).[58] Appropriate matching variables are those that jointly affect treatment status and the outcome.

Two assumptions are required for the identification of the average treatment effect on the treated (ATT). First, the conditional independence assumption, often referred to as selection on observables or unconfoundedness, states that outcomes are independent of participation given the observables (ie. $Y_0, Y_1 \perp D|Z$). It can be shown that the conditional independence assumption

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[57] Clearly, this indicator is a crude measure of expectations given that it is binary and fails to capture the full range of values that would be associated with a probability. Nevertheless, it seems entirely reasonable that the expectations of receiving the cash incentive will be higher amongst those who knew of someone who had received the money than those who had never heard of anyone.

[58] The propensity score is one of a number of possibilities available to overcome the problem of high dimensionality when using a large number of Z variables.

continues to hold conditional on $P(Z)$, such that outcomes are independent of participation given the propensity score (ie. $Y_0, Y_1 \perp D|\mathrm{P}(Z)$). Second, the common support assumption ensures that there are treated and non-treated individuals with the same characteristics (ie. $P = (D = 1|Z) < 1$). If there are regions where this assumption fails to hold, the estimated treatment effect must be redefined to apply only to those treated individuals falling within the common support. Where impacts differ across treated individuals, restricting the sample to individuals within the common support may change the parameter being estimated, making it impossible to recover the average treatment effect on the treated.

When these conditions hold, the average treatment effect on the treated is identified non-parametrically by the mean conditional difference in the outcome over the common support, suitably weighted by the distribution of *Z* in the treatment group. In terms of the various sources of bias, PSM eliminates both the bias associated with non-overlapping support of the observables and that arising from differences in the distribution of the observables between the two groups, although it does not necessarily provide the most efficient means to do so. As a (semi) non-parametric approach, PSM does not encounter the problem of mis-specification and uses only comparable individuals, avoiding any need to impose additional assumptions to extrapolate outside the common support.

However, it fails to address the problem of bias due to unobservables, and herein lies the main difference between PSM and a social experiment. While randomisation ensures that the treated and non-treated groups are identical in the distribution of their observed and unobserved characteristics (ie. $Y_0, Y_1 \perp D$ holds), PSM can only achieve this for the observables and must assume conditional independence to overcome the problem of endogeneity. As a consequence, PSM is only as good as the data available to the researcher. If joint determinants of participation and the outcome are not captured by the available dataset, PSM will not be able to replicate estimates obtained from a social experiment. Thus, the argument in support of PSM in any particular study must be made with reference to the richness of the available data and founded in an understanding of the factors determining programme participation (Blundell, Dearden et al. 2005).[59]

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[59] Both a conceptual framework to provide a theoretical underpinning and knowledge from other sources, such as qualitative field work, can help in improving prior understanding of the determinants of participation.

Applying propensity score matching

The propensity score gives the probability that an individual participates in the programme given the set of observed characteristics that jointly influence treatment status and outcomes. The propensity score is estimated by means of a probit model. While estimation by this method is parametric, it has been found to perform well against non-parametric alternatives (Zhao 2004). Computation of the propensity score is a first step to correct for selection bias on observables. The propensity score is then used as the basis to define the common support and form the comparison group.

The average impact estimator can be estimated by performing matching on the conditional expectation of the outcome in the non-treated group and averaging it over the distribution of Z in the treated group. Matching is non-parametric and aims to pair a group of comparable non-treated individuals to each treated individual. The general form of the average treatment effect on the treated is given by:

$$ATT = \frac{1}{N_1} \sum_{i \in \{D_i = 1\}} (Y_i - \sum_{j \in C^0(Z_i)} W_{ij} Y_j)$$

where N_1 is the number receiving the programme, $C^0(Z_i)$ is the set of neighbours of treated i in the non-treated group, and W_{ij} is the weight on non-treated individual j in forming a comparison with treated i. There are a number of ways to construct the matched outcome that vary around how the set of neighbours, $C^0(Z_i)$, is defined and how the weights, W_{ij}, are chosen. Three matching estimators are used and then evaluated. With caliper matching, each treated observation is matched to the 10 neighbours nearest in terms of their propensity score (Cochran and Rubin 1973). A caliper of 0.01 sets the maximum distance within which the untreated observations must fall in order to be matched. In kernel matching, the outcome of a treated individual is matched to the weighted outcomes of all untreated units, where the weight is in proportion to the closeness between the propensity score of the treated and untreated individuals (Heckman, Ichimura et al. 1997; Heckman, Ichimura et al. 1998; Heckman, Ichimura et al. 1998; Blundell, Dearden et al. 2005). The weight is given by:

$$w_{ij} = \frac{K\left(\frac{p_i - p_j}{h}\right)}{\sum_{j \in \{D=0\}} K\left(\frac{p_i - p_j}{h}\right)}$$

where K is the epanechnikov kernel and h is set at a bandwidth of 0.03. Finally, mahalanobis-metric matching combines the matching variables into a distance measure and then matches based on the resulting scalar. The propensity score is included in the set of matching variables.

How the common support is defined depends on the matching estimator. In caliper and kernel matching, treated individuals whose propensity score is greater than the largest of the propensity scores of the untreated individuals remain unmatched. Moreover, caliper matching ignores treated observations which cannot be matched because no neighbour falls within the caliper distance and kernel matching's imposition of the common support depends on the choice of bandwidth and, to some degree, the choice of kernel.

The percent of treated observations lost due to common support and various tests of matching quality provide the basis with which to evaluate the matching procedures. Smith and Todd (2005) suggest testing for differences in the covariates between the treated and the non-treated group. For each variable, the standardised percentage bias – the difference of the sample means in the treated and non-treated groups as a percentage of the square root of the average of the sample variances in each group (Rosenbaum and Rubin 1985) – is calculated before and after matching. A two-sample t-test can then be used to check if there are significant differences between the means before and after matching. In addition, a likelihood-ratio test of joint significance of covariates before and after matching can provide tests of matching quality.

PSM introduces variability through estimation of the propensity score and the matching procedure. The common practice is to derive standard errors through bootstrapping. However, the statistical properties of matching estimators are not well understood and it is unclear if bootstrapping is valid in the context of nearest-neighbour matching (Abadie and Imbens 2008). In the case of kernel-based matching, Heckman et al. (1998) have derived analytical asymptotic results. The Stata `psmatch2` module was used to perform the PSM analysis in this study (Leuven and Sianesi 2003). The standard errors of the impact estimates are those reported by `psmatch2`. The complementary routine, `pstest` was used for test of imbalance in the observables.

7.2.4 Robustness checks

A number of checks are used to assess the robustness of the basic results. First, the impact estimates that emerge when using the three different matching estimators are compared. Second, a number of checks are used to assess the plausibility of the conditional independence assumption in light of the fact that the propensity score matching estimates may be upward biased if there are confounders that are unobserved.

If the impact estimates from the propensity score matching are subject to omitted variable bias, this bias can be expected to work in the same direction for government and NGO maternity services, given that the two types of provider are close substitutes. Thus, estimates of impact that are upward biased are likely to hide any evidence of crowding-out of the non-state sector.

The theoretical expectation is that the SDIP will have little or no impact on women who knew about the SDIP but did not expect to receive the conditional cash transfer. However, the pseudo control group and the original control group contain women with very different characteristics (and different biases). Any omitted variable bias should be apparent through a difference in the mean utilisation of maternity services between the two groups (Imbens and Wooldridge 2009). In this sense, a finding of no treatment effect in the analysis of the pseudo control group, coupled with a large treatment effect in the analysis of the credible treatment group provides evidence in support of the assumption of conditional independence.

Finally, instrumental variable estimation is used to control for unobservables. If omitted variable bias plagues the propensity score estimates and the instrument used is valid, there should be a large difference between the impact estimates from the two methods. A promising candidate with which to instrument knowledge of the SDIP during pregnancy is the frequency with which women in the sample listen to the radio. Data from the Survey of Women and qualitative interviews (as reported in chapter 6) confirm that some households found out about the SDIP from the radio and indeed it was used by some district headquarters to promote the programme. It was not used, however, to promote institutional delivery care more generally.[60] Thus, the main pathway through which the radio influences a woman's place of delivery is through its promotion

[60] The evaluation of the SDIP used research teams drawn from each of the study districts. These individuals had a deep knowledge of the local area and were able to confirm that FM radio was used only to promote the SDIP.

of the SDIP. The two-stage least squares estimate of impact should be interpreted as a local average treatment effect, given that the assumption of homogeneous treatment effects is particularly unrealistic in this instance. The treatment effect, in other words, applies only to the sample of women who found out about the SDIP through the radio. One possible problem of using the frequency of radio listenership as an instrument is the fact that there is likely to be multicollinearity in the first stage. Radio listenership is correlated with some of the socioeconomic variables, particularly education. While multicollinearity does not bias the treatment effect, it is likely to result in a large loss of efficiency, large standard errors and an imprecise coefficient (Angrist and Pischke 2009).

7.2.5 Heterogeneous impacts

Until recently, much of the applied evaluation literature has focused on the mean impact, assuming a common effect across all individuals (ie. $\beta_i \equiv \beta$ for all i). This parameter leaves unanswered a range of questions regarding the impact of the programme across individuals and groups (Djebbari and Smith 2008).[61] Insight into these questions can inform the targeting of the programme in order to achieve the greatest impact. In the evaluation of the SDIP, there was considerable interest from policymakers, particularly the international donor funding the programme, as to the impact on the poorest and most marginalised sections of society.

Heterogeneity is most commonly introduced into the analysis by estimating mean treatment effects for subgroups of the population in which differences are predicted by the model to arise – ie. wealth and level of financial reward. This is otherwise known as systematic impact heterogeneity, as distinct from idiosyncratic (unobserved) variation in the treatment effects that remains are removing subgroup variation (Djebbari and Smith 2008).[62] An OLS regression of the outcome on the subgroup dummy variables and interactions between the same dummy variables and the treatment variable is used to estimate mean treatment effects among subgroups. The regression is weighted by the kernel weight provided by `psmatch2` (Wagstaff, Lindelow et al. 2009).

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[61] As noted by Heckman et al. (1997), focus on the mean impact can only be justified if: i) increases in total output increases welfare; and ii) undesirable distributional aspects of programmes are either unimportant or offset by some transfer of outcomes between participants or settled by some external distribution mechanism. In any case, health outcomes are not transferrable and there are thus good reasons to look at heterogeneity in impacts.

[62] Getting a handle on idiosyncratic variation in treatment effects is complex even with experimental data since only marginal distributions and not the joint distribution of outcomes in the treated and untreated states are given (Djebbari and Smith 2008).

A next step is then to examine the importance of subgroup impacts jointly and explore which factors drive the variation in ATT estimates. Heterogeneity in impacts across wealth quintiles, for example, may be due to a correlation between a household's wealth and the design of the policy operating in their region, when it is in fact the latter which is the determinant of the impact. Interactions between the treatment indicator and covariates suffice to estimate the systematic variation in mean impacts across subgroups. A probit regression includes all the covariates as well as the interactions and, as above, is weighted by the kernel weight provided by `psmatch2`. Where a variable is separated into dummy variables, a test of the null hypothesis that the coefficients of the interaction terms are equal to zero is performed. Two models are estimated. The first model includes the full set of covariates and interactions between the treatment indicators and covariates. In the second model, the region dummy variables are replaced by a variable that corresponds to the size of the subsidy (conditional cash transfer and free delivery care) relative to the cost of delivery care in each district.

7.2.6 Benefit incidence analysis

Benefit incidence analysis explores who benefits from a public health subsidy (Brennan 1976; Van de Walle and Nead 1995). The SDIP's conditional cash transfer is a public subsidy, making it suitable for this type of analysis. The analysis describes the distribution of the public subsidy across beneficiaries ranked in terms of their socioeconomic status, although this can easily be extended to examine the distribution of spending by ethnicity, geography and so on.

This analysis essentially requires information on who received the conditional cash transfer and the living standards of each individual to establish the distribution of the cash subsidy in relation to socioeconomic status. The household wealth asset score provides the living standards measure with which to rank households. The distribution of the conditional cash transfer can then be shown as cumulative shares received by successive wealth quintiles or, more completely, as a concentration curve. The final step is to evaluate the distribution of cash subsidy against some stated target distribution. If evaluated against the line of equality (ie. the 45 degree line), a judgement can be made as to whether the subsidy is pro-poor or pro-rich. A concentration curve of the cash subsidy that dominates the line of equality is said to represent absolute progressivity (Castro-Leal, Dayton et al. 2000). Similarly, the concentration index quantifies the extent of

absolute progressivity. The methods used to compute quintile shares, dominance test and the concentration index have been described in chapter 6.

7.3 Data

7.3.1 Data source

The data used in the analysis come from the Survey of Women, conducted in six districts of Nepal. A detailed description of the survey is given in chapter 3. The unit of analysis is a delivery and, given the three year recall period, it is possible for a woman to have had more than one delivery. Multiple births (eg. twins) are counted as a single observation. The same household can also be represented by more than one woman, as all women in the household who had recently given birth were interviewed. The recall period extended five months earlier than the start of the SDIP. The dataset contains complete data on 5,903 deliveries, of which 420 took place before the start of the SDIP.

7.3.2 Descriptive statistics[63]

Outcomes

The impact of the SDIP is assessed on a set of utilisation outcomes that refer to the place of delivery, the type of attendant present at the delivery and the type of procedure, if carried out during the delivery. The outcomes are binary to reflect the occurrence of a single event and, therefore, each outcome measure is a probability.

Table 7.1 reports the summary statistics of the outcomes for the treatment and control group. Utilisation of professional delivery care services in the control group is low. Deliveries in a health facility account for 16 percent of all deliveries. Maternity care is dominated by the public sector. Just over 10 percent of deliveries in the control group take place in a government health facility, while non-governmental (not-for-profit) and private (for-profit) health facilities account for 3 percent and 2 percent of all deliveries respectively. Within the public sector, the majority of deliveries take place in hospitals (9 percent of total deliveries), while 2 percent of women give birth in government primary health care centres or health posts (result not shown).

Almost a fifth of women in the control group give birth with a doctor, nurse or midwife in attendance. This indicator corresponds with the standard international World Health

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[63] The explanatory variables used in this analysis are not defined here since variable definitions for the same dataset were described in chapter 6.

Organisation definition of a skilled birth attendant.[64] The proportion of women in the control group who deliver with any professional health worker is 23 percent. This indicator excludes female community health volunteers, trained birth attendants and traditional birth attendants, who do not work in a health facility but instead in the community. The rate of caesarean section in the study area is low. Only 3 percent of women had surgery at childbirth, while 5 percent of women had either surgery or an assisted delivery. An assisted delivery involves the use of forceps or a ventouse that are attached to the baby's head.

Table 7.1 Descriptive statistics on utilisation outcomes, by treatment group

	Treated		Control	
Variable	Mean	SD	Mean	SD
Place of delivery				
Health facility	0.263	0.440	0.155	0.362
Government health facility	0.210	0.407	0.106	0.307
NGO hospital	0.024	0.154	0.031	0.175
Private health facility	0.029	0.168	0.018	0.134
Type of attendant				
Doctor, nurse or midwife (SBA)	0.293	0.455	0.182	0.386
Any professional health worker	0.351	0.478	0.225	0.418
Procedure at delivery				
Caesarean section	0.047	0.212	0.025	0.155
Caesarean section or assisted	0.099	0.299	0.048	0.214
Observations	1489		4416	

Note: NGO = non-governmental organisation (not-for-profit). SBA = skilled birth attendant. SD= standard deviation.

While the survey was not designed to be representative of the entire country, the control group estimates correspond closely with national estimates. The most recent Nepal Demographic and Health Survey (2007) estimated that 18 percent of live births took place in a health facility and 19 percent of live births were with a skilled birth attendant. Estimates from the control group of women in the Survey of Women fall within the confidence intervals of these national estimates.

Clearly, there are large differences in the outcomes between the control group and the treated group. Women in the treated group gain greater access to professional care at childbirth. For

[64] There is a suspicion that skilled birth attendance is overestimated in Nepal since women who give birth with a male health worker often refer to the attendant as a doctor in the local language. There is unlikely to be any reason, however, why reporting should differ between treated and untreated individuals.

instance, 26 percent of deliveries in this group are in a health facility and 30 percent with skilled birth attendance.

Independent variables

The literature offers little guidance as to the variables to include in the probit model used to derive the propensity score of participation in the programme (Ravallion 2008). The results of the previous chapter examining the determinants of exposure to information about the programme can provide guidance on the choice of variables in the propensity score model. However, the strategy of estimating a parsimonious model is not followed, since simulations have shown that including even poor predictors of outcomes can reduce bias in estimating causal effects when using PSM (Rubin and Thomas 2000).

Table 7.2 reports the summary statistics for the covariates used in the estimation of the propensity score. The covariates included are those variables that are expected to jointly influence the outcome(s) and treatment, which is why these variables do not correspond exactly with the list of determinants explored in chapter 6. The variables measuring exposure to the radio or newspaper from the previous analysis are excluded here on the basis that they are not likely to be direct determinants of health care seeking behaviour. Instead, it is presumed that they influence health seeking behaviour via their effect on knowledge of the SDIP, akin to an instrumental variable.[65] The time variable measures the fiscal year in which the delivery took place with possible values ranging from 1 to 4, and 2 representing the first year of the SDIP. It captures unobservables whose variation over time influence both programme participation and outcomes.

Based on these covariates, the two subsamples appear to be different. The control group is older, less wealthy, less educated, more likely to be from marginalised castes, and lives further from its nearest health facility than the other two groups. These and other differences are analysed in more detail in the results section.

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[65] There is some evidence to support this argument. The various forms of media are not significant in their influence on utilisation when a probit model is run with the full set of independent variables. Moreover, there is little use of the media in Nepal to encourage institutional deliveries other than through the promotion of the SDIP.

Table 7.2 Descriptive statistics on covariates, by treatment group

	Treated		Control	
Variable	Mean	SD	Mean	SD
Age of woman	25.379	5.285	26.622	5.990
Log of wealth	0.441	3.333	2.911	0.676
No education (reference)				
Primary education	0.135	0.342	0.119	0.323
Secondary education	0.271	0.445	0.195	0.396
Higher education	0.189	0.391	0.080	0.272
No work (reference)				
Agriculture work	0.684	0.465	0.701	0.458
Salaried work	0.030	0.169	0.012	0.109
Small business	0.066	0.248	0.046	0.209
Waged work	0.063	0.243	0.084	0.278
Other work	0.003	0.058	0.002	0.045
Brahmin & Chhetri (reference)				
Terai & Madeshi	0.063	0.243	0.079	0.270
Dalit	0.118	0.323	0.141	0.348
Newar	0.043	0.203	0.016	0.125
Janajati	0.173	0.379	0.204	0.403
Muslim	0.005	0.068	0.028	0.165
Other Castes	0.075	0.263	0.129	0.335
Walk to facility < 1hr (reference)				
Walk to facility 1hr < 4 hr	0.613	0.487	0.572	0.495
Walk to facility 4hr < 1 day	0.115	0.319	0.184	0.388
Walk to facility > 1 day	0.031	0.173	0.106	0.307
Urban dwelling	0.120	0.325	0.084	0.277
Previous delivery during SDIP	0.091	0.287	0.060	0.238
Active FCHV	0.147	0.128	0.076	0.098
Women's groups	0.337	0.473	0.274	0.446
Morang (reference)				
Sankhuwasabha	0.238	0.426	0.140	0.347
Myagdi	0.163	0.370	0.142	0.350
Rupandehi	0.109	0.312	0.160	0.367
Jumla	0.217	0.412	0.185	0.389
Achham	0.129	0.335	0.189	0.391
Time	1.947	0.752	1.617	0.872
Observations	1489		4416	

Note: FCHV = female community health volunteer. SD= standard deviation.

7.4 Results

7.4.1 Benefit incidence of the conditional cash transfer

The concentration curves in Figure 7.1 show the inequality in the receipt of the conditional cash transfer and the utilisation of government maternity services. The concentration curves of both indicators lie below the line of inequality indicating that richer households have disproportionately benefited. The fact that the concentration curve for utilisation falls below that for the cash transfer is suggestive of greater inequality in service utilisation in favour of wealthier households. This finding is perhaps encouraging when compared with the prior expectation of there being no difference in the equalities of the two indicators given that receipt of the cash is conditional on using government maternity services.

Figure 7.1 Concentration curves for receipt of the cash and use of maternity services

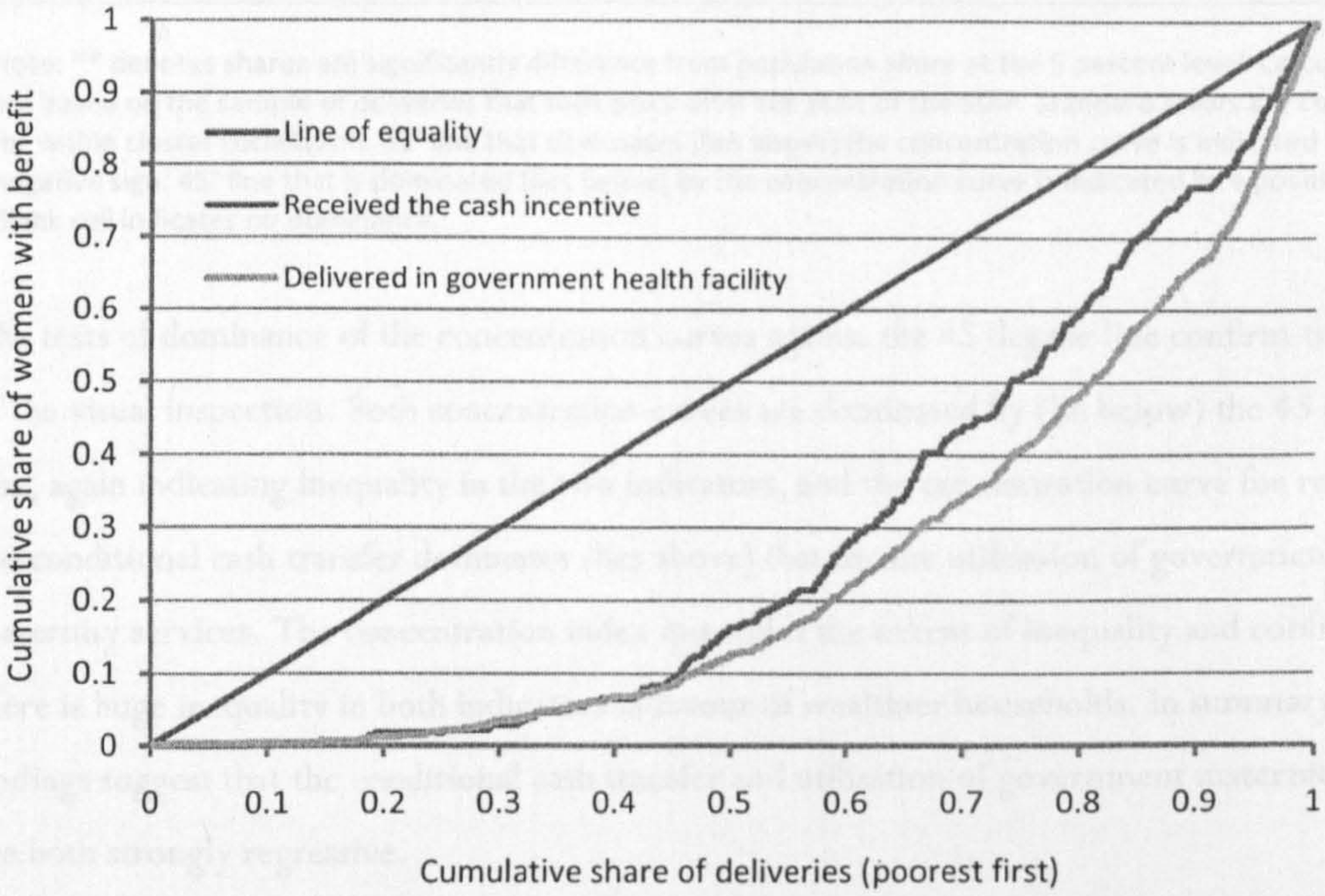


Table 7.3 provides quantitative estimates of various measures of inequality in the receipt of the conditional cash transfer and the utilisation of government maternity services in the entire sample. The cumulative percentage of all cash incentives accounted for by each wealth quintile shows that poorer groups received less than their population share. The poorest two-fifths of households, for example, received only 6.5 percent of the conditional cash transfers. A similar pattern of inequality is shown for utilisation of government maternity services. The poorest two-fifths of households accounted for just 6.9 percent of deliveries in government health facilities. All

estimates are significantly different from the respective population share at the 5 percent threshold.

Table 7.3 Inequality in the receipt of the cash and use of maternity services

Cumulative shares	Receipt of conditional cash transfer (%)	Utilisation of government maternity services (%)
Poorest 20%	2.63**	2.66**
(standard error)	(0.892)	(0.477)
Poorest 40%	19.98**	15.34**
	(2.207)	(1.033)
Poorest 60%	41.15**	31.17**
	(2.664)	(1.261)
Poorest 80%	69.19**	56.84**
	(2.460)	(1.261)
Test of dominance against 45 line	–	–
Test of dominance against other curve	+	–
Concentration index	0.295**	0.395**
(standard error)	(0.035)	(0.022)

Note: ** denotes shares are significantly difference from population share at the 5 percent level. Calculations are based on the sample of deliveries that took place after the start of the SDIP. Standard errors are corrected for within cluster correlation. 45° line that dominates (lies above) the concentration curve is indicated by a negative sign. 45° line that is dominated (lies below) by the concentration curve is indicated by a positive sign. Blank cell indicates no dominance.

The tests of dominance of the concentration curves against the 45 degree line confirm the finding of the visual inspection. Both concentration curves are dominated by (lie below) the 45 degree line, again indicating inequality in the two indicators, and the concentration curve for receipt of the conditional cash transfer dominates (lies above) that for the utilisation of government maternity services. The concentration index quantifies the extent of inequality and confirms that there is huge inequality in both indicators in favour of wealthier households. In summary, the findings suggest that the conditional cash transfer and utilisation of government maternity services are both strongly regressive.

7.4.2 Estimation of the propensity score and balancing tests

The results of the probit model used to derive the propensity score of being reached by the SDIP are shown in Table A2 in Appendix A1. No behavioural interpretation is offered here, since the model in this instance is used purely as a statistical tool to give the propensity score required for matching. The analysis in chapter 6 is more comprehensive and rigorous in providing a

behavioural explanation for why women did not hear about the programme or receive the conditional cash transfer.

The pseudo R^2 of the probit model is 0.177 and the coefficients indicate that a handful of covariates are important predicators of treatment status. The logarithm of wealth is modelled flexibly with the inclusion of a quartic function. The coefficient on each term is significant suggesting wealth exerts a non-linear influence on treatment status.

The purpose of the matching exercise is to balance the covariates such that the bias on observables is reduced as much as possible. The quality of the matching of the covariates can be assessed through various balancing tests, informing which matching method to use in the estimation of impacts. Table A3 in Appendix A1 provides, for each covariate, the t-statistic for the test of the equality of means in the treated and untreated groups, before and after matching. In addition, the table reports the standardised bias before and after matching, along with the percentage reduction in bias.

Before matching, the t-statistic for the equality of means is significant at the five percent level in the case of 28 out of the 32 covariates. There are, in other words, substantial differences between the two sub-samples in terms of the observables, as remarked upon earlier. Kernel and caliper neighbour matching balance the two groups remarkably well – the t-statistic for every covariate is insignificant at the conventional five percent level and the standardised biases are greatly reduced.[66] The mahalanobis matching does not perform as well with significant differences remaining in four of the covariates.

Overall measures of imbalance in the covariates before and after matching are reported in Table 7.4. The pseudo R^2 from the probit model estimated on the trimmed sample using the weights generated from all three matching exercises is appreciably lower than the value from the model on the original unweighted sample. However, again kernel matching and nearest neighbour matching perform better, reducing the pseudo R^2 value from 0.177 to 0.002 respectively. Moreover, the hypothesis of the joint insignificance of all the regressors before and after matching cannot be rejected in the case of these two matching methods, as indicated by the p-values of the

[66] While the t-statistic reflects sample size as much as anything else, it remains useful when comparing between different matching estimators.

likelihood-ratio test. Before matching, the average standardised bias is 17.2 percent. All three matching methods reduce the bias dramatically, although some more than others. Kernel matching reduces the average bias the most to 1.7 percent, while caliper matching reduces the average bias to 1.9 percent. Mahalanobis matching performs less well, reducing the average bias to 3.5 percent. Note, however, that some bias, albeit small, does remain after matching whichever method is used.

Table 7.4 Covariate balancing indicators before and after matching

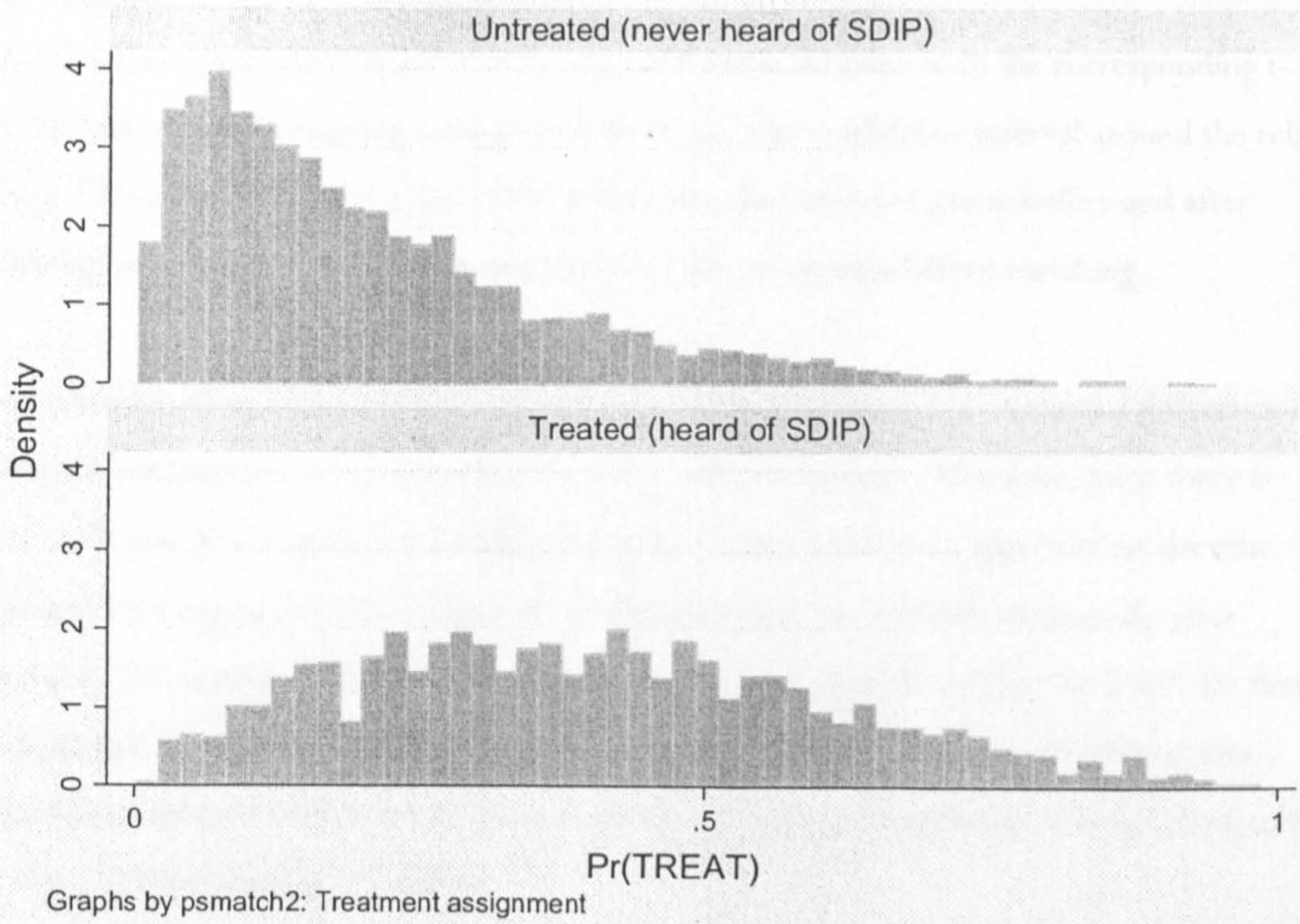
Impact parameter	N_1 Before	N_0 Before	Probit pseudo R^2 Before	Probit pseudo R^2 After	$p>\chi^2$ After	Mean bias (%) Before	Mean bias (%) After	Lost to common support (%) After
Kernel matching								
ATT	1,489	4,416	0.177	0.002	1.000	17.18	1.74	0.13
ATNT	4,416	1,489	0.177	0.004	0.041	17.18	1.76	2.85
Malahanobis matching								
ATT	1,489	4,416	0.177	0.021	0.000	17.18	3.46	0.00
Nearest neighbour matching								
ATT	1,489	4,416	0.177	0.002	1.000	17.18	1.88	0.81

Note: The pseudo R^2 is from the probit estimation of the conditional treatment probability and gives a measure of how well the regressors explain variation treatment. The p value of the likelihood ratio test after matching tests the hypothesis that the regressors are jointly significant. The mean bias is the mean absolute standardised bias, as defined in section 7.2.3. Lost to common support gives the percentage of treated observations that fall outside the boundaries.

The percentage of observations lost to the common support restrictions is negligible indicating that none of the matching methods appear to pose a problem in this regard. The kernel, malahanobis and caliper matching procedures lose two (0.13%), zero and twelve (0.81%) treated observations respectively.

Figure 7.2 shows the histogram of the propensity scores before matching for those in the treatment group and those in the control group. Despite a distribution that is skewed to right in the case of the untreated deliveries, the region of common support is substantial.

Figure 7.2 Histogram of propensity scores for the treated group and the control group



The common support and balancing test results suggest that bias associated with differences in the observables between the treated and untreated groups can be almost completely eliminated without the need to discard a large number of observations from the sample due to a lack of common support. Since the region of common support includes almost the entire sample, the estimated treatment effect barely has to be redefined, essentially allowing the ATT to be recovered. The common support findings may seem innocuous but they are in fact important, indicating that the parameter of interest – the ATT in the sample population – can be identified by the estimation strategy.[67] While there is little to choose between the kernel and the nearest neighbour matching procedures, the former is preferred on the basis that it loses the least observations to common support while achieving a substantial reduction in bias. The next section reports estimates of programme impact using the kernel matching estimator.

[67] With a large loss of observations due to common support the estimated treatment effect is analogous to the concept of the local average treatment effect in instrumental variable estimation. The estimated treatment effect loses some policy relevance because it is not clear for whom the treatment effect has been calculated.

7.4.3 Impact of the SDIP

Basic results

Table 7.5 shows estimates of the ATT for each utilisation outcome with the corresponding t-statistic, the relative percentage change and the 95 percent confidence interval around the relative change. Also reported is the mean in the treated and the untreated group before and after matching, as well as the mean difference between the two groups before matching.

The estimates before matching (see columns 5 and 6) suggest there is a substantial difference in utilisation outcomes between the treated and the untreated groups. However, since there is (observed) selection bias the mean difference in the outcome does not approximate the true impact of the programme. The magnitude of these estimates is reduced substantially after matching. The matched estimates (see columns 7, 8, 9 and 10) indicate that the SDIP, for those it reached, had a significant impact on the probability of women delivering in a health facility. Institutional deliveries for those treated increased by 4.0 percentage points (relative change 18%; CI: 5% , 31%) as a result of the SDIP,

Among those reached by the SDIP, impact estimates show that the programme increased both deliveries with a skilled birth attendant and deliveries with any professional health worker by 4.2 percentage points (relative change 17%; CI: 4% , 29%) and 5.2 percentage points (relative change 17%; CI: 6% , 28%) respectively. The programme also had a positive impact of 1.2 percentage points (relative change 36%; CI: -3% , 74%) on the caesarean section rate, and a positive impact of 1.9 percentage points (relative change 24%; CI: 0% , 48%) on caesarean sections and assisted deliveries combined.

The findings are fairly robust to the matching procedure used (see Table A4 in Appendix A1). There is consistency in the statistical significance and magnitude of impact estimates across the different outcomes. Programme impact tends to be greatest with the kernel matching.

Table 7.5 Impact of the SDIP's demand-side incentives on health seeking behaviour (ATT)

	Before matching		With matching		Before matching		With matching			
	Mean of treated (1)	Mean of untreated (2)	Mean of treated (3)	Mean of untreated (4)	Mean difference (5)	t-Stat (6)	ATT (7)	t-Stat (8)	% change (9)	95% CI (10)
Place of delivery										
Health facility	0.263	0.155	0.262	0.223	0.107	9.33	0.040***	2.70	17.8	(5.1 ; 31.1)
Type of attendant										
Doctor, nurse or midwife (SBA)	0.293	0.182	0.293	0.251	0.110	9.11	0.042***	2.72	16.6	(4.1 ; 29.1)
Any professional health worker	0.351	0.225	0.351	0.299	0.126	9.70	0.052***	3.17	17.2	(6.1 ; 28.1)
Procedure at delivery										
Caesarean section	0.047	0.025	0.047	0.035	0.022	4.35	0.012*	1.83	35.5	(-3.1 ; 74.1)
Caesarean section or assisted	0.099	0.048	0.099	0.080	0.051	7.15	0.019**	2.02	23.9	(0.1 ; 48.1)

Note: Sample includes 5,903 deliveries. *** denotes impact parameters are significant at 1%, ** at 5%, and * at 10%. Kernel matching with a bandwidth of 0.03 is used to compute impact estimates. A treated observation whose propensity score is greater than the largest of the propensity scores of the untreated is dropped. Standard errors are those provided by psmatch2. 95 percent confidence intervals are around the relative percentage impact. ATT = average treatment effect on the treated. CI = confidence interval. SBA = skilled birth attendant. NGO = non-governmental organisation.

Another impact parameter of interest is the average treatment effect on the non-treated. Table 7.6 provides estimates of this parameter in addition to the same ATT estimates shown previously. Since matching allows (observably) heterogeneous impacts, the various parameters are not constrained to be equal. The absolute ATNT estimates are smaller than the ATT estimates for most outcomes except the emergency procedures, although it is worth noting that none of the differences are significant at conventional levels. The ATNT estimate corresponding to utilisation of health facilities suggests that if the non-treated women had in fact been reached by the SDIP, they would have enjoyed a 1.6 percentage point increase in utilisation as a result of the programme. In contrast, however, the SDIP has increased utilisation of government maternity by 4.0 percentage points among the small proportion of the total sample who are in the treatment group.

Table 7.6 Impact of the SDIP's demand-side incentives on health seeking behaviour (ATNT)

	ATT	t-Stat	ATNT	t-Stat
Place of delivery				
Health facility	0.040***	2.70	0.016	0.83
Type of attendant				
Doctor, nurse or midwife (SBA)	0.042***	2.72	0.022	1.09
Any professional health worker	0.052***	3.17	0.024	1.15
Emergency procedure				
Caesarean section	0.012*	1.83	0.013	1.45
Caesarean section or assisted	0.019**	2.02	0.021	1.62

Note: Sample includes 5,098 deliveries. *** denotes impact parameters are significant at 1%, ** at 5%, and * at 10%. Kernel matching with a bandwidth of 0.03 is used to compute impact estimates. A treated observation whose propensity score is greater than the largest of the propensity scores of the non-treated is dropped. Standard errors are those provided by psmatch2. 95 percent confidence intervals are around the relative percentage impact. ATT = average treatment effect on the treated. ATNT = average treatment effect on the non-treated. SBA = skilled birth attendance. NGO = non-governmental organisation.

The differences between the ATT and the ATNT estimates are suggestive of some heterogeneity in impacts. It is worth noting that there may be reasons to expect ATNT estimates to be biased (Blundell, Dearden et al. 2005). Identification of the ATNT requires the more restrictive assumption of no selection on unobserved returns. If this assumption does not hold and individuals with higher returns are more likely to be in the treatment group, the ATNT will be biased upwards. Moreover, the matching procedure to balance the covariates for the non-treated group may not have performed

as well as it did for the treated individuals. The quality of the matching can easily be checked in the same way as before (see Table 7.4). In fact, the covariates remain quite unbalanced as shown by the rejection of the hypothesis that the covariates are the same after matching.

Impact by type of provider

Table 7.7 present impact results for various types of health facility. The impact of 4.3 percentage points (relative change 26%; CI: 10% , 42%) in the government sector is offset by a negative impact of 1.1 percentage points (relative change -31%; CI: -65% , 2%) on utilisation of NGO hospitals. The evidence suggests that the SDIP encouraged women to switch from NGO hospitals to government health facilities, which is not surprising given its focus on the public sector and the fact NGO hospitals are the closest substitute. Nonetheless, there remained a significant positive impact on utilisation of health facility care overall. In absolute terms, the SDIP had a larger impact on utilisation of government hospitals than health centres (results not shown).

This finding provides weak evidence in support of the robustness of the basic results and, more specifically, the conditional independence assumption. If omitted variable bias were driving the positive impact on government maternity services, it is unlikely that there would be evidence of crowding-out of the NGO sector, which is probably subject to the same bias. It should be noted that the impact on NGO hospitals is only significant at the 10 percent level when using caliper matching, suggesting that the importance of this result should not be moderated.

Credibility of the SDIP's promise of cash

In this analysis the treatment group is defined differently to address the question of whether it is sufficient to have heard of the SDIP for the programme to influence health seeking behaviour. Two analyses are conducted. The first applies PSM to the new treatment group and the control group. The second applies PSM to the pseudo control group and the original control group. Statistical evidence of a large positive impact in the first analysis and a zero impact in the second analysis would support the hypothesis that credibility of the promise of the demand-side incentives is also necessary for the SDIP

to affect behaviour. Table 7.8 reports the findings. [68] In column 1, the ATT estimates suggest that the SDIP had a large and significant impact on women who knew about the SDIP and had heard of someone receiving the conditional cash transfer. These women increased utilisation of government maternity services by 9.6 percentage points (relative change 53%; CI: 31% , 74%) because of the SDIP.

In column 2, the results suggest that knowing about the SDIP while having little expectation of receiving the cash incentive has no effect on utilisation of maternity services. Knowledge on its own does not appear sufficient to change behaviour. The impact estimates on the key outcomes are highly insignificant – ie. skilled birth attendance and deliveries in a health facility. A woman in the pseudo control group is 0.3 percentage points (relative change -2%; CI: -21% , 17%) less likely to deliver in a government health facility as a result of the SDIP and 0.2 percentage points (relative change -0.9%; CI: -15% , 13%) less likely to deliver with skilled birth attendance. These results are in sharp contrast to those estimated using the data from the new treatment group and the control group, which showed a large impact of the SDIP on utilisation of government maternity services and skilled attendance at delivery. Note that the 95 percent confidence intervals of the treatment effects from the two sets of results do not overlap for these outcomes.

The results from this analysis can be interpreted as providing evidence in support of the robustness of the basic findings. The finding of no treatment effect and the fact that the pseudo control group and the original control group are very different from each other (and therefore likely to have different biases) suggest that the conditional independence assumption is plausible. Suppose that conditional independence did not hold, the ATT estimates from the analysis of the pseudo control group would be biased upwards, for the control group is the more *genuine* control group. Alternatively, if credibility did not matter or the measure of the expected probability of receiving the conditional cash transfer was invalid, the ATT estimates would show a positive impact on utilisation. Either way, it is difficult to conceive how either or both could lead to a result of no statistical difference in the outcomes between the pseudo control and the control group.

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[68] In terms of the balancing of the covariates, it suffices to note that the kernel matching estimator performs well in both matching exercises.

Instrumental variable estimates

When using propensity score matching, there are always concerns over endogeneity. The robustness of the basic results can be further assessed by instrumenting knowledge of the SDIP prior to childbirth using the frequency of radio listenership. Table 7.9 reports the impact estimate on utilisation of institutional delivery care and utilisation of government maternity services using three methods: ordinary least squares (columns 1 and 2), propensity score matching (columns 3 and 4) and instrumental variable estimation (columns 5 and 6).

Columns 5 and 6 confirm that the instruments are correlated with knowledge of the SDIP prior to childbirth (F-statistic is 8.76). The Sargan test of over-identification passes in both instances. The impact estimates using two-stage least squares are, if anything, greater in absolute size than those obtained using propensity score matching and ordinary least squares. These results suggest the propensity score matching estimates may not be subject to upward bias owing to omitted variables. The two-stage least squares estimates of the effect of the SDIP are not, however, close to being statistically significant. The loss of efficiency and subsequently large standard errors are probably the result of two problems. First, there is multicollinearity between the instruments and several of the covariates, particularly education. Second, the fact that the dependent variable is binary increases the risk that the analysis lacks statistical power (Type II error).

Table 7.7 Impact of the SDIP's demand-side incentives on utilisation of different types of health facility (ATT)

	Before matching		With matching		Before matching		With matching			
	Mean of treated (1)	Mean of untreated (2)	Mean of treated (3)	Mean of untreated (4)	Mean difference (5)	t-Stat (6)	ATT (7)	t-Stat (8)	% change (9)	95% CI (10)
Health facility	0.263	0.155	0.262	0.223	0.107	9.33	0.040***	2.70	17.8	(5.1 ; 31.1)
Government health facility	0.210	0.106	0.209	0.166	0.104	10.35	0.043***	3.28	25.8	(10.1 ; 42.1)
NGO hospital	0.024	0.031	0.024	0.035	-0.007	-1.44	-0.011*	-1.86	-31.4	(-65.1 ; 2.1)
Private health facility	0.029	0.018	0.029	0.021	0.011	2.45	0.008	1.40	36.3	(-16.1 ; 88.1)

Note: Sample includes 5,903 deliveries. *** denotes impact parameters are significant at 1%, ** at 5%, and * at 10%. Kernel matching with a bandwidth of 0.03 is used to compute impact estimates. A treated observation whose propensity score is greater than the largest of the propensity scores of the untreated is dropped. Standard errors are those provided by psmatch2. 95 percent confidence intervals are around the relative percentage impact. ATT = average treatment effect on the treated. CI = confidence interval. SBA = skilled birth attendant. NGO = non-governmental organisation.

Table 7.8 Credibility of the SDIP's promise of demand-side incentives

	Credible treated compared with control				Pseudo control compared with control			
	ATT (1)	t-Stat (2)	% change (3)	95% CI (4)	ATT (5)	t-Stat (6)	% change (7)	95% CI (8)
Place of delivery								
Health facility	0.094***	4.36	38.3	(20.7 ; 55.8)	-0.008	-0.47	-3.8	(-20.1 ; 12.1)
Government health facility	0.096***	4.87	52.6	(31.0 ; 74.2)	-0.003	-0.21	-2.0	(-21.1 ; 17.1)
NGO hospital	-0.015*	-1.85	-38.5	(-80.2 ; 3.1)	-0.008	-1.19	-24.6	(-66.1 ; 17.1)
Private health facility	0.012	1.48	52.6	(-18.5 ; 123.7)	0.003	0.55	16.8	(-44.1 ; 78.1)
Type of attendant								
Doctor, nurse or midwife (SBA)	0.090***	4.06	33.0	(16.7 ; 49.2)	-0.002	-0.13	-0.9	(-15.1 ; 13.1)
Any professional health worker	0.103***	4.45	31.7	(17.5 ; 46.0)	0.006	0.33	2.2	(-11.1 ; 15.1)
Procedure at delivery								
Caesarean section	0.023**	2.16	57.3	(4.2 ; 110.3)	0.002	0.27	6.1	(-39.1 ; 51.1)
Caesarean section or assisted	0.045***	3.04	49.9	(17.1 ; 82.8)	-0.001	-0.10	-1.5	(-32.1 ; 29.1)

Note: Sample includes 5,098 deliveries in the comparison of treated and control observations. Sample includes 5,223 deliveries in the comparison of pseudo control and control observations. *** denotes impact parameters are significant at 1%, ** at 5%, and * at 10%. Kernel matching with a bandwidth of 0.03 is used to compute impact estimates. A treated observation whose propensity score is greater than the largest of the propensity scores of the untreated is dropped. Standard errors are those provided by psmatch2. 95 percent confidence intervals are around the relative percentage impact. ATT = average treatment effect on the treated. CI = confidence interval. SBA = skilled birth attendant. NGO = non-governmental organisation.

Table 7.9 Dealing with endogeneity concerns

	Delivery in health facility	Delivery in government health facility	Delivery in health facility	Delivery in government health facility	Delivery in health facility	Delivery in government health facility
Method	OLS	OLS	PSM	PSM	2SLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
Knowledge of SDIP	0.031***	0.038***	0.040***	0.043***	0.087	0.046
	(0.011)	(0.011)	(0.015)	(0.013)	(0.157)	(0.153)
Controls	YES	YES	YES	YES	YES	YES
Year effects	YES	YES	YES	YES	YES	YES
F test on instruments in first stage					8.76	8.76
Over-identification test p value					0.12	0.64
Adjusted R^2	0.37	0.21	-	-	0.37	0.22
Observations	5905	5905	5903	5903	5905	5905

Note: Robust standard errors are reported in parentheses. Controls include age, wealth (fourth degree polynomial), education, occupation of household head, caste, distance to nearest health facility, urban residence, previous delivery during SDIP, active FCHV index, availability of women's groups, and district fixed effect. The three instruments used in columns 5 and 6 are: i) listens to radio daily; ii) listens to radio at least once a week; iii) listens to radio less than once a week. The over-identification test is due to Sargan (1958).

Heterogeneity in impacts

Table 7.10 provides estimates of the ATT on the two key outcomes – delivery at a health facility and skilled birth attendance – for various subgroups suggested as relevant by economic theory: wealth quintile; and region (which corresponds to the SDIP's three different packages of incentives). In addition, the table gives subgroup estimates by geographical accessibility to health services and according to whether the household is categorised as a marginalised caste or ethnic group.

First, the impact of the SDIP on institutional delivery care is explored. The results by wealth quintile show a consistent gradient in impact estimates, with the poorer households benefiting most in terms of the relative impact of the programme. The poorest two-fifths of households in the treated group saw a 51 percent rise in utilisation as a result of the SDIP. In absolute terms, the impact was largest in the middle wealth quintile with an ATT of 6.3 percentage points. The t-statistics of the ATT estimates indicate that the impacts were significant in the middle quintile at the 5 percent level and in the poorest two quintiles at the 10 percent level, but not in the richest two-fifths of households. There is sufficient power to detect only large impacts.

The impact of the SDIP was larger among the marginalised households, both in relative and absolute terms. It appears households living close to a health facility were highly incentivised to use institutional delivery care. The relative impact is also large for those living more than four hours walk away, but the result is not significant. There appear to be enormous differences in impact by region. The SDIP increased utilisation by 9 percentage points in the mountain districts, equivalent to a 85 percent rise. In contrast, the programme appeared to have no impact in the hill districts and only a small positive impact in the terai districts.

Table 7.10 Impact of the SDIP's demand-side incentives on health seeking behaviour by subgroup

	ATT	t-Stat	% change	95% CI
	(1)	(2)	(3)	(4)
A. Institutional delivery				
Wealth quintile				
Poorest 40%	0.026*	1.79	50.8	(-5.8 ; 107.5)
Middle 20%	0.063***	2.94	45.2	(14.4 ; 75.9)
Richest 40%	0.032	0.78	6.9	(-10.8 ; 24.5)
Caste / ethnicity				
Not marginalised	0.037**	2.45	15.2	(2.8 ; 27.6)
Marginalised	0.043***	3.83	24.1	(11.5 ; 36.6)
Access to health facility				
Near (< 1 hour)	0.077**	2.03	20.4	(2.1 ; 41.1)
Medium (1 hr > 4 hr)	0.025	1.34	13.1	(-3.1 ; 32.1)
Far (> 4 hour)	0.028	0.92	23.2	(-36.1 ; 41.1)
Region				
Terai	0.029	0.91	5.3	(-6.1 ; 17.1)
Hill	-0.020	-0.84	-14.6	(-49.1 ; 20.1)
Mountain	0.087***	4.11	85.1	(44.1 ; 127.1)
B. Skilled birth attendance				
Wealth quintile				
Poorest 40%	0.022*	1.81	65.1	(-5.8 ; 107.5)
Middle 20%	0.073**	2.33	70.6	(14.4 ; 75.9)
Richest 40%	0.019	0.85	4.5	(-10.8 ; 24.5)
Caste / ethnicity				
Not marginalised	0.042**	2.34	15.2	(2.2 ; 28.2)
Marginalised	0.042***	3.56	19.9	(8.7 ; 31.0)
Access to health facility				
Near (< 1 hour)	0.083**	2.17	21.4	(2.1 ; 41.1)
Medium (1 hr > 4 hr)	0.032*	1.67	14.7	(-3.1 ; 32.1)
Far (> 4 hour)	0.004	0.14	2.6	(-36.1 ; 41.1)
Region				
Terai	0.024	0.77	4.3	(-6.1 ; 17.1)
Hill	0.002	0.07	0.9	(-49.1 ; 20.1)
Mountain	0.078***	3.85	80.3	(44.1 ; 127.1)

Note: Sample includes 5,903 deliveries. *** denotes impact parameters are significant at 1%, ** at 5%, and * at 10%. Impact estimates are computed using an OLS regression of the outcome on dummy variables of treatment, the subgroups and treatment-subgroup interactions weighted by the kernel weight provided by `psmatch2`. The regression-based standard error is somewhat smaller than that provided by `psmatch2`, so the t-statistics for the subgroup estimates reported in this table may be somewhat higher than warranted. 95 percent confidence intervals are around the relative percentage impact. ATT = average treatment effect on the treated. CI = confidence interval.

In terms of the impact on skilled birth attendance, there are again noticeable differences across wealth groups. The middle group seemed to be most incentivised by the SDIP, although the poorest wealth quintile also saw a relatively large impact on skilled birth attendance. The

programme appears to have had a negligible impact on the richest quintile. As before, marginalised households benefited slightly more in terms of improved health seeking behaviour. The effect of the SDIP on skilled birth attendance was substantially greater among those living within one hour of their nearest health facility. Finally, the SDIP had the greatest effect on treated individuals living in the mountain districts, with an ATT of 8 percentage points. The effect of the SDIP was negligible in both the hill and terai region and far off conventional levels of statistical significance.

The next step is to examine the factors that influence the impact of the SDIP in a multivariate framework. Table 7.11 shows the probit results with institutional delivery care as the dependent variable for two specifications, as described in section 7.2.5. The final rows give the p-values for the F-tests of four null hypotheses of interest: i) all the coefficients of all the interaction terms are equal to zero; ii) the coefficients of the region-treatment interaction terms are equal to zero; iii) the coefficients of the accessibility-treatment interaction terms are equal to zero; iv) the coefficients of the caste-treatment interaction terms are equal to zero.

The null hypothesis of zero coefficients on all of the interaction terms is firmly rejected in both models, indicating that there is variation in impacts across the observables. In both models, the coefficient on wealth is negative, suggesting the impact of the SDIP is greater among poorer families. However, the coefficient is not significant, implying that the evidence is very weak. The statistical significance of wealth is not altered by including wealth quintile dummy variables. The null hypothesis for the caste dummy variables is also rejected at the 10 percent level in both models. Caste appears to influence the impact of the SDIP, even when controlling for all other covariates. It is worth noting that the null hypothesis of zero coefficients on interaction terms of the accessibility dummy variables cannot be rejected.

The null hypothesis of zero coefficients on the interaction terms of the regional dummy variables is rejected in the first model. A closer look at the coefficients suggests a larger impact for households in mountain districts than those in terai districts and hill districts. In the second model, the size of cash subsidy relative to the cost of care in a district is positively associated with utilisation of institutional delivery care. These finding are consistent with the notion that health care seeking will change most in areas where the financial package offered by the SDIP is most attractive. Finally, the year of implementation has a positive, although statistically insignificant,

effect on the impact of the programme on utilisation of institutional delivery care. The variable may be picking up, inter alia, improvements in the disbursement of SDIP funds through the government's financial system.

Table 7.11 Determinants of variation in the impact of the SDIP's demand-side incentives

	Model 1			Model 2		
Variable	dy/dx	Std Error	z-Stat	dy/dx	Std Error	z-Stat
Treatment	0.242	0.190	1.27	0.082	0.170	0.48
Treatment x Age of woman	0.004	0.003	1.21	0.003	0.003	1.10
Treatment x Log of wealth	-0.057	0.040	-1.42	-0.031	0.034	-0.91
Treatment x Primary education	-0.003	0.048	-0.06	-0.001	0.048	-0.02
Treatment x Secondary education	-0.053	0.034	-1.43	-0.055	0.033	-1.50
Treatment x Higher education	-0.061	0.040	-1.35	-0.068	0.038	-1.57
Treatment x Woman works agriculture	-0.088**	0.037	-2.23	-0.087**	0.037	-2.21
Treatment x Woman is salaried worker	0.049	0.100	0.53	0.020	0.090	0.23
Treatment x Woman has small business	-0.090*	0.038	-1.77	-0.088*	0.038	-1.75
Treatment x Woman is a waged worker	-0.013	0.069	-0.18	0.004	0.072	0.05
Treatment x Woman has other work	-0.162**	0.009	-2.09	-0.162**	0.009	-2.13
Treatment x Terai & Madeshi	0.161*	0.098	1.93	0.182**	0.094	2.27
Treatment x Dalit	0.071	0.066	1.19	0.074	0.067	1.22
Treatment x Newar	0.260***	0.120	2.57	0.250**	0.119	2.49
Treatment x Janajati	-0.016	0.040	-0.39	-0.008	0.040	-0.21
Treatment x Muslim	0.098	0.183	0.60	0.072	0.154	0.52
Treatment x Other Castes	0.051	0.064	0.87	0.084	0.066	1.42
Treatment x Time to facility 1 > 4 hr	-0.043	0.036	-1.17	-0.051	0.035	-1.37
Treatment x Time to facility 4 > 24 hr	0.026	0.061	0.45	0.043	0.063	0.72
Treatment x Time to facility > 1 day	-0.037	0.081	-0.42	-0.043	0.077	-0.51
Treatment x Urban	-0.034	0.044	-0.71	-0.032	0.044	-0.68
Treatment x Previous delivery SDIP	0.005	0.070	0.07	0.007	0.071	0.10
Treatment x Active FCHV	-0.044	0.141	-0.31	-0.052	0.141	-0.37
Treatment x Active women's groups	-0.005	0.031	-0.17	-0.017	0.030	-0.56
Treatment x Hill	-0.068	0.039	-1.56			
Treatment x Mountain	0.056	0.057	1.03			
Treatment x Ratio of CCT to cost				0.314**	0.129	2.41
Treatment x Time	0.006	0.020	0.32	0.008	0.019	0.43
R^2			0.3476			0.3391
F-statistic for null that all interactions = 0			54.52			54.65
p-value			0.0009			0.0005
F-statistic for null that regional interactions = 0			7.75			-
p-value			0.0207			-
F-statistic for null that accessibility interactions = 0			3.21			5.31
p-value			0.3607			0.1501
F-statistic for null that caste interactions = 0			12.23			13.17
p-value			0.0571			0.0404
N			5902			5902

Note: Sample includes 5,903 deliveries. *** denotes impact parameters are significant at 1%, ** at 5%, and * at 10%. Results are based on a probit model, which is weighted by the kernel weight provided by `psmatch2`. The table gives the marginal effects calculated at the average of the covariates. Each model includes all the covariates that were interacted with the treatment indicator, but the effects of these variables are not reported. FCHV = female community health volunteer.

7.5 Discussion

7.5.1 Interpretation of findings

This chapter finds that the SDIP had a positive impact on the utilisation of maternity services. Women in the treated group were 4.3 percentage points (26 percent) more likely to deliver in a public health facility, 4.2 percentage points (17 percent) more likely to deliver with a skilled birth attendant and 1.2 percentage points (36 percent) more likely to have a caesarean section. There was some evidence that the SDIP encouraged some women to switch from using a non-state hospital to delivering in a government health facility. The SDIP, in other words, may led to some crowding out of the non-governmental sector, which is hard to justify from a policy perspective unless there is evidence to suggest quality of care is higher in the public sector. Still, it remained the case that the SDIP led to more women delivering in a health facility. These findings are consistent with the predictions from standard consumer theory.

Interpretation of the findings is not straightforward and requires some caution in light of how the study was designed.[69] The treatment group was defined in such a way that the measure of programme impact essentially filters out issues related to implementation. This is useful in separating the question of whether the incentive mechanism underpinning the programme worked from questions about administrative failings.

The impact of the SDIP over the entire sample, therefore, is a fraction of the estimates given by the ATT. With just over one-quarter of the sample reached by the programme, the ATT estimate implies that the increase in skilled birth attendance as a result of the SDIP was 1.2 percentage points across the entire sample. Similarly, the rise in the utilisation of institutional deliveries attributable to the SDIP is 1.1 percentage points and, in the case of the caesarean section rate, 0.3 percentage points. There is a large gap between the population-wide impacts achieved so far and the potential impact of the SDIP, even after taking into account that the estimated impact for those who were not treated (ATNT) may be lower than that felt by the treated group (ATT). These figures provide a stark illustration of how weak implementation has limited the programme impact and suggest a missed opportunity.

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[69] Particular care should be taken in the interpretation of results for subgroups. It is perfectly possible, and indeed likely, that the SDIP had a large impact on utilisation of a subgroup (ie. high ATT estimate), yet failed to reach many in that subgroup (ie. low uptake). This is given greater consideration in chapter 9.

The impact on utilisation at the population level is too low for maternity services to have been overwhelmed as a result and there has been no evidence from the qualitative studies in the evaluation to suggest otherwise. Nonetheless, concerns over the capacity of health services to deal with an influx of deliveries were at the heart of the decision by the central government not to promote the programme in the public arena. The magnitude of the impact estimates also suggest there can be little expectation of a sizeable improvement in maternal health, particularly when one accepts that increased utilisation does not automatically translate into improved health, for example see Ansah et al. (2009).

The findings from the analysis of the pseudo control group are interpreted as providing evidence of a link between the administration of the demand-side incentives and the impact of the programme. Knowledge of the SDIP appears to be insufficient to influence health seeking behaviour, suggesting that credibility of the promise of the demand-side incentives is indeed necessary. This is consistent with the theoretical model of how the programme is expected to cause change.

The analysis of the heterogeneity of impacts indicates that the programme had a substantial impact in the mountain districts, yet a negligible impact in the other two regions. This is a cause for concern and potentially has important policy implications. There are a number of possible reasons for the variation in the impact of the SDIP across regions, of which the most likely relates to the difference in the package of financial incentives offered across the regions. As noted in chapter 4, the demand-side incentives represent 47 percent of the total household cost of delivery care in the mountain districts, but just 14 percent in the tarai districts and 16 percent in the hill districts. Thus, there may be a question mark over whether the financial incentive provided in the hill (1,000 NRS) and tarai (500 NRS) districts is sufficient to change health seeking behaviour.

It remains possible that the variation in impacts is also linked to differences in baseline utilisation, supply-side factors and implementation across regions. Future analysis may seek to include data on health providers to try and understand whether the impact of the programme at the district level is associated with the availability and quality of care. In one of the hill districts, the reason for a lack of impact may be because the policy guidelines were misinterpreted and women giving birth at home were also given the conditional cash transfer. In the mountain districts, demand for maternal health care may have been more responsive to price because the baseline proportion of

women giving birth in a health facility was lower, ensuring there was more room for improvement.

There was little evidence in the multivariate analysis to support the hypothesis that demand-side incentives have a greater effect on poorer households. There appeared to be significant variation between caste groups. This subgroup analysis was defined ex-post and theory can offer little explanation as to why one might expect variation after controlling for other factors. Further research in this area is recommended.

7.5.2 Internal validity

The internal validity of the study comes down to the plausibility of the conditional independence assumption. Theory leads to a number of robustness checks, the results of which suggest conditional independence can be defended. The SDIP increased utilisation of public health facilities, and crowded out the non-governmental sector. Credibility of the promise of the financial incentives is found to be necessary to influence health seeking behaviour. And finally, the point estimates of the treatment effect are no smaller in absolute size when instrumenting for knowledge of the SDIP using radio listenership.

Internal validity is strengthened by the richness and quality of the data. Unlike many studies using PSM, data were collected primarily for the purpose of the evaluating the SDIP. In particular, it is recommended to use the same questionnaire on both participants and controls, take all individuals from the same context (eg. geographical area or local labour market), and collect information on all factors that might jointly influence programme participation and the outcome, as informed by the theory (Heckman, Ichimura et al. 1998; Diaz and Handa 2006). The approach of the study was guided by these principles. In addition, the covariates included time, which soaks up the influence of some of the unobservables.

7.5.3 Limitations

Notwithstanding the arguments above, the conditional independence assumption is in the end untestable, and it is not possible to estimate robustly the extent to which there is bias due to selection on unobservables. If the evaluation had had more control over the implementation process, it may have sought to use alternative study designs that can in theory control for

unobservables. For example, difference-in-difference impact estimators have been popular in the literature recently. This approach looks for differences in changes between treated and untreated individuals before and after the programme's implementation and is able to sweep out correlation with fixed individual unobservables that confound identification of the programme's effect on outcomes.

However, it can be argued that in the context of this study, selection bias may be less of a problem. Much of the econometrics of programme evaluation has been concerned with training programmes in which the eligible individual chooses whether to participate. The selection process in this study is quite different; the individual does not actively select or enrol into the programme, but rather is a passive recipient of the 'treatment'. As Ravallion (2009) has argued, greater consideration of the government's role is called for in the theoretical characterisation of the selection problem and attempts were made to do just that in chapter 6.[70]

It seems reasonable to assume that selection bias on unobservables is more of a problem in programmes which require a decision on the part of the beneficiary to participate, since the decision may be influenced by, rather than simply correlated with, the unobservables. As a final point it is worth remarking that the bias from the observables remaining after the matching procedure was minimal and the quality of matching achieved in the analysis compares very favourably with other studies, for example see Wagstaff et al. (2009) and Blundell et al. (2005).

Discussion of three issues allows further consideration of the limitations of the analysis in this chapter. First, the sample was not designed to be representative of the entire country, which has implications for the external validity of the findings, as discussed in chapter 9. Another problem is concerned with the sample size, which meant the analysis of the heterogeneity in the impacts lacked statistical power where subgroups contained few observations.[71]

A second limitation relates to the focus of the analysis on utilisation outcomes as the main measure of performance. In contrast with many simple health technologies, the link between utilisation of maternity services and improved health depends on a complex set of factors concerning the

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[70] The sources of information individuals found out about the SDIP provide a useful starting point in characterising the selection problem.

[71] A further methodological point is that the impact estimates are not weighted to account for oversampling. The literature is not clear on how to incorporate weights when performing propensity score matching.

quality of care. Individuals demand health, not health care per se. Thus, judging the success of the SDIP on the extent to which it influenced health seeking behaviour at childbirth is fraught with problems. The standard measure of utilisation, skilled birth attendance, is a crude measure of access to quality maternity services. Not only does it fail to capture very well the skills of the attendant, it says nothing about many other equally important aspects of quality that impact on health. Nor can the caesarean section rate be relied on as an indicator of access to emergency care, since there is no way of knowing from the data whether there was a medical need for the intervention.

The third limitation concerns the possibility that there were recall errors in responses to questions about knowledge of the SDIP, particularly in light of a recall period of up to three years. However, the most likely recall error would be for women to state that knew about the SDIP prior to childbirth when in fact they had found subsequently. This would create a downward bias on impact estimates since these women were not exposed to knowledge about the incentives and are thus less likely to have delivered in a health facility.

Finally, as mentioned in the previous chapter, knowledge of someone who has received the conditional cash transfer may not be a valid measure of credibility of the programme. A number of factors are likely to influence the chances an individual attaches to receiving the demand-side incentives, including perceptions of the public health system, perceptions of the government more generally, and the trustworthiness of the source of the information about the SDIP.

7.5.4 Conclusion

This chapter has assessed the impact of the SDIP's demand-side incentives on health seeking behaviour at childbirth in six districts of Nepal. It finds that the financial incentives were reasonably effective in encouraging women to deliver with professional care. The impacts appear to be greatest in the region offering the most attractive package of financial incentives relative to the cost of care. Owing to the low proportion of the sample who were reached by the SDIP, these treatment effects translate into small population-wide impacts, illustrating how weak implementation has constrained its success. The universal nature of the conditional cash transfer means its recipients are disproportionately from richer households, who are more likely to use maternity services.

Chapter 8. IMPACT OF THE SAFE DELIVERY INCENTIVE PROGRAMME IN THE DISTRICT OF MAKWANPUR

8.1 Introduction

This chapter seeks to provide further evidence on the impact of the Safe Delivery Incentive Programme (SDIP). It focuses on rural areas of Makwanpur district, the same study setting as the analysis in chapter 5, which found that price has a significant but small effect on utilisation of government health services at childbirth. Demand for maternity care was shown to be inelastic and, in simulation exercises, a subsidy on the price care equivalent to the value of the cash incentive appeared to have only a negligible impact on utilisation.

The analysis builds on previous chapters in a number of ways. First, it offers an alternative method to evaluate the impact of the SDIP. This is useful for assessing the robustness of results to different non-experimental evaluation techniques. Second, it assesses the impact of the SDIP not only on utilisation of maternity services, but also on health status, as measured by neonatal deaths. Third, it evaluates the impact of the entire package of incentives offered by the SDIP and not just the demand-side incentives. Fourth, by analysing performance of the programme in the same study setting as the analysis of demand for maternity care in chapter 5, it allows for a direct comparison between the two sets of findings.

The policy evaluation method used in this analysis is quite different from the previous chapter, which estimated impacts through propensity score matching. A longitudinal analysis is used to study trends in outcomes over a five-year period, two years of which the SDIP was running. Time is modelled flexibly and impacts are identified as either a shift or a slope change in the outcome after adjusting for socioeconomic factors and community-level fixed effects. Data come from the Community Surveillance System in Makwanpur and are supplemented with primary data about the activities and services of health providers and non-governmental organisations (NGO) working in health in the district.

Given the non-experimental nature of the design, an important part of the empirical strategy is to assess the validity of the findings. A variety of methods are used, including estimation of the regression model with a non-equivalent dependent variable and an assessment of contextual factors that may act as potential confounders. It is intended that this approach strengthens the conclusions that can be drawn from the study.

8.2 Methods

8.2.1 Identification of impacts

Time is commonly used in the evaluation literature to establish a comparison group with which to assess a programme's impact. The most basic longitudinal approach estimates impact by measuring the mean change in outcome before and after the programme commences. It is rarely able to permit reasonable causal inferences, as the key assumption of no change in the absence of the programme is rarely plausible in practice. Unless the influence of non-programme factors can be ruled out with confidence, the conclusions from such a design can be weak. With more time periods before and after the intervention it is possible to test for a structural change at a specific point in time around the start of the programme, thereby providing more plausible causal inferences. In this way the approach can attempt to separate genuine intervention effects from other long-term trends in the data (Glass 1997).

The logic of the identification strategy is simple. If there is a shift in level or change in direction of the dependent variable at the time of the intervention, then this change is interpreted as the causal effect of the intervention. Conceivably, the effect of an intervention could take on a number of different forms, ranging from a simple shift to more complex ones that might reflect, for example, an accelerated change in direction or a change in variability (Glass 1997). In the context of the SDIP, the conditional cash transfer and the provider payment in principle should have an instantaneous impact on health seeking behaviour but if implementation has been slow, the effects may be incremental. The critical factors are exposure to information about the SDIP and administration of the cash payment, and the findings in chapter 6 suggested that both these elements of the programme have improved over time even when controlling for other factors. Thus, it seems reasonable to search for two types of effects: an immediate effect identified by a shift in the outcome at the time the programme began; and a longer-term or incremental effect identified by a change in the slope of the outcome. Identification of the long-term impact of the SDIP as a change in slope of the outcome could be threatened by confounding factors that operate at any point over a longer period of time, making the task of ruling out such factors much more difficult. Findings regarding the long-term effect of the SDIP are, in other words, more likely to be spurious.

As is already clear, treatment is defined by time. Treated observations are deliveries that took place after the launch of the SDIP. The comparison group then consists of all deliveries taking place prior to start of the programme. Implementation of the SDIP in Makwanpur district is known from interviews with district programme managers, corroborated using financial data on programme disbursements, to have started in September 2005, two months after the official launch at the beginning of the fiscal year. The impact parameter provided by this approach is the average treatment effect on the treated.

The definition of treatment raises of a number of issues. First, since all deliveries in the sample after a certain point in time make up the treatment group, the average treatment effect on the treated provides an estimate of the impact of the SDIP on the entire population under surveillance. Moreover, it captures the effect of the entire package of incentives – ie. the supply-side and demand-side incentives – provided by the SDIP. This contrasts with the way treatment is defined in chapter 7, in which the treatment effect applies only to the fraction of the entire sample that had heard of the SDIP. Since the treated populations are not the same, the two impact parameters are not directly comparable. A second, closely related point is concerned with the fact that the treated group, as defined in this chapter, may include deliveries by women who had not heard of the SDIP or did not perceive the programme as credible. The impact parameter therefore reflects programme implementation as well as the effect of the financial incentives. To some extent, this issue is addressed by stratifying the analysis into two geographical areas in which exposure to information about the SDIP was known to differ considerably (see below).

8.2.2 Empirical model

The unit of analysis is a delivery. In the first instance, outcomes are plotted against time (in months) to see if there is any evidence of a discontinuity in the observations around the month the SDIP began. The graphs also plot the three-month moving average to show with more clarity the underlying pattern by smoothing the data. While crude, the graphs provide a visual means of assessing the impact of the programme on the set of outcomes.

The second step involves estimation of a model that links the level of the outcome at a point in time to the start of the programme, contemporaneous values of a series of demographic controls, time and community level fixed-effects. The specification takes the form:

$$y_{it} = \gamma D_t + \omega D_t \cdot T + \beta X_{it} + vT + \alpha_j + \varepsilon_{it}$$

where y_{it} is the outcome variable for individual i measured at time t, D_t is the treatment dummy at time t, X_{it} is a vector of individual and household characteristics measured at time t, T is time measured in months (with $T = 1$ being the month of the first observation), α_j are community-level fixed effects and ε_{it} is a random error. The immediate impact of the programme, given by the size of the coefficient γ, is modeled as a shift in the level of the outcome. A value of γ equal to 0 indicates that the SDIP has had no immediate impact on the outcome of interest. The longer-term impact of the programme is modelled as a change in the slope of the outcome and is given by the size of the coefficient ω. While it would be possible to incorporate more flexible forms of the programme effect, the task of ruling out confounding factors becomes increasingly difficult. The above model thus represents a balance in this regard.

The model includes a full set of community dummy variables to control for influences at the village level such as the activities of non-governmental organisations (NGO). Also included is a vector of individual and household characteristics to capture other secular trends in the outcome: the woman's age, religion, ethnicity, educational attainment, the occupation of the household head, the size of the household, the materials used to make the house, and the number of months the household had sufficient food in the previous year. The time variable(s) captures the secular trend in the outcome over time. How the relationship between the outcome and time is specified may affect the results. Therefore, results are shown for two different specifications to assess the robustness of the results: a flexible model in which time is specified as a fourth degree polynomial function and a more restricted model where time is a quadratic function. Given the former model's flexibility, it is the preferred specification on a priori grounds.

In rural areas of Makwanpur district, women's groups have been active in half of the villages since the year 2001. These women's groups were used to inform the community about the SDIP when it was launched, making exposure to information about the programme substantially higher in these areas. In this sense, the women's groups are expected to modify the impact of the SDIP by influencing implementation. It is therefore important to stratify the analysis according to whether or not there were women's groups functioning in the village. Although there are no data on household knowledge of the SDIP in the district, it can only be assumed that awareness in villages with no women's groups was low, similar to that found in the other districts sampled in the

Survey of Women.

8.2.3 Outcomes

The impact of the SDIP is assessed in relation to a set of outcomes that include a measure of health and various indicators of utilisation of delivery care services. These outcomes are single events and therefore defined as probabilities. The primary outcome in the analysis is utilisation of maternity services, which includes the place of delivery (government facility or private facility), the type of birth attendant (a skilled birth attendant or any health worker) and whether the woman undergoes a surgical delivery (caesarean section). A skilled birth attendant is a doctor, nurse or midwife, and any health worker refers to these cadres as well as all other health workers in a health facility, but not community health workers such as trained birth attendants (TBA).

To reiterate the predictions of the economic model, the SDIP is expected to have a positive impact on utilisation of government maternity services and skilled birth attendance. The conditional cash transfer to the woman functions as a price subsidy reducing the cost of care and thereby raising demand, the extent to which depends on the household's price elasticity. The provider payment, on the other hand, should increase the availability of health workers to attend deliveries by providing additional motivation to work. Expectation of an impact on the caesarean section rate is low given that no health facility in the district was able to conduct caesarean sections at the time the SDIP began.

It would have been preferable to use maternal mortality as the main health outcome, to be consistent with the goal of the programme. However, given the rarity of a maternal death, the study has insufficient statistical power to detect even a large effect despite the large sample size. Instead, it uses neonatal mortality, which is considered a secondary outcome given that the analysis may still lack power to detect a change in this outcome. Neonatal mortality is of interest, given that about 25 to 45 percent of neonatal deaths occur around the first day of life and can, therefore, be prevented through direct medical intervention at the time of childbirth (Lawn, Cousens et al. 2005). It should not be considered a proxy for maternal mortality. A prerequisite for there to be an effect of the SDIP on mortality is an increase in utilisation of maternity services and adequate quality of care. Put another way, a finding that showed an impact on neonatal mortality without any impact on utilisation of maternity services would, given our behavioural

model, be difficult to rationalise. The final outcome in the analysis is the number of antenatal care visits, whose inclusion is explained below.

With the exception of antenatal care visits, all outcomes are binary. The appropriate model is thus a probit. In presenting the results, the change in probability associated with a given change in the treatment variable is reported rather than the estimated coefficient since the former is more easily interpreted. The number of antenatal care visits is an example of a count dependent variable and a model that assumes a Poisson process is appropriate. In all cases, there is strong evidence of overdispersion as shown by the size of the dispersion parameter (alpha) and the likelihood ratio test, which rejects the Poisson specification of equi-dispersion decisively (see notes of regression result tables). For this reason, a negative binomial specification, which maintains the Poisson process but allows for overdispersion, is used (Cameron and Trivedi 1998).

8.2.4 Assessing validity

The internal validity of non-experimental studies is always open to question. This study's identification strategy relies on there being no other change at the time of the programme's introduction that could account for a discontinuity or slope change in the relationship between the outcome and time. Changes in non-programme factors such as health infrastructure, staffing levels, government policy and the activities of NGOs working in maternal health are a particular concern. An important part of the empirical strategy is to rule out alternative explanations for observed trends, thereby complementing the longitudinal analysis.

Validity of the findings is assessed using two different approaches. The first aims to estimate the causal effect of the SDIP on an outcome known to be unaffected by it, but closely related to the other outcomes under investigation (Imbens and Wooldridge 2009). Lagged outcomes are often attractive candidates when using matching methods. In this study, use of antenatal care is appropriate since it is precedes childbirth along the continuum of care, but is not targeted by the SDIP. Thus, potential confounding factors are likely to cause a shift or slope change in the utilisation of antenatal care. The absence of any discontinuity in the trend of antenatal care seeking at the time of the SDIP suggests that there is no confounding. Clearly, this approach fails to rule out factors that affect utilisation of maternity services independently of antenatal care. Changes to the availability of emergency obstetric care, for instance, are unlikely to induce any change in the utilisation of antenatal care services.

The second approach is descriptive and uses information regarding contextual factors to assess internal validity. Contextual factors can act both as confounders and effect modifiers and in the analysis it is important to differentiate between the two, since the former have more relevance for internal validity and the latter for external validity (Victora, Schellenberg et al. 2005). Effect modifiers are factors that are on the causal path of an intervention, influencing its impact. Primary data collection centred around four categories of interest: health policy; political and governance factors; health service-related factors; and the presence of relevant projects or programmes.

The analysis includes a description of each contextual factor and an assessment of its threat to internal validity. The latter is framed around a number of criteria that each contextual factor must meet if it is to affect internal validity. Each factor should be consistent with the effect identified from the regression analysis in terms of: i) the timing of the introduction of the SDIP; ii) the direction of the effect; iii) the magnitude of the effect; and iv) the type of effect. The assessment of each factor against these criteria is based on qualitative data concerning contextual factors, available evidence from other studies or theory. For instance, the expected magnitude of the effect of an NGO project is likely to depend on the coverage of its activities (how many villages does it cover?), the type of intervention (does it seek to influence the demand or supply of maternity services?) and its budget (does the project have sufficient resources to cause the size of change implied by the regression results?).

In addition to the factors mentioned above, there are two measurement issues to consider. One of these concerns the introduction of a new questionnaire around the start of the SDIP as part of improvements made to the Community Surveillance System. In the revised questionnaire, questions pertaining to the place of delivery were re-worded and given a different coding system. Inconsistent measurement of outcomes could lie behind any structural change in the time trend. Since the measurement of skilled birth attendance remained completely unaltered, the impact estimate on this outcome can be compared against that on institutional delivery care to assess whether the change in questionnaire confounded estimates. These two outcomes are close proxies for each other and any influence of measurement might be revealed by differences between the two impact estimates. As the results will show, impact estimates of the SDIP on institutional deliveries and skilled birth attendance are highly consistent, both in magnitude and direction, suggesting the introduction of a new questionnaire posed no problem.

A second measurement concern is variation over time in the coverage of the surveillance system. There were large differences in the monthly number of deliveries captured by the surveillance system. These variations cannot be explained by seasonal variations alone and were, in fact, the consequence of political instability in specific parts of the district and fluctuations in project funding levels. The concern is that any change in the outcome of interest may be due to bias linked to systematic changes in the sample over time. An inspection of monthly data on the proportion of women with primary education reveals no obvious structural break in the time series (result not shown). This provides some reassurance that the sample remained representative of the population during the period when the surveillance system was unable to capture all deliveries in the study area. The empirical strategy involving the estimation of a model with antenatal care as the dependent variable should also identify this problem.

8.3 Data

8.3.1 Data sources

The longitudinal analysis uses data from the Community Surveillance System in rural areas of Makwanpur, collected between 2002 and 2007. Each observation in the dataset is a delivery. Because the data contain some deliveries from the same woman, the analysis adjusts for clustering at the level of the woman, although doing so makes no difference whatsoever to the results. Still births are included, as are maternal deaths. Multiple births are counted as one delivery and if only one of the babies dies within 28 days it is defined as a neonatal death. With the start of the SDIP in the district in September 2005, the dataset covers 22 months of programme implementation and 49 months prior to the start of the programme. The dataset contains complete data on 14,799 deliveries.

In July 2005, the surveillance area was expanded to cover new villages. To ensure consistency, observations from these additional villages are not included in the analysis. Similarly, owing to the introduction of a modified questionnaire in July 2005, the analysis includes only those explanatory variables available throughout the entire seven-year period that the surveillance system has been active.

Two methods were used to collect contextual information. The first involved key informant interviews using a semi-structured topic guide (see Appendix A5). The purpose of these interviews was to gather respondents' views of what factors other than the SDIP have influenced health care seeking at childbirth in the previous three years. These interviews were conducted by a Nepalese researcher trained in qualitative methods, transcribed and then translated into English.

The second method involved the collection of data through record review and was guided by a structured questionnaire (see Appendix A5). Two questionnaires were developed, one for NGOs and one for respondents working in government. Information was sought on the type of activities carried out by the organisation or health provider, their timing, the services provided, the coverage of the activities or services, and the budget for activities or services. Information was provided both by the respondents themselves and through the review of project documents and administrative data.

The sample for the two data collection tools was the same. Initially, two senior health staff working at the district hospital, one member of the district hospital management committee and staff at two NGOs were interviewed. At the end of each interview, respondents were asked to identify other organisations working in maternal health in the district. Three other organisations were identified as being relevant, but it was only possible to interview one of these organisations. In total, six key informant interviews and record reviews were carried out.

8.3.2 Descriptive statistics

Table 8.1 gives the summary statistics on the outcomes and explanatory variables for the periods before and after the start of the SDIP in the district. There has been a noticeable improvement in the outcomes of interest. Neonatal mortality has fallen from 29 deaths per 1,000 live births to 23 deaths per 1,000 live births between the two periods. Utilisation of maternal health services has increased. For instance, the proportion of deliveries at home has fallen by almost 8 percentage points, while the number of antenatal care visits has almost doubled.

Women give birth at a younger age and, in general, socioeconomic indicators show an improvement between the two periods. Women are more educated, there is greater sufficiency in food, and there is an increase in proportion of households with higher quality building materials. Household heads working as wage labourers appear to have shifted in agriculture. There is little change in the composition of the population either in terms of religion or caste. A greater proportion of deliveries are in villages with women's groups in the first period than in the second period.

Table 8.1 Descriptive statistics for the periods before and after the start of the SDIP

	Pre-SDIP		Post-SDIP	
Variable	Mean	Std Deviation	Mean	Std Deviation
Outcomes				
Neonatal mortality	0.029	0.168	0.023	0.150
Delivery at home	0.944	0.229	0.866	0.340
Delivery at government facility	0.043	0.203	0.112	0.316
Delivery at private facility	0.003	0.051	0.010	0.101
Delivery with skilled birth attendant	0.046	0.209	0.113	0.317
Delivery with any health worker	0.065	0.247	0.174	0.379
Delivery by caesarean section	0.004	0.060	0.010	0.099
Number of ANC visits	1.274	1.746	2.146	2.063
Characteristics of woman and household				
Age of woman at birth of child	27.733	6.562	25.645	6.420
Education grade	1.084	2.394	2.014	3.157
Household members	6.914	3.067	7.199	3.203
Months of sufficient food in previous year	9.238	2.704	9.653	2.806
Hindu	0.333	0.471	0.323	0.468
Buddhist	0.655	0.475	0.654	0.476
Muslim	0.000	0.016	0.000	0.021
Christian	0.010	0.098	0.015	0.122
Other religion	0.001	0.037	0.008	0.088
Brahmin / Chhetri	0.157	0.363	0.156	0.363
Newar	0.022	0.147	0.019	0.137
Janajati	0.778	0.416	0.777	0.417
Other caste	0.004	0.061	0.007	0.081
Cement house	0.023	0.150	0.045	0.207
Brick / mud house	0.020	0.142	0.032	0.176
Stone / mud house	0.626	0.484	0.589	0.492
Planks house	0.309	0.462	0.253	0.435
Brushwood house	0.009	0.093	0.009	0.096
Thatch house	0.005	0.070	0.005	0.073
Other type of house	0.006	0.076	0.047	0.211
Agricultural work	0.910	0.286	0.927	0.260
Salaried / government work	0.019	0.137	0.014	0.118
Small business	0.014	0.119	0.017	0.127
Wage labourer	0.056	0.230	0.040	0.196
Other work	0.000	0.000	0.002	0.048
HH in women's group intervention area	0.499	0.500	0.461	0.498
N obs	8199		6600	

Note: Data come from 24 village development committees covered by the Community Surveillance System. HH = household.

8.4 Results

8.4.1 Graphical inspection

Figure 8.1 to Figure 8.7 plot the outcomes over time, showing the three-month moving average and a vertical line to indicate the point at which implementation of the SDIP began. Visual inspection of the time series data provides a useful starting point to identify impacts.

A clear discontinuity in the time series at the month of the programme's introduction can be seen in the case of a delivery in government health facility, a delivery with a skilled birth attendant and a delivery with any health worker. The shifts are in the expected direction: an increase in the chances of a delivery at a government health facility, with a skilled birth attendant and with any health worker. In contrast, there is no sizeable shift in the probability of a neonatal death, the caesarean section rate or the number of antenatal care visits at around the time of the programme's introduction, but rather a consistent trend over the entire period. The plot of deliveries at a private health facility shows a small positive shift, but it is not clear that this occurs at the time the SDIP started.

Figure 8.1 Probability of a neonatal death over time

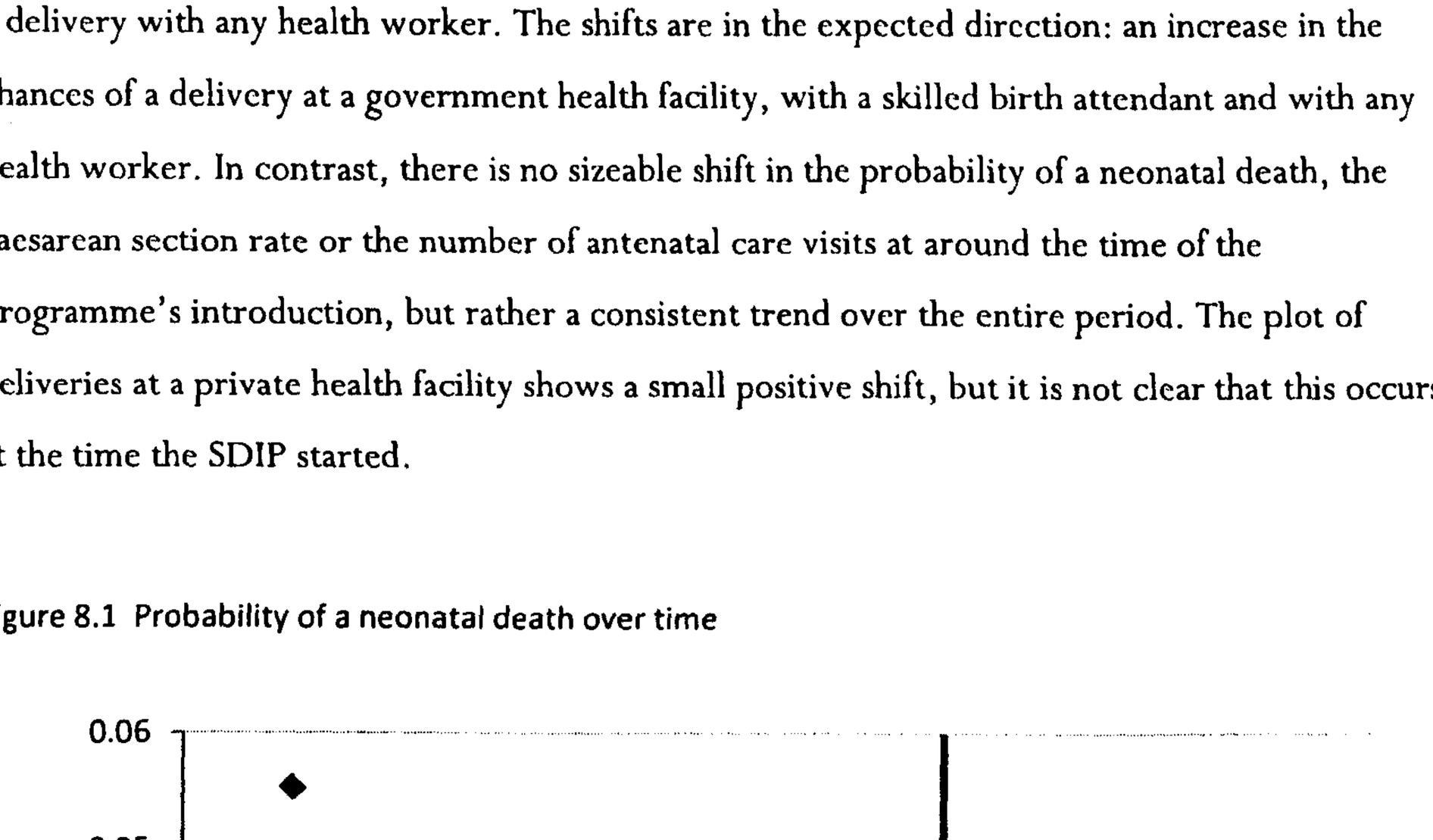


Figure 8.2 Probability of a delivery in a government health facility over time

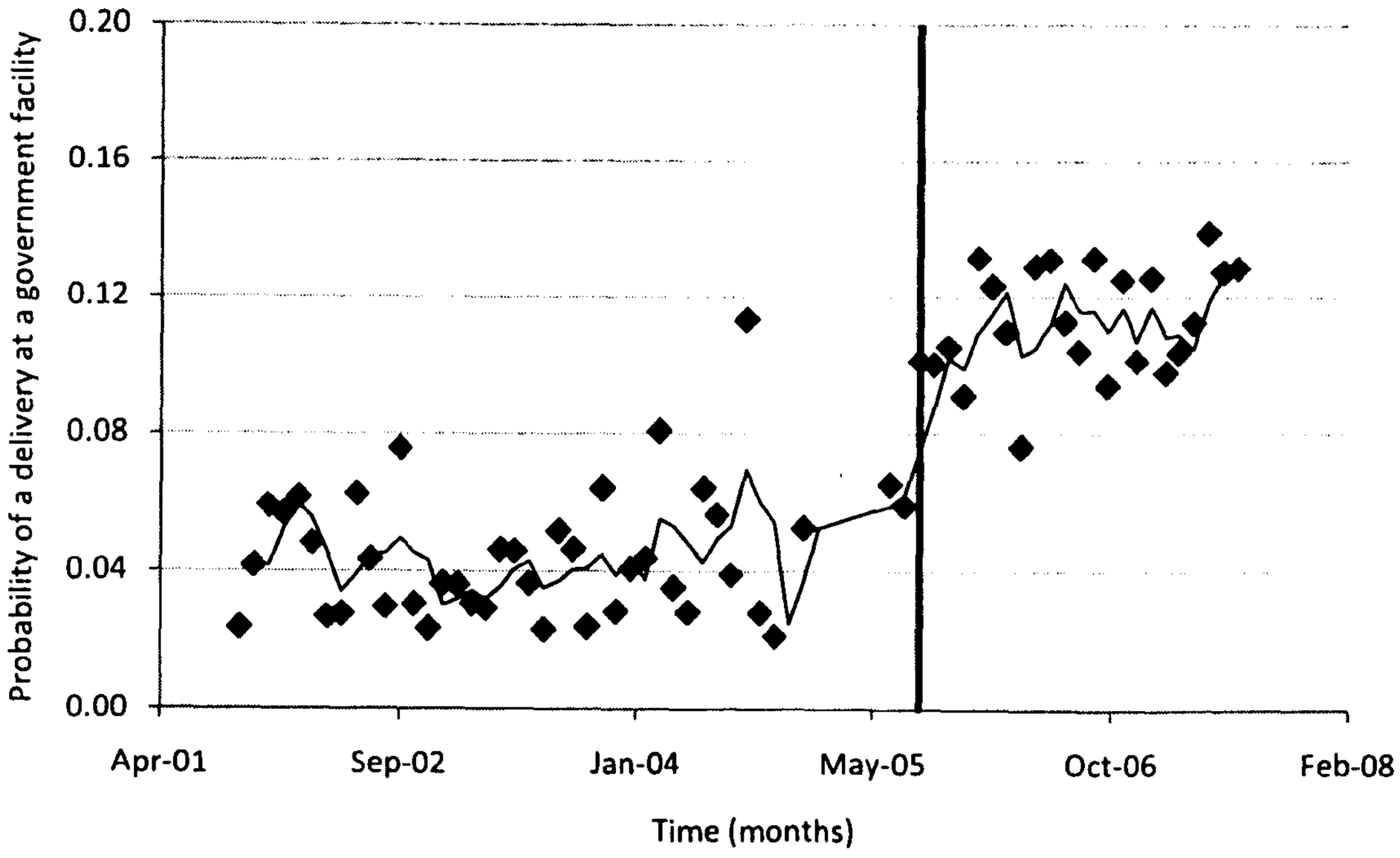


Figure 8.3 Probability of a delivery in a private health facility over time

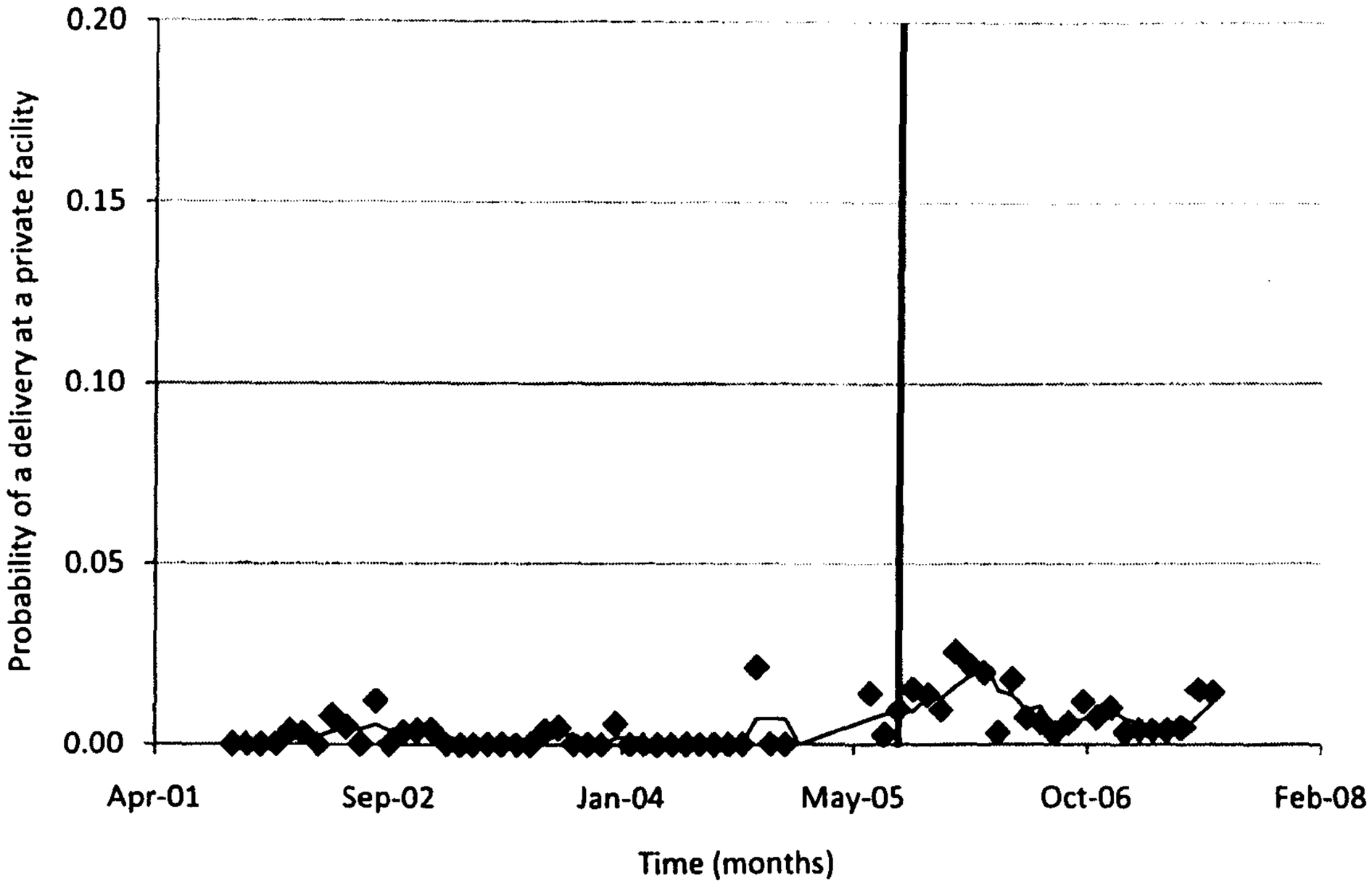


Figure 8.4 Probability of a delivery with a skilled birth attendant over time

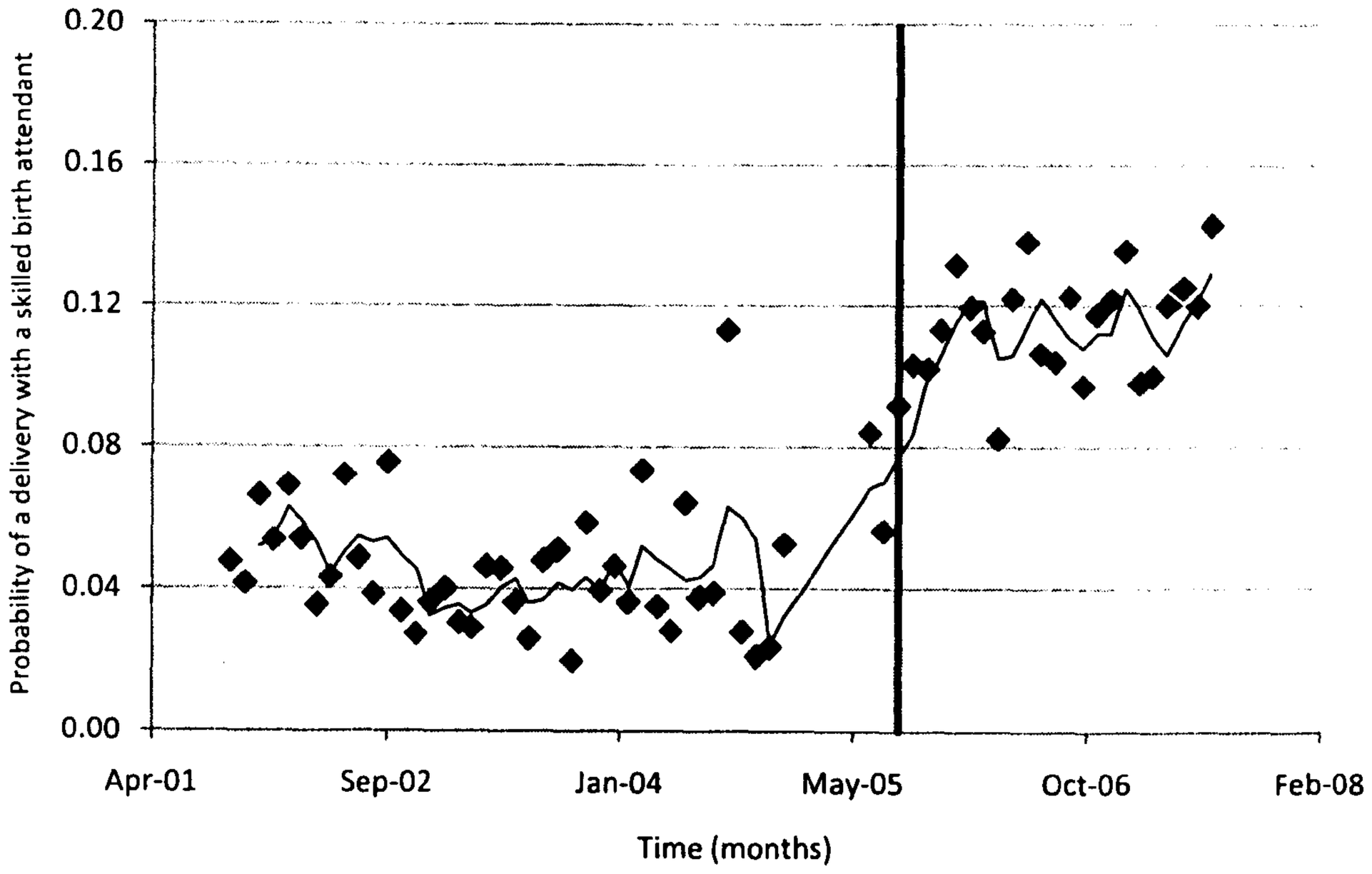


Figure 8.5 Probability of a delivery with any health worker over time

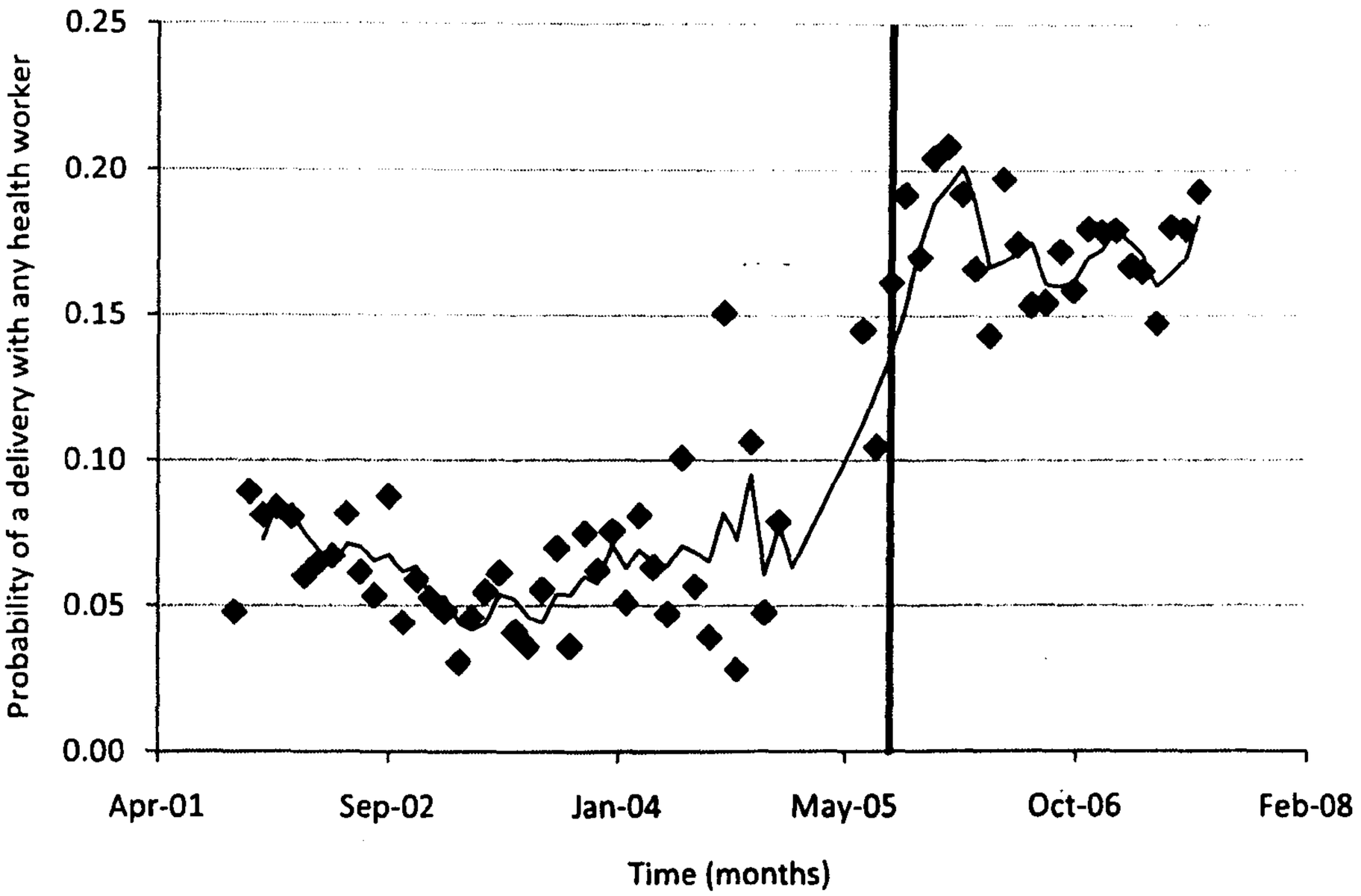


Figure 8.6 Probability of a caesarean section over time

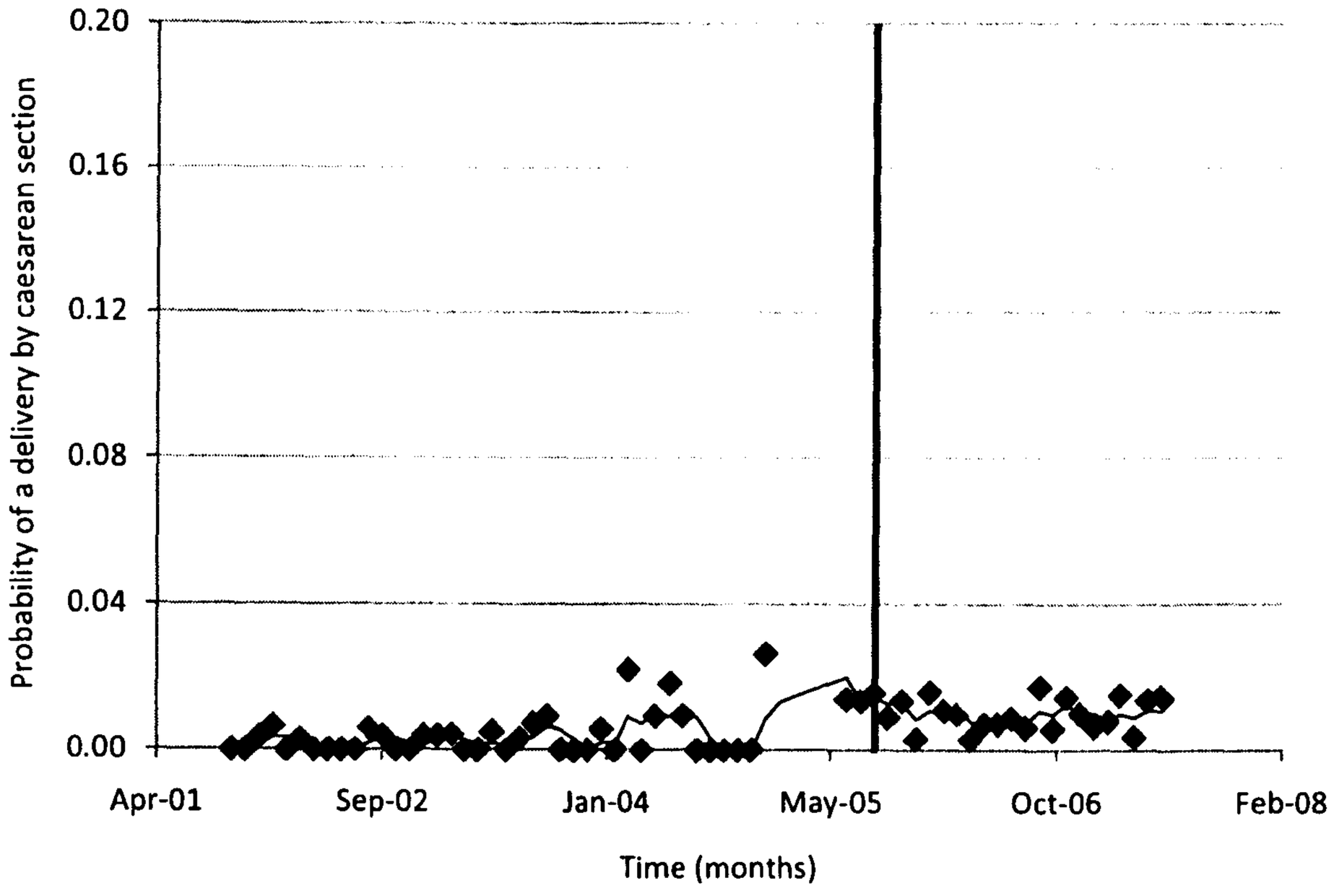
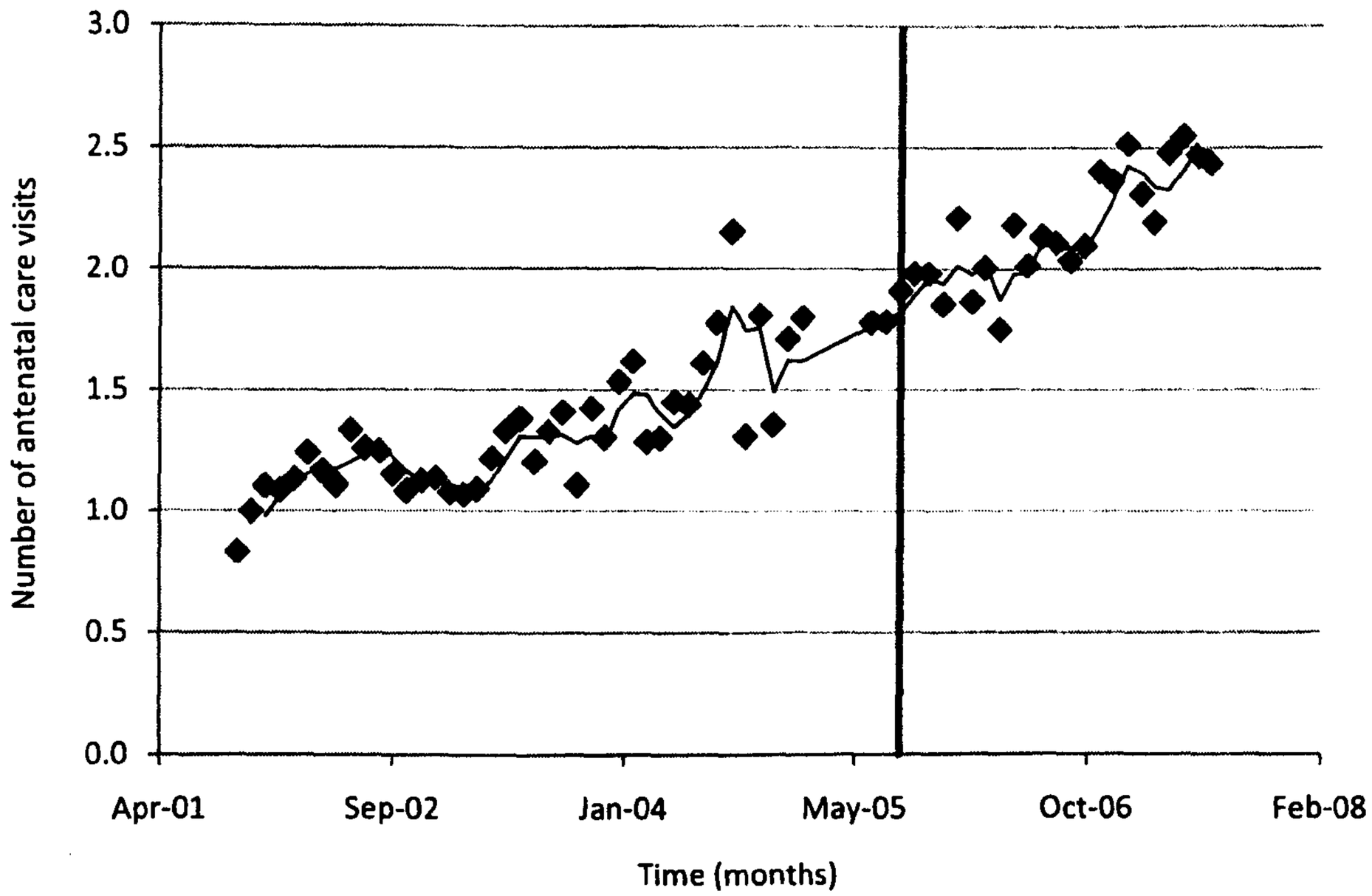


Figure 8.7 Number of antenatal care visits per delivery over time



8.4.2 Longitudinal analysis

To reiterate, immediate impacts are identified as a change in the level, while longer-term impacts are indentified as a change in the slope of the outcome at the time the SDIP began implementation in Makwanpur district. The marginal effect corresponding to the change in slope is interpreted as the monthly percentage point change in utilisation due to the SDIP. Table 8.2 presents the impact estimates based on the full sample, which includes all the villages in the surveillance area. Impact estimates are also stratified between the villages in which women's groups were running at the time the SDIP began and the villages in which no women's groups were operating at that time. These are shown in Table 8.3 and Table 8.4 respectively.

Table 8.2 Effect of the SDIP on the probability of a neonatal death and use of maternal health services (all villages, quartic time function)

	All villages (Model 1)					
	Effect (change in level)		Effect (change in slope)		Pseudo R^2	N
Outcome	dy/dx	z-Stat	dy/dx	z-Stat		
Neonatal mortality	-0.001	-0.08	0.001	0.39	0.019	14,717
Delivery at government facility	0.026***	2.75	0.0005	0.28	0.244	14,737
Delivery at private facility	0.001	1.27	-0.0004	-1.51	0.340	9,347
Delivery with SBA	0.022**	2.34	-0.0004	-0.20	0.245	14,737
Delivery with a health worker	0.044***	3.56	-0.005**	-2.02	0.247	14,799
Delivery by caesarean section	-0.001	-0.68	-0.0005	-1.20	0.187	12,832
Number of antenatal care visits	0.035	0.52	0.006	0.41	0.101	14,799

Note: Each row is a different model. *** denotes coefficients are significant at 1%, ** at 5%, and * at 10%. Standard errors are adjusted for clustering at the level of the woman. Regression models include 24 community fixed effects, dummies capturing ethnicity, religion, occupation of household head, and materials used to make house, as well variables for age of the woman at childbirth, educational attainment and number of months in the previous year for which household had enough food. The time function is a polynomial of degree four. Marginal effects for these variables are not reported. For those outcomes where the dependent variable is a probability of utilisation, a probit model is used, while estimates of impact on the number of ANC visits are derived from a negative binomial model. A likelihood ratio test of equi-dispersion (alpha=0) between the negative binomial and the poisson specification rejects the latter decisively ($chibar^2$=1535.4, p<0.001). Standard errors are robust to heteroskedasticity. Observations in which the regression model predicts failure perfectly must be dropped, explaining why N varies in each model. SBA = skilled birth attendant.

In Table 8.2, the parameter estimates largely confirm the results of the visual inspection of the graphs. In terms of immediate effects, the SDIP had a significant impact on deliveries in government facilities, deliveries with a skilled birth attendant, and deliveries with a health worker. Specifically, the SDIP increased the probability of a woman delivering in a government health facility by 2.6 percentage points (relative to a predicted mean of 9.1 percent in the month prior to the start of implementation), with a skilled birth attendant by 2.2 percentage points (relative to a predicted mean of 9.6 percent in the month prior to the start of implementation)

and with any health worker by 4.4 percentage points (relative to a predicted mean of 15.9 percent in the month prior to the start of implementation). In terms of a change in the slope of the outcome, the SDIP led to a decrease in deliveries with any health worker, equivalent to a fall of 0.5 percentage points per month. Notably, there is no evidence that the SDIP had any impact (either immediate or long-term) on neonatal mortality, utilisation of private health facilities or the caesarean section rate.

When the results are stratified between the villages that were receiving the women's group intervention at the time the SDIP began and those that were not, substantial differences in the impacts are revealed (Table 8.3 and Table 8.4). In the villages with women's groups, the immediate effect of the SDIP was to increase skilled birth attendance by 5.2 percentage points (relative to a predicted mean of 11.4 percent in the month prior to the start of implementation) and raise the chances of a delivery in a government health facility by 6.2 percentage points (relative to a predicted mean of 11.1 percent in the month prior to the start of implementation). The programme's immediate impact of 8.5 percentage points on deliveries with any health worker was offset by a negative impact of 1 percentage point per month in the rate of change of the outcome. The results also indicate a negative long-term impact on deliveries at private facilities, equivalent to 0.03 percentage points every month. However, the magnitude of the impact is so small that it is does not have any major bearing on utilisation of maternity services in general. In these villages, the programme appears to have had no effect of either type on neonatal mortality or the caesarean section rate.

In the villages without women's groups, the SDIP had no significant impact on almost all the outcomes (Table 8.4), suggesting the significant results from the full sample are driven by the villages with women's groups. The only exception is the caesarean section rate. The results imply that the SDIP had a negative long-term impact on the caesarean section rate, but the magnitude of the effect is small, equivalent to 0.36 percentage points per year.

Table 8.3 Effect of the SDIP on the probability of a neonatal death and use of maternal health services (villages with women's groups, quartic time function)

	Villages with women's group (Model 2)					
	Effect (change in level)		Effect (change in slope)		Pseudo R^2	N
Outcome	dy/dx	z-Stat	dy/dx	z-Stat		
Neonatal mortality	-0.003	-0.24	0.001	0.71	0.021	7,081
Delivery at government facility	0.062***	3.22	-0.002	-0.45	0.226	7,095
Delivery at private facility	0.000	0.33	-0.0003***	-2.67	0.418	3,950
Delivery with SBA	0.052***	2.72	-0.003	-0.92	0.223	7,095
Delivery with a health worker	0.085***	3.56	-0.010**	-2.15	0.220	7,095
Delivery by caesarean section	-0.003	-1.01	-0.001	-1.07	0.184	6,434
Number of antenatal care visits	0.129	1.17	-0.002	-0.07	0.096	7,128

Note: Each row is a different model. *** denotes coefficients are significant at 1%, ** at 5%, and * at 10%. Standard errors are adjusted for clustering at the level of the woman. Regression models include 12 community fixed effects, dummies capturing ethnicity, religion, occupation of household head, and materials used to make house, as well variables for age of the woman at childbirth, educational attainment and number of months in the previous year for which household had enough food. The time function is a polynomial of degree four. Marginal effects for these variables are not reported. For those outcomes where the dependent variable is a probability of utilisation, a probit model is used, while estimates of impact on the number of ANC visits are derived from a negative binomial model. A likelihood ratio test of equi-dispersion (alpha=0) between the negative binomial and the poisson specification rejects the latter decisively (chibar^2=398.1, p<0.001). Standard errors are robust to heteroskedasticity. Observations in which the regression model predicts failure perfectly must be dropped, explaining why N varies in each model. SBA = skilled birth attendant.

Table 8.4 Effect of the SDIP on the probability of a neonatal death and use of maternal health services (villages without women's groups, quartic time function)

	Villages without women's group (Model 3)					
	Effect (change in level)		Effect (change in slope)		Pseudo R^2	N
Outcome	dy/dx	z-Stat	dy/dx	z-Stat		
Neonatal mortality	0.002	0.13	-0.001	-0.26	0.025	7,610
Delivery at government facility	0.003	0.43	0.001	0.34	0.235	7,614
Delivery at private facility	0.0003	0.71	-0.0001	-0.76	0.199	4,821
Delivery with SBA	0.005	0.52	0.000	0.11	0.253	7,533
Delivery with a health worker	0.016	1.40	-0.003	-1.13	0.240	7,670
Delivery by caesarean section	0.0004	0.52	-0.0003**	-1.99	0.229	5,937
Number of antenatal care visits	0.004	0.05	0.002	0.09	0.091	7,671

Note: Each row is a different model. *** denotes coefficients are significant at 1%, ** at 5%, and * at 10%. Standard errors are adjusted for clustering at the level of the woman. Regression models include 12 community fixed effects, dummies capturing ethnicity, religion, occupation of household head, and materials used to make house, as well variables for age of the woman at childbirth, educational attainment and number of months in the previous year for which household had enough food. The time function is a polynomial of degree four. Marginal effects for these variables are not reported. For those outcomes where the dependent variable is a probability of utilisation, a probit model is used, while estimates of impact on the number of ANC visits are derived from a negative binomial model. A likelihood ratio test of equi-dispersion (alpha=0) between the negative binomial and the poisson specification rejects the latter decisively (chibar^2=1244.8, p<0.001). Standard errors are robust to heteroskedasticity. Observations in which the regression model predicts failure perfectly must be dropped, explaining why N varies in each model. SBA = skilled birth attendant

The final table assesses the robustness of the results to a different specification of the time function. Table 8.5 provides impact estimates using the more restricted specification where time is modelled as a quadratic function. In many instances, there is agreement between these impact estimates and those generated previously in the more flexible model. The two sets of specifications remain consistent in their finding of no impact on either neonatal mortality or the caesarean section rate. The findings regarding the impact of the SDIP in villages with women's groups are also consistent. However, differences emerge in the statistical significance of the results for villages with no women's groups. Contrary to the previous results, the marginal effects under the more restricted specification suggest the SDIP had a significant, albeit small, immediate positive impact on utilisation of government maternity services, skilled birth attendance and attendance by any health worker, as well as a negative longer-term impact on attendance by any health worker.

8.4.3 Assessment of internal validity

Non-equivalent outcome

In the last row of Table 8.2, Table 8.3 and Table 8.4, estimates show that there was no discontinuity or slope change in the number of antenatal care visits at the time of the SDIP's introduction, strengthening the plausibility of the impact estimates identified on the other outcomes. This finding suggests non-programme factors that might affect health seeking along the entire continuum of care are unlikely to confound the impact estimates. Moreover, it implies that changes in the coverage of the surveillance system over time were not a source of confounding, since it would bias impact estimates on utilisation of both antenatal care and intrapartum care in the same direction.

Table 8.5 Effect of the SDIP on the probability of a neonatal death and use of maternal health services (quadratic time function)

	All VDCs (Model 4)				VDCs with women's group (Model 5)				VDCs without women's group (Model 6)			
	Effect (change in level)		Effect (change in slope)		Effect (change in level)		Effect (change in slope)		Effect (change in level)		Effect (change in slope)	
Outcome	dy/dx	z-Stat	dy/dx	z-Stat	dy/dx	z-Stat	dy/dx	z-Stat	dy/dx	z-Stat	dy/dx	z-Stat
Neonatal mortality	-0.0003	-0.05	-0.0001	-0.18	0.003	0.33	0.0003	0.25	-0.002	-0.16	-0.001	-0.45
Delivery at government facility	0.028***	3.63	-0.0003	-0.30	0.047***	3.08	0.0005	0.25	0.017**	2.18	-0.001	-1.12
Delivery at private facility	0.001	1.49	-0.0004***	-3.02	0.001	1.10	-0.0002	-2.64	0.0002	0.44	-0.0001	-1.58
Delivery with SBA	0.028***	3.47	-0.001	-0.80	0.044***	2.87	-0.0005	-0.27	0.018**	2.22	-0.001	-1.15
Delivery with a health worker	0.048***	4.68	-0.006***	-4.81	0.078***	3.98	-0.009***	-3.63	0.027***	2.71	0.005***	-3.48
Delivery by caesarean section	-0.001	-0.72	-0.0003	-1.49	-0.003	-1.18	-0.0005	-1.19	0.001	0.70	-0.0002	-1.44
Number of antenatal care visits	-0.004	-0.10	0.009	1.69*	0.042	0.47	0.019	1.66*	-0.018	-0.28	0.007	0.75

Note: Each row is a different model. *** denotes coefficients are significant at 1%, ** at 5%, and * at 10%. Standard errors are adjusted for clustering at the level of the woman. Regression models include community fixed effects (model 4, 5 and 6 include 24, 12 and 12 respectively), dummies capturing ethnicity, religion, occupation of household head, and materials used to make house, as well variables for age of the woman at childbirth, educational attainment and number of months in the previous year for which household had enough food. The time function is a polynomial of degree four. Marginal effects for these variables are not reported. For those outcomes where the dependent variable is a probability of utilisation, a probit model is used, while estimates of impact on the number of ANC visits are derived from a negative binomial model. A likelihood ratio test of equi-dispersion (alpha=0) between the negative binomial and the poisson specification rejects the latter decisively in all models models (Model 4: $chibar^2$=1535.15, $p<0.001$; Model 5: $chibar^2$=398.42, $p<0.001$; Model 6: $chibar^2$=1244.61, $p<0.001$). Standard errors are robust to heteroskedasticity. Observations in which the regression model predicts failure perfectly must be dropped, explaining why N varies in each model.

Contextual factors as confounders

The longitudinal analysis shows that there was a positive shift in utilisation of government health facilities and attendance by a skilled health worker in villages with women's groups at the time the SDIP began implementation. The threats to internal validity are assessed in relation to this finding. In other words, could factors other than the SDIP explain these changes in utilisation of maternity services?

Interviews with key informants identified a range of factors that could potentially confound impact estimates. An obvious political factor mentioned by respondents was the end of civil conflict. In terms of service-related factors, those identified included changes made to the delivery of maternity services at the district hospital, a new sub-health post and two new small private hospitals. Finally, a number of project managed by NGOs were identified as being potentially relevant. These include the activities of PLAN international, Mother and Infant Research Activities, Family Planning Association of Nepal, Marie Stopes and the Centre for Community Development Nepal. Respondents made no mention of any health policy changes that might be relevant.

Table 8.6 provides a description of each factor, the geographical coverage, and the budget (where relevant). Table 8.7 summarises the threat to internal validity of each factor, basing this assessment largely on the information given in the previous table.

The civil conflict in Nepal started in 1996 and took the form of a Maoist-led violent insurgency. Conventional wisdom suggests that the provision of and access to health services were disrupted during this time. The latter was particularly hampered due to frequent vehicle strikes caused by the political instability. In 2006, however, the King was forced to relinquish power in the face of widespread popular protests (International Crisis Group 2006). This lay the foundation for a ceasefire between the Maoists and the new government and a serious peace process. While the direction and magnitude of the effect of the conflict's end on maternal health care seeking are probably consistent with the structural break in the trend of skilled birth attendance, the inconsistent timing suggests this factor is not a credible threat to internal validity.

Table 8.6 Description of contextual factors in Makwanpur district

Factor	Description	Geographical coverage	Annual budget
1. Political factors			
Civil conflict and the Maoist insurgency	In April 2006, the King agreed a peace deal in which parliament was restored and the Maoists were brought into the political process. This marked the end of the civil conflict between the government and the Maoists	Entire district	N/A
2. Health service-related factors			
Government district hospital	Hospital has always provided normal delivery care, vacuum extraction and forceps delivery. In mid-2006, hospital started to provide c-section and blood transfusion services, as well as clothes, towel and soap for the newborn financed through the health management committee. In 2007, an additional three midwives and gynaecologist were appointed.	Entire district	$356,028 (for entire district, excluding SDIP)
Government health centres	Sub-health post in Chhatiwon VDC became functioning in 2008.	1 VDC of the 24 VDCs covered by the surveillance system	See district hospital
Devi private hospital	Devi hospital opened in 2005, providing privately antenatal care, normal and emergency delivery care and postnatal care.	Entire district	Not known
Samudyak private hospital	Samudyak hospital opened end of 2007, providing health services, but none related to delivery care.	Entire district	Not known
3. Presence of other projects or programmes			
PLAN International	Started in 1997. Activities include: immunisation; IMCI programme; health component in cooperative groups (2004); training to health workers and community volunteers; capacity building; and provision of health equipment to health institutions.	Work in 14 of the 24 VDCs covered by surveillance system	$148,887
MIRA Makwanpur	Started in 12 VDCs in 2001, another 12 VDCs in 2006 (implemented slowly and incrementally over one year), and finished in 2008. Activities include mainly women's groups action cycle to help women identify MNH problems and address them by developing strategies using local resources and knowledge. Small interventions include: training FCHV and TBA in essential newborn training; provided equipment to district hospital and primary health centres; provided economic support to women's groups for stretcher purchase, seed money for transport fund, safe delivery kits.	Work in 24 of the 24 VDCs covered by surveillance system	$2,230

Factor	Description	Geographical coverage	Annual budget
Family Planning Association of Nepal	Started in 1984. Activities include: antenatal and postnatal health services ; family planning and safe delivery counselling; temporary family planning services; health checkups; immunisation services; referral services; abortion services; VCT checkup; and lab services. Services provided through 9 clinics	Work in 9 of the 24 VDCs covered by surveillance system	$7,136
Marie Stopes	Started end of 2005. A health centre opened, providing family planning services, comprehensive abortion care, antenatal care and postnatal care.	Not known	Not known
Centre for Community Development Nepal	Started in 2002. Activities include: family planning, dental, and mental health services and support in outreach clinics	Work in 4 VDCs	Not known

Note: The budget is the average over last four years and is converted to US dollars at the current exchange rate. VDC = village development committee.

Table 8.7 Assessment of the contextual factors as confounders

Factor	Timing relative to SDIP	Hypothesised direction of effect on (outcome)	Hypothesised magnitude of effect in district	Hypothesised type of effect
1. Political factors				
Civil conflict and the Maoist insurgency	8 months after SDIP start	Positive (govt maternity services) Positive (skilled birth attendance)	Medium	Ambiguous
2. Health service-related factors				
Government district hospital	8 months after SDIP start	Positive (govt maternity services) Positive (skilled birth attendance)	Medium	Shift (immediate)
Government health centres	3 years after SDIP start	Positive (govt maternity services) Positive (skilled birth attendance)	Very small	Shift (immediate)
Devi private hospital	Same time as SDIP start	Positive (private maternity services) Positive (skilled birth attendance)	Medium	Shift (immediate)
Samudyak private hospital	2 years after SDIP start	No effect on maternity services	N/A	N/A
3. Presence of other projects or programmes				
PLAN International	At least 18 months before start of SDIP	Positive (govt maternity services) Positive (skilled birth attendance)	Small – few activities devoted to maternal health	Slope change (incremental)
MIRA Makwanpur	4 years before (in 12 VDCs) and 6 months after (in 12 VDCs) start of SDIP	Positive (govt maternity services) Positive (skilled birth attendance)	Medium	Slope change (incremental)
Family Planning Association of Nepal	2 decades before SDIP start	Positive – govt maternity services Positive – skilled birth attendance	Small – budget small	Slope change (incremental)
Marie Stopes	Same time as SDIP start	No effect on maternity services	N/A	N/A
Centre for Community Development Nepal	3 years before start of SDIP	No effect on maternity services	N/A	N/A

Makwanpur's district hospital was upgraded in mid-2006 to provide caesarean section and blood transfusion services, although these were not made available on a 24-hour basis. These changes are expected to have led to an immediate shift in utilisation of government maternity services. However, the timing of the change was not consistent with the start of the SDIP, making it an unlikely source of confounding. Other changes to government services included the opening of a new sub-health post. This factor poses no threat to internal validity since its timing does not coincide with the start of the SDIP and the magnitude of its effect was probably far too small to explain the regression results.

Two new private hospitals have opened in Makwanpur district in recent years. The first of these, Devi private hospital, is expected to have increased skilled birth attendance, and its anticipated effect is consistent with the timing and magnitude of the discontinuity in the time trend. Given that this factor concerns the private sector, it could only have improved skilled birth attendance through an increase in the utilisation of private maternity services. The regression results, however, provide no evidence of any positive shift in private hospital deliveries at the time the SDIP started, suggesting this factor was not responsible for the shift in skilled birth attendance.[72] The second hospital, Samudyak private hospital, provides no delivery care services and opened a couple of years after the start of the SDIP, ruling out the possibility that it could have confounded impact estimates.

Of the five NGOs working in reproductive health in the district, the potential influence of two of these can be immediately ruled out on the basis that they were not involved in any activities directly related to care seeking at childbirth. The assessment of the three remaining NGOs that could plausibly have increased utilisation of maternity services suggests none were likely to have affected internal validity of the study. PLAN international started well before the SDIP and few of its activities focused on maternal health. MIRA's women's group intervention, although shown to influence health care seeking (Manandhar, Osrin et al. 2004), is not consistent with the start of the SDIP, nor is its effect likely to have been instantaneous given the time it takes to complete the women's group action cycle. Finally, the activities of Family Planning Association of Nepal started a long time before the SDIP and the annual budget appears too small for any impact on health care seeking at childbirth.

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[72] If anything, the regression results suggest that there was negative long-term effect on private hospital deliveries.

8.5 Discussion

8.5.1 Interpretation of findings

The findings show that utilisation of government maternity services has risen noticeably in rural areas of Makwanpur. Various pieces of evidence suggest that part of this increase is attributable to the SDIP. Inspection of trends over time show a clear shift in the level of skilled birth attendance and utilisation of government health facilities precisely around the time the SDIP began implementation. Confirmation of the discontinuity in these outcomes is provided by the regression results. They indicate the programme raised skilled birth attendance by 2.2 percentage points and utilisation of government maternity services by 2.6 percentage points, a magnitude which is consistent with the impact findings from the previous chapter.

With the same study setting, the findings from this analysis can be directly compared to those that emerged from the demand model in chapter 5. A calculation based on the above impact estimate and the household cost of seeking care at childbirth gives a price elasticity of -1.3 – that is, for every 100 percent fall in the price of care, there is a 130 percent increase in utilisation of government maternity services. This estimate compares with a price elasticity of -2.3 for the regional hospital and -1.3 for the district hospital generated by the model in chapter 5. The estimates of price elasticity are of same order of magnitude, thereby adding to the credibility of the overall findings. If anything, one might expect the evaluation impact estimate to be higher than the model estimates owing to an interaction effect between the supply-side and demand-side incentive.

The programme failed to have any significant impact on the caesarean rate, presumably because the district hospital was not upgraded to provide surgery until nine months after the start of the SDIP in the district. The results also showed no impact on neonatal mortality. The analysis was not powered to detect the small change in neonatal mortality that one might expect, given the size of the impact of the SDIP on service utilisation. In any event, inadequate quality of care may have constrained improvements in health outcomes that would be expected from the increased utilisation.

A closer examination of the data provides some understanding of what influenced the impact of the SDIP. In the stratified analysis, it becomes clear that the positive impact on utilisation over the

entire sample is driven largely by the villages with women's groups. In these villages, the impact of the SDIP on utilisation of maternity services and skilled birth attendance was substantial. The findings suggest that the women's groups, by providing a channel to communicate the policy to the community, acted as a mediating factor between implementation and the impact of the SDIP. Moreover, the women's groups may have been particularly effective in this regard because of the trust that has developed between the group facilitators and the community, ensuring the message had credibility despite poor administration of the cash incentive. The impact estimates suggest then that the price elasticity is probably double the -1.3 calculated above.

There are a number of reasons behind why the women's groups are likely to be the most plausible explanation for the difference between the two sets of villages. First, the findings are consistent both with what is known about implementation of the programme in the district and the conceptual framework in chapter 3. Second, the fact that the women's group intervention was randomised across villages narrows the possibility that other factors were responsible for differences in impact between the two groups.[73]

The results have implications for the health provider incentive, a component of the SDIP yet to be addressed in this thesis. Given that there is no obvious reason why the women's groups would have modified the effect of the health provider incentive, the little or no impact in villages without women's groups provides some evidence that the supply-side incentive had at most a small effect on utilisation in this district. Unfortunately, with no information on processes it is difficult to understand the reasons for why this might be case.

There are reasons to believe that the impact estimates in this study area were greater than the country as a whole. Geographical access to health facilities in the district is relatively good, whereas in many other districts in Nepal, poor access represents more than simply a high transport cost – it is a physical barrier to getting to the health facility. Moreover, our sample included only rural households who are typically poorer than urban households. Economic theory would predict that poorer households are likely to be more incentivised by the conditional cash transfer.

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[73] This is certainly true in terms of characteristics that are fixed over time. Conceivably, factors themselves influenced by the women's groups prior to the SDIP may have mediated the impact.

8.5.2 Limitations

An important part of the empirical strategy was to assess the threats to internal validity. It focused on confounding arising from problems in the completeness of data or contextual factors. The evidence in its entirety points to no external factor that could explain the discontinuity in the utilisation outcomes, thereby strengthening the plausibility of the findings. Most of all, it is difficult to see how any potential confounding factor could explain the differences between the stratified results. There are, however, a number of limitations that should be noted, even if they do not invalidate the findings.

First, the robustness of the results to different specifications of the time function is mixed. While the preferred specification is the quartic time function, differences between the two specifications in the statistical significance of results suggest the functional form of the regression model is not unimportant. The level of significance is a moot point and what should be emphasised is that the SDIP had a greater impact on utilisation of government maternity services in those villages with women's groups. Whether the SDIP had any impact in villages with no women's groups is more uncertain.

Second, while the use of additional qualitative information improves the validity of the findings, this is no substitute for more credible policy evaluation methods. For instance, if there had been genuine control areas in which individuals could not participate in the programme, difference-in-difference methods could have been used. The findings suggest that the villages with no women's groups are almost control areas; however, there is no quantitative data on knowledge of the SDIP to be sufficiently confident to justify a difference-in-difference approach in this instance.

Third, it was a challenge getting information on the coverage and impact of NGO activities, an indication perhaps that these organisations rarely conduct rigorous evaluations of their projects.[74] While this posed no major problem in this study given that most potential confounders could be disregarded on timing alone, it does serve to highlight a limitation of using data on contextual factors to assess internal validity if the evaluation covers, say, many districts. As the number of potential confounders rises it becomes increasingly difficult to rule them out, particularly if little is known about the magnitude of their effect on outcomes.

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[74] The sole exception is MIRA, the organisation which is responsible for implementing the women's group intervention. They kept detailed documentation of their activities and have rigorously evaluated their intervention.

Fourth, the model implicitly assumed a certain functional form of the intervention effect – a shift and/or a change in the slope of outcome. While this seemed realistic, other types of effect are possible, such as an accelerated or decaying change in direction.

Fifth, the external validity of the findings is questionable given that the women's groups – identified as an important effect modifier – are not widespread in Nepal. The results may simply indicate the importance of effectively communicating the SDIP to the public. On the other hand, the interaction between the women's groups and the SDIP may be much more complex. For instance, as already mentioned, there is the issue of trust, which is specific to the women's groups. In addition, the women's groups may have broken down many of the non-financial barriers to health care, allowing the SDIP's cash incentive to trigger a greater behaviour change than would otherwise happen.

Sixth, there are unexpected findings which, unless spurious, are difficult to rationalise. For instance, the regression results suggest that the SDIP led to a (change in slope) reduction in the proportion of deliveries with a health worker. Perceptions of a gradual weakening in the implementation of the supply-side incentive over time or a confounding factor may explain this finding.[75]

8.5.3 Conclusion

As in the previous chapter, the results from the analysis of the impact of the SDIP in Makwanpur district demonstrate the potential for the SDIP to influence health seeking behaviour were it not for weak implementation. The analysis in this chapter was able to separate implementation from the underlying mechanism of the SDIP and show the latter to work. The women's group appeared to be an important effect modifier, by providing an effective means through which to communicate the policy.

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[75] As mentioned previously, an incremental effect identified by a change in the slope is probably more susceptible to confounding that the shift in the outcome.

Chapter 9. DISCUSSION AND CONCLUSION

This thesis explored the impact of demand-side incentives on health seeking at childbirth, in the context of Nepal's Safe Delivery Incentive Programme (SDIP). This final chapter discusses the findings in reference to the broader literature on demand-side incentives and health seeking behaviour, and seeks to draw conclusions. More specifically, it brings together the findings from each of the four empirical analyses to discuss how they link together and to provide a coherent overview of the thesis results. It outlines the broad limitations, which provide the basis to discuss the key policy implications of the findings. These concern demand-side incentive programmes in low-income countries and maternal health care more broadly. The chapter concludes by exploring priorities for future research.

Before discussing the findings, it is important to be mindful of a number of design changes that have been made to the SDIP after the end of the fieldwork for this research. In July 2008, the SDIP was expanded to cover the non-state sector. It meant that women receiving delivery care in participating hospitals – mostly private medical colleges and some non-profit mission hospitals – could claim the conditional cash transfer as long as they were on the general ward, not paying for a private room. In early 2009, the SDIP underwent two further major changes. The revised policy stated that the incentives to health workers for attending deliveries would no longer be paid. Moreover, it specified that both public and non-state providers are to provide free delivery care. To compensate for loss of revenue, the government reimburses health facilities for the cost of care.[76] Part of this reimbursement is set aside for quality of care improvements, including a provision to give a small financial benefit to health workers in light of the discontinuation of the provider incentive.

While it is recognised that these policy changes have already taken place, the discussion around policy implications can only draw on the research evidence. There is clearly a challenge in conducting an evaluation of a policy which is constantly evolving. The research remains relevant in informing discussion of whether the policy changes that have been made are likely to have much impact.

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[76] In light of these changes, the government has renamed the SDIP, the "Ama Surakchhya Karyakram" programme.

9.1 Main findings

9.1.1 Objective 1: Exploring the demand for maternity care

The utility model of provider choice showed that price has a negative effect on utilisation of health services. Price operates through both an income effect and a substitution effect. Moreover, it is predicted to have a greater effect on poorer households. Inferences about the relative importance of the determinants of demand for health care at childbirth were made using discrete choice models and full information maximum likelihood estimation techniques. Prices were measured comprehensively, including the financial costs of health seeking as well as the opportunity cost of time.

Using data from the district of Makwanpur, descriptive statistics showed that the vast majority of women give birth at home. The cost of care at a health facility places a considerable burden on the household budget and the budget share is greater the poorer is the household. Caesarean sections, in particular, appear to cause severe financial distress, as shown by the high incidence of catastrophic expenditure.

The discrete choice models showed that price is indeed a significant determinant of provider choice at childbirth. Price elasticity estimates indicate that demand for maternity care is elastic for regional hospitals, and close to unity for the district hospital and primary health care centre alternatives. The estimates of price elasticity, however, are highly sensitive to the choice of behavioural model. In the case of regional and district hospitals, price elasticities are highest for the middle wealth quintiles (quintile three and four) and lowest at each end of wealth distribution. In the simulation exercises, reducing the price of care at health facilities has a reasonably large effect on utilisation of maternity services (Figure 9.1). If maternity care were to be free, almost 40 percent of women would deliver in health facility. In contrast, ensuring all health facilities have at least a doctor, nurse or midwife to attend deliveries has almost no effect on the proportion of women delivering at home because this is already almost always the case.

Figure 9.1 Simulated effects of changes to key policy variables on institutional delivery care

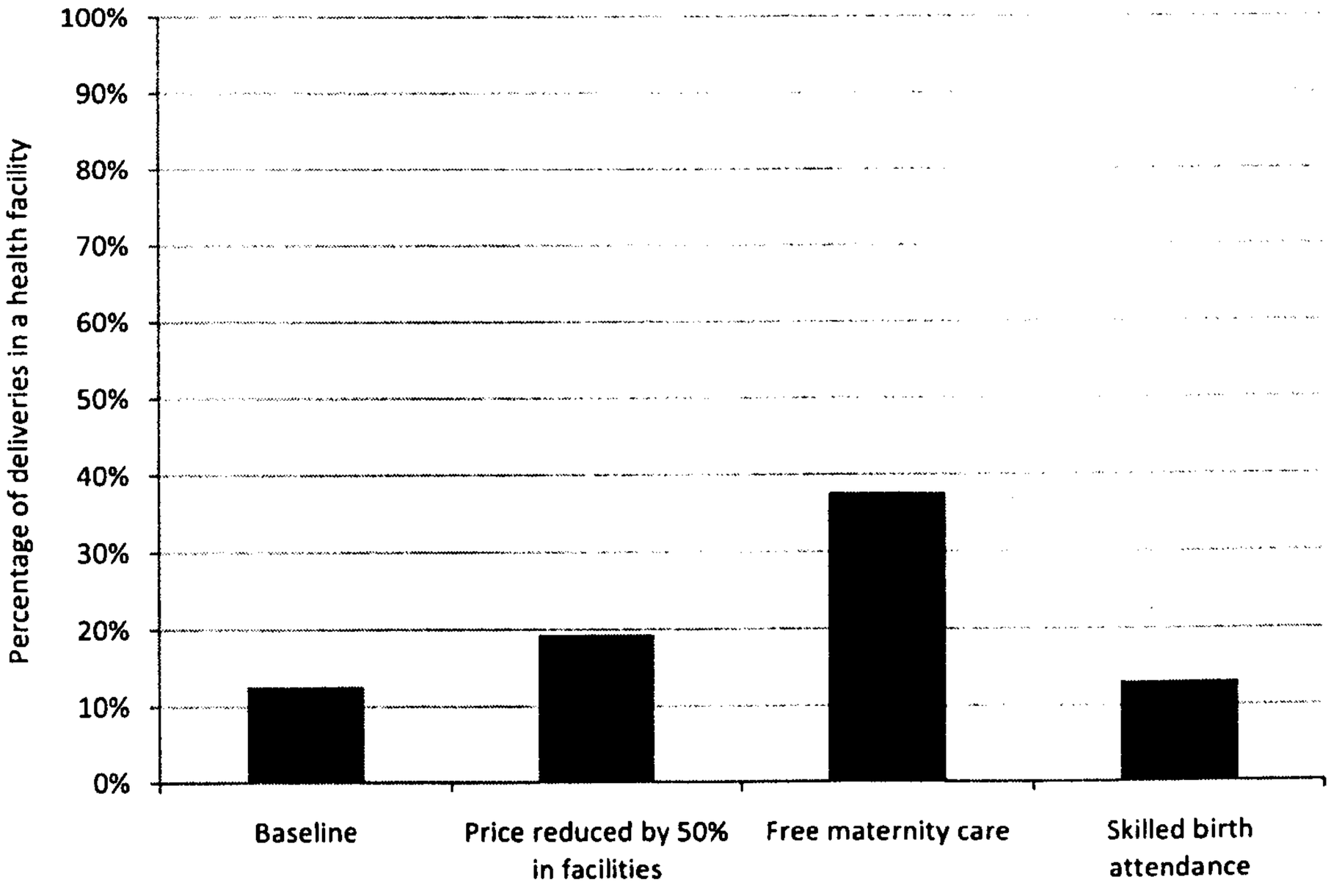
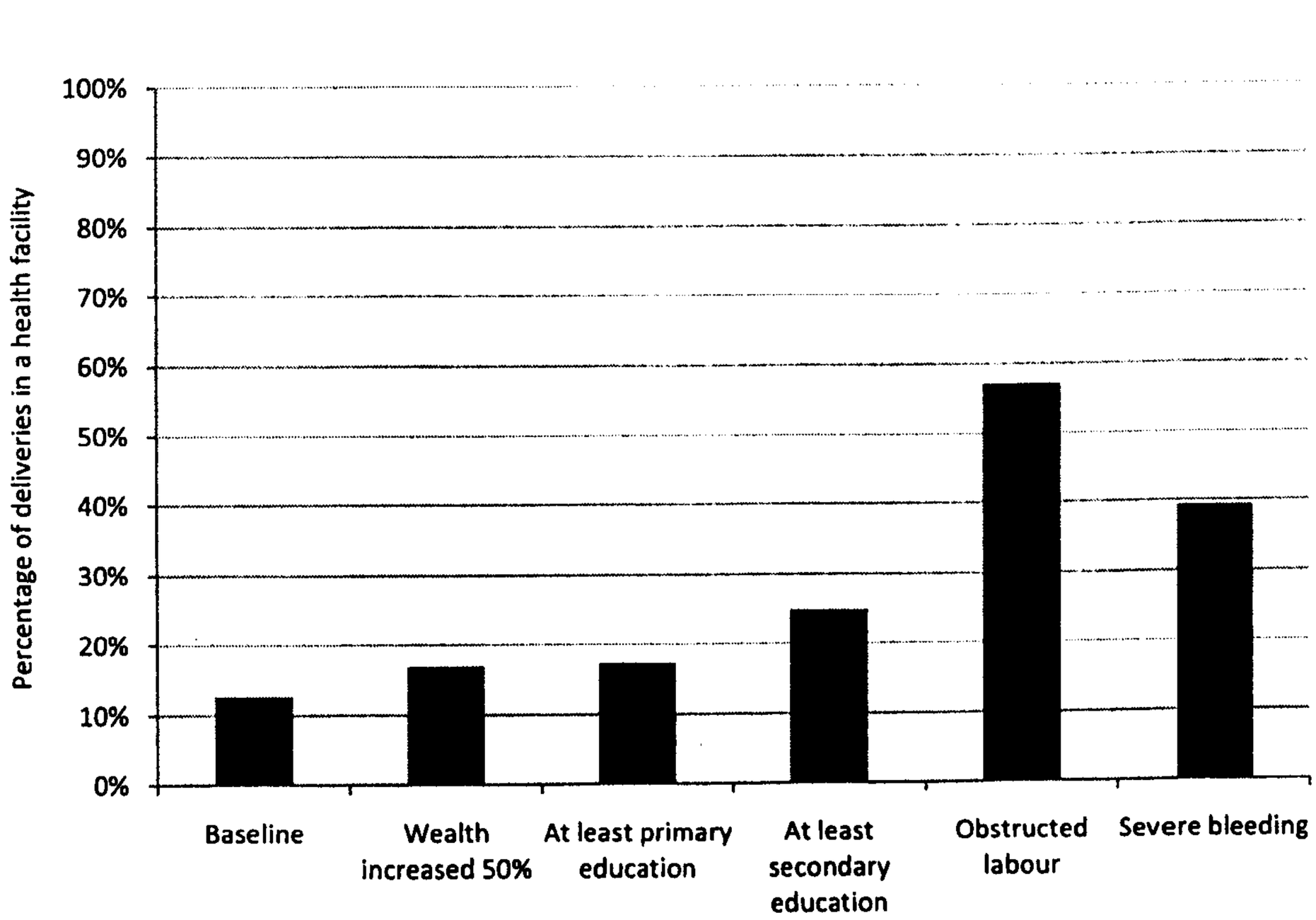


Figure 9.2 Simulated effect of changes to predisposing factors on institutional delivery care



Other factors are significant determinants of health seeking, including household wealth and education of the woman. Simulations of changes in these and other variables are shown in Figure 9.2. Self-reported complications prior to or during labour were the most important determinants. The reason for this may be linked to perceptions of the quality of care, such that women only seek care in a dire emergency. Or perhaps, there is an information failure such that families may not recognise the need for maternity care when there is no problem during childbirth, seeing it primarily as a curative intervention.

Price elasticity estimates are reasonably consistent with other studies that have used similar methods in the general health care literature (Gertler and Hammer 1997). They are, however, substantially higher than previous studies on maternal health seeking, which found little or no effect of price on utilisation (Heller 1982; Akin, Guilkey et al. 1985; Schwartz, Akin et al. 1988; Li 1996; Hotchkiss 1998). The difference is most likely due to the use of a more flexible model in this study. Numerous studies have found that morbidity, or at least self-reported morbidity, is positively associated with health seeking at childbirth, in line with the findings from this study (van den Heuvel, de Mey et al. 1999; Amooti-Kaguna and Nuwaha 2000; Afsana and Rashid 2001; Paul and Rumsey 2002; Glei, Goldman et al. 2003; Matthews, Ramakrishna et al. 2005; Islam, Chowdhury et al. 2006).

In summary, the findings suggest that price is an important determinant of health care seeking at childbirth. Households are thus likely to be reasonably sensitive to a price subsidy equivalent to the conditional cash transfer of the SDIP. Other important barriers exist, relating to women's preferences to deliver at home in the absence of any sign of obstetric complications.

9.1.2 Objective 2: Assessing implementation of the SDIP

The second objective of the thesis was to explore implementation of the SDIP. The theoretical model of the programme's causal pathway pointed towards a number of intermediate processes that are key to the implementation of the SDIP. Indicators related to these processes were analysed and findings from a qualitative study were brought into the discussion to explain in more depth why uptake of the programme was low.

Information on the process indicators is telling. Only a quarter of women had heard of the SDIP prior to childbirth and only a fifth of women who delivered in a public health facility received the

conditional cash transfer that they were entitled to immediately after childbirth. If women who received a deduction from their health facility bill equivalent to the conditional cash transfer are also included, the proportion increases to 36 percent. It is therefore not surprising that only one-tenth of women prior to childbirth knew of the SDIP and expected to receive the conditional cash transfer.

Table 9.1 summarises the evidence on the factors that influenced knowledge of the SDIP prior to childbirth and receipt of the conditional cash transfer. It incorporates evidence from the qualitative study in the first phase of the evaluation. Constraints at the central level provide the most plausible reason for why few families heard about the SDIP and why administration of the demand-side incentives was weak. There was no attempt by programme managers at the central level to promote the SDIP, owing to two concerns. First, it was feared that public health services might not be able to meet the increase in demand. Second, there were well-known problems in the disbursement of funds to pay beneficiaries and it was felt irresponsible to raise public expectations.

The late disbursement of funds from the donor was the primary reason behind the failure of health providers to pay women. Long delays in the disbursement of funds from the donor to the central government meant health providers could rarely honour the promise to pay beneficiaries on discharge from the health facility. With the donor funding 90 percent of the national programme budget, the government was in no position to fill the gap caused by these delays. The unpredictability of donor funding has been well documented (Bulir and Hamann 2001). The problem is accentuated if the funding is for a demand-side incentive progamme, whose success ultimately depends on being able to pay beneficiaries on time. This explains why Gilson and McIntyre (2005) caution against the use of donor funds to finance the removal of user fees. Closely related is the strength of the public financial management system. Delays in the disbursement of funds were observed at every level throughout the system (Powell-Jackson, Neupane et al. 2008).

Table 9.1 Factors influencing the uptake of the SDIP

Factor	Direction of influence	Evidence (QUANT = quantitative; QUAL = qualitative)
1. Knowledge of SDIP and receipt of the conditional cash transfer		
Lack of preparation and planning	Negative	Planning was limited due to political expediency for quick adoption of policy (QUAL)
District level factors	Positive	Districts borrowing funds from other budget lines to pay beneficiaries (QUAL). Districts used FM radio and other strategies to promote the SDIP (QUAL). Variation in sources of information about SDIP by district (QUANT).
Access to health services	Positive	Proximity to health providers is associated with knowledge and receipt of cash (QUANT)
Year of exposure to SDIP	Positive	Year of implementation is associated with knowledge and receipt of cash (QUANT)
2. Knowledge of SDIP		
Lack of central level promotion of the SDIP	Negative	Failure to promote the programme led to low awareness of SDIP in target population (QUAL)
Communication channels at the community level (women's groups, female community health volunteers)	Positive	Variation in impacts by women's group area, indicative of variation in knowledge of the SDIP (QUANT).[a] FCHV is associated with knowledge (QUANT)
Age	Negative[b]	Age is associated with knowledge (QUANT)
Socioeconomic status (wealth, education, ethnicity)	Positive	Wealth, education level and marginalised ethnicities are associated with knowledge (QUANT)
Access to media	Positive	Access to media is associated with knowledge (QUANT)
3. Receipt of the conditional cash transfer		
Donor funding of SDIP	Negative	Delays in disbursement by the donor (QUANT). Donor support led to a lack of ownership at the district level and perceptions of SDIP as a vertical programme (QUAL)
Weak financial management system	Negative	Delays in disbursement of funds throughout the system from central level to the health providers (QUANT & QUAL). Misuse of funds (QUAL)
Delivery in a hospital	Negative	Hospital delivery associated with receipt of cash (QUANT)

Note: [a] Although chapter 7 suggests no effect of women's groups on knowledge of the SDIP, this is likely to be because women's groups were rarely used to promote SDIP. [b] Evidence is weak ($p<0.1$)

Underpinning the disbursement delays and failure to promote the SDIP was a general lack of preparation and planning prior to the launch of the programme. This has been noted as an important constraint in other studies. For instance, the experience of financial reforms in South Africa and Zambia suggest political pressure to rush through policy changes meant there was limited time to plan effectively (Gilson, Doherty et al. 2003). While policymakers have an incentive to come up with new policy initiatives that will attract the interest of donors, they may be less concerned with the practical issues of implementation (Witter and Adjei 2007).

Despite the central level constraints, it is clear that some districts were able to perform considerably better than others in the implementation of the programme. Implementers at this

level appear to have considerable influence in how the policy takes shape on the ground (Lipsky 1983). The qualitative data shed light on some of these unobserved district level factors. Some districts took it upon themselves to communicate the policy. On the financial side, the decision by some district and hospital managers to direct funds from other budget lines for the purposes of the SDIP was critical. This practice allowed payment of beneficiaries earlier than would otherwise have been possible. The reasons why districts did or did not take actions to cope with the challenges seem to be linked to local pressures, perceptions of the programme as a donor-funded vertical programme, and understanding of the policy.

A range of factors at the community, household and individual-level were associated with uptake of the programme (including access to women's groups, actions of the female community health volunteer, age, wealth, education, ethnicity, access to media, and proximity to health services). The direction of influence of these factors was as expected, but probably context-specific. That is, if the government had used (different) strategies to communicate the SDIP or had stronger administrative structures in place, the direction of influence of some of these factors may have changed. For instance, in the conditional cash transfer programmes in Brazil and Ecuador, income and education were shown to be negatively associated with participation because the government was able to communicate the policy effectively to the poorest households (Fiszbein, Schady et al. 2008). The context in Nepal of a relatively free media and a strong tradition of community based organisations that act largely independent of government should also be considered.

Finally, the length of time the SDIP had been operating was found to be an important determinant of both the receipt of the conditional cash transfer and knowledge of the SDIP prior to childbirth. In the case of administration of the conditional cash transfer, it is likely to reflect major changes made in disbursement arrangements between the bilateral donor and the central government, which goes back to the point about the predictability of donor funding. More generally, however, it indicates that it took time for the programme to bed down and it seems reasonable to expect the same in different contexts.

There is little in the literature about the implementation of demand-side incentive programmes beyond a description of programme design. As such, it is not clear if there have been implementation challenges in other countries and, if so, what are the lessons. In the study of the experience of financing reform in South Africa and Zambia, Gilson et al. (2003) note a number of

factors that constrained implementation, many of which ring true in this research. They include political pressure for a quick policy change; a failure to provide information about the new policy to key implementers; and a failure to build implementation capacity such as monitoring systems.

A review of conditional cash transfer programmes provides an indication of their complexity (Fiszbein, Schady et al. 2008). The monitoring systems are intricate, using cutting-edge technology to collect information on as many as 400 process indicators. Moreover, the designs are complex. For example, Brazil's Bolsa Familia required at least 60 regulatory documents to guide implementation (Lindert, Linder et al. 2007), while Chile's Solidario has over 53 minimum conditions of participation (Fiszbein, Schady et al. 2008). In terms of community awareness of the programmes, there appears to be little evidence but, as Gilson and McIntyre emphasise, communication is one of the key strategies to implement health financing reforms (Gilson and McIntyre 2005).

Weak financial management and administrative capacity, in particular, seems to be a common theme emerging from the recent literature on financing policies in low-income countries. For instance, the removal of fees for delivery care in Ghana was characterised by considerable unpredictability in funding and in India there have been long delays in paying beneficiaries of the national demand-side incentive programme (Witter and Adjei 2007; Devadasan, Elias et al. 2008). The Government of Mexico's contracting of the national telecoms company to manage payments in the Oportunidades programme perhaps illustrates the importance of having an administrative infrastructure already in place (Eichler and Levine 2009).

In summary, the findings showed that implementation of the SDIP has been weak, although there are indications it has improved over time. The majority of the target population were not reached by the SDIP, dampening expectations of a large impact on health seeking behaviour. The analysis shed light on a range of factors that influenced individual participation in the programme, thereby helping to characterise the selection process.

9.1.3 Objective 3: Analysing the impact of the SDIP

The conceptual model provided insights into the hypothesised effect of the SDIP on health seeking behaviour. These predictions provided the basis for the two separate analyses of the programme's impact that corresponded to different geographical areas in Nepal. The choice of control group

with which to identify the impact of the SDIP was guided by the theoretical model of the programme's causal pathway. Table 9.2 summarises the evidence from the empirical analyses of the impact of the SDIP.

In the first analysis, primary data were used from a survey of six districts in Nepal. Impact estimates were derived using propensity score matching methods. Among women who knew about the SDIP prior to childbirth, the programme had a positive impact on the utilisation of maternity services. There was some weak evidence that the SDIP crowded out the non-governmental sector, as shown by the negative impact on deliveries in NGO health facilities.

Table 9.2 Summary of evidence on the impact of the SDIP

Main finding	Evidence (ATT estimates)
a. Propensity score matching analysis in six districts (treated = heard of the SDIP prior to childbirth)	
SDIP increased utilisation of maternity services	▪ +4.0 percentage points on institutional delivery care (p value<0.001) ▪ +4.3 percentage points on skilled birth attendance (p value<0.001) ▪ +1.2 percentage points on caesarean section rate (p value=0.067)
SDIP crowded out the non-governmental sector	▪ -1.1 percentage points on NGO delivery care (p value=0.063)
SDIP impacts varied by region	▪ Tarai districts: +2.9 percentage points on institutional delivery care (p value=0.363) ▪ Hill districts: -2.0 percentage points on institutional delivery care (p value=0.401) ▪ Mountain districts: +8.7 percentage points on institutional delivery care (p value<0.001)
SDIP impacts varied by wealth for institutional delivery care	▪ Poorest 40%: 2.6 percentage points on institutional delivery care (p value=0.073) ▪ Middle 20%: 6.3 percentage points on institutional delivery care (p value<0.001) ▪ Richest 40%: 3.2 percentage points on institutional delivery care (p value=0.435)
b. Longitudinal analysis in Makwanpur district (treated = area in which policy was communicated)	
SDIP increased utilisation of maternity services	▪ +6.2 percentage points on government delivery care (p value<0.001) ▪ +5.2 percentage points on skilled birth attendance (p value<0.007)
SDIP did not increase the caesarean section rate	▪ -0.3 percentage points on caesarean section rate (p value=0.312)
SDIP did not reduce neonatal mortality	▪ -0.3 percentage points on neonatal mortality (p value=0.810)

Note: ATT = average treatment effect on the treated. CCT = conditional cash transfer. NGO = non-governmental organisation.

The greatest impact of the programme was in the mountain region, where the average treatment effect on the treated (ATT) was substantial. The impact on institutional delivery care in the tarai and the hill districts was not significant. It should be noted, however, that the subgroup analysis

only had enough power to detect a large impact. There was weak evidence of variation in the impact of the SDIP on institutional delivery care by wealth. The largest ATT estimate is found in the middle wealth group, but in relative terms the poorest two-fifths of households were most responsive to the demand-side incentives.

The second analysis provides evidence of the SDIP's impact in the district of Makwanpur and allows a direct comparison with results from the demand model in chapter 5. The longitudinal analysis showed that in areas where the programme was communicated widely through women's groups, the SDIP increased utilisation of maternity services. There was, however, no impact on the caesarean section rate because it was not for another nine months after the start of the SDIP that the district hospital was upgraded to provide emergency surgery. There was no evidence of an impact of the programme on neonatal mortality, although the analysis was not powered to detect the small change in neonatal mortality that one might expect, in light of the size of the impact of the SDIP on service utilisation.

The magnitude of the impact estimates in this analysis is consistent with that computed by the demand model in chapter 5. Individuals appear similarly sensitive to prices in both the evaluation of the SDIP and in the modelling exercise. In principle, the evaluation impact estimates reflect the combined effect of the conditional cash transfer and the provider incentive and thus may not be directly comparable, but indications are that the supply-side incentive had a minimal effect.

The results from the two analyses of impact show that the demand-side incentives, as the mechanism through which the programme works, are effective in raising utilisation of maternity services. In this sense, the core insight emerging from each analysis is consistent. However, the finding of no impact in the hill districts in chapter 7 was unexpected. In one of the two districts, women were mistakenly given the incentive even when they delivered at home – in effect, a measurement error in the treatment variable, which would dampen the estimated effect. In the other hill district, the terrain is particularly challenging, which may have meant the cash incentive represented a small fraction of the overall cost of seeking care.

A direct comparison of the two sets of ATT estimates is complicated by the fact that the treatment group is defined differently in the two analyses. In particular, the treatment group for the propensity score matching was defined in such a way that the measure of programme impact

essentially filters out issues related to implementation. Over the entire sample, the increases in utilisation attributable to the SDIP are a fraction of the estimates given by the ATT. With just over one-quarter of the sample reached by the programme, the ATT estimate implies that the increase in skilled birth attendance as a result of the SDIP was 1.2 percentage points across the entire sample (see section 9.3.4).

This compares with an impact of 2.2 percentage points on skilled birth attendance across the entire sample in Makwanpur district. There are various reasons why estimates might differ, relating to differences in the financial package of incentives on offer and differences in implementation. It is reassuring, however, that the impact estimates are of the same order of magnitude. In view of the government target of 60 percent for skilled birth attendance in 2015, the impact indicated by the estimates from the two analyses are modest at best.

With little evidence from other countries on the effect of demand-side incentives on utilisation of maternity services it is difficult to put these findings into perspective. Indeed, this illustrates the important contribution of this research to the literature. A number of studies have noted that when user fees for maternal health services have been abolished, utilisation has increased, but without a credible identification strategy, one would be ill-advised to attribute all of the change to the reform (Wilkinson, Gouws et al. 2001; Deininger and Mpuga 2004; Nabyonga, Desmet et al. 2005; Penfold, Harrison et al. 2007).

Similarly, comparisons of impact estimates with those from evaluations of conditional cash transfer programmes are difficult, although for other reasons. These programmes focus on quite different health interventions and provide an incentive on top of fully subsidised health care. To get a sense of the magnitude, estimates of programme impact on health centre visits by children range from a 6 percentage point increase in Nicaragua to a 33 percentage point increase in Columbia (Attanasio, Battistin E et al. 2005; Macours, Schady et al. 2008). It suffices to note that evaluations of these programmes provide compelling evidence that conditional cash transfers have the potential to increase utilisation of health services.

Whether the positive impact on service utilisation improves health depends on the quality of care. The Survey of Health Providers conducted during the first phase of the evaluation provides evidence on a comprehensive range of both structural and process-orientated measures (Powell-

Jackson, Neupane et al. 2008). The quality of maternity services was found to be poor. Most telling is the fact that no primary health care centre and only 13 percent of district hospitals could provide basic emergency obstetric care. Neither of these two types of health facility could provide surgical procedures.

Various empirical methods were used in an effort to assess the robustness of the findings in light of the non-experimental study design. Table 9.3 summarises the findings from these empirical assessments. In its entirety, the evidence suggests that the findings from both analyses are credible.

Table 9.3 Summary of evidence on the robustness of the impact findings

Main finding	Evidence
a. Propensity score matching analysis in six districts	
SDIP has no impact on women with low expectation of receiving CCT	▪ -0.3 percentage points on government delivery care (p value=0.834) ▪ +0.6 percentage points on skilled birth attendance (p value=0.741)
Absolute estimates of impact from IV estimation are greater	▪ +4.6 percentage points on government delivery care (p value=0.764) ▪ +8.7 percentage points on institutional delivery care (p value=0.582)
Impact estimates are fairly robust to different matching estimators	▪ Kernel matching: +4.0 percentage points on institutional delivery care (p value<0.001) ▪ Malahanobis matching; + 3.9 percentage points on institutional delivery care (p value=0.039) ▪ Nearest neighbour matching: + 4.6 percentage points on institutional delivery care (p value<0.001)
b. Longitudinal analysis in Makwanpur district	
SDIP had no impact in areas in which the policy was poorly communicated	▪ +0.3 percentage points on government delivery care (p value=0.672) ▪ +0.5 percentage points on skilled birth attendance (p value=0.603)
SDIP had no impact on antenatal care (non-equivalent outcome)	▪ +0.04 antenatal care visits (p value=0.603) in entire sample ▪ +0.13 antenatal care visits (p value=0.242) in sample with women's groups
Contextual factors as confounders are ruled out	▪ Political factors, health-service related factors, and the activities of NGOs ruled out as confounders on basis of either timing, direction of possible bias, or size of possible bias
Robustness of results to different specifications of the time function was mixed	▪ Quartic time function: +5.2 percentage points on skilled birth attendance (p value<0.007)in sample with women's groups ▪ Quadratic time function: +4.4 percentage points on skilled birth attendance (p value<0.004)in sample with women's groups ▪ Quartic time function: +1.6 percentage points on skilled birth attendance (p value<0.162)in sample with no women's groups ▪ Quadratic time function: +1.8 percentage points on skilled birth attendance (p value<0.026)in sample with no women's groups

Note: CCT = conditional cash transfer. NGO = non-governmental organisation.

Equally compelling is the fact that the findings are consistent with standard economic theory and the model of the programme's causal pathway. As predicted, reducing the price through a cash

subsidy has a positive and modest impact on utilisation of government maternity services and leads to substitution away from the home and non-state providers. Moreover, the effect of the demand-side incentives on behaviour is modified by the size of financial package relative to price, consistent with the theoretical predictions. In terms of the programme's causal pathway, the findings confirm that knowledge of the SDIP is necessary but not sufficient for the programme to change health seeking behaviour. There must also be an expectation that the conditional cash transfer will be paid.

9.1.4 Linking implementation with impacts

The story of the SDIP has two parts. On the one hand, the programme reached only a small proportion of the target population in its first three years and implementation has unintentionally favoured some subgroups more than others. On the other hand, the demand-side incentives have been shown to be effective in changing health seeking behaviour at childbirth. The behaviour of some subgroups was more affected by the financial incentives than others. Thus, it helpful to make the distinction between the impact of the demand-side incentives (the mechanism through which the programme works) and the impact of the programme (a combination of implementation and the effect of the demand-side incentives).

Figure 9.3 summarises the findings from chapters 6 and 7 according to the stages laid out in the theoretical model of the programme's causal pathway. The entire sample of women is regarded as being eligible to receive the demand-side incentives. The first column shows the proportion of the target population who knew about the SDIP prior to childbirth. The second column shows the shows the proportion of the target population who knew about the SDIP and expected to receive the demand-side incentives (as proxied by knowledge of someone else who had received the cash incentive). The third column indicates the proportion of the total who were reached by the programme and delivered with skilled birth attendance. In this group there are women who would have delivered with skilled birth attendance in the absence of the SDIP, and there are women whose health seeking behaviour changed as a result of the incentive. The last column shows the latter group of women as a proportion of the target population, calculated on the basis of the ATT given by the propensity score matching. It gives the increase in skilled birth attendance over the entire sample that can be attributed to the SDIP.

Presentation of the findings in this way is useful for identifying where the major bottlenecks exist along the programme's causal pathway. Clearly, the major constraint is in the communication of the programme, given that three-quarters of women were excluded from the programme on the basis of knowledge alone (Figure 9.3). However, there are also important bottlenecks at each subsequent stage. Only 11 percent of target households were reached by the programme; of these, half delivered with skilled birth attendance (5 percent of the target population). In the end, 1.3 percent of deliveries were with a skilled birth attendant as a result of the programme. The majority of women who were reached by the SDIP and delivered with skilled birth attendance would have done so in the absence of the programme. Raising the level of incentives such that more women are encouraged to deliver in a health facility would have a limited impact if no action was taken to improve knowledge of the SDIP and administration of the demand-side incentives.

Figure 9.3 Uptake and impact of the SDIP in six districts of Nepal

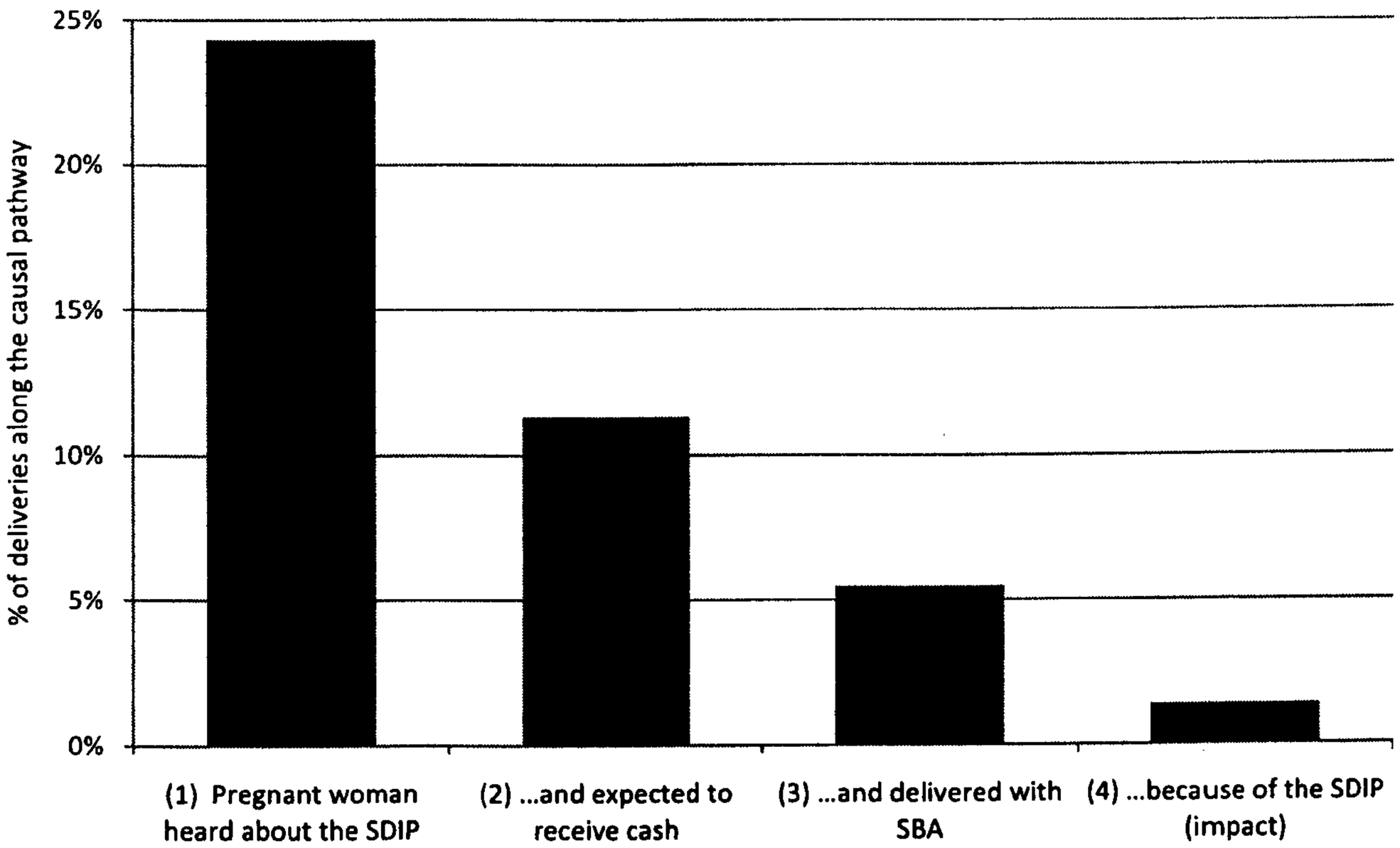


Figure 9.4 links the process and impact findings in the same way but this time disaggregated by wealth quintile. There is a consistent positive gradient in the proportion of women reached by the SDIP (column 2). Only 13 percent of women in the richest quintile participated in the programme, but this is almost double that of the poorest quintile. In the poorest four-fifths of the

population, less than 5 percent of women were reached by the programme and delivered with skilled birth attendance. The last column is revealing. It shows that almost none of the women in the richest quintile who delivered with skilled birth attendance were incentivised to do by the SDIP. Moreover, despite a large effect of the incentives on behavioural change in the poorest two-fifths of the population, the impacts were negligible because few women had been reached by the programme. Thus, when the combination of implementation and the effect of the incentives are factored in, the middle wealth quintile benefits the most from the SDIP.

Figure 9.4 Uptake and impact of the SDIP in six districts of Nepal by wealth quintile

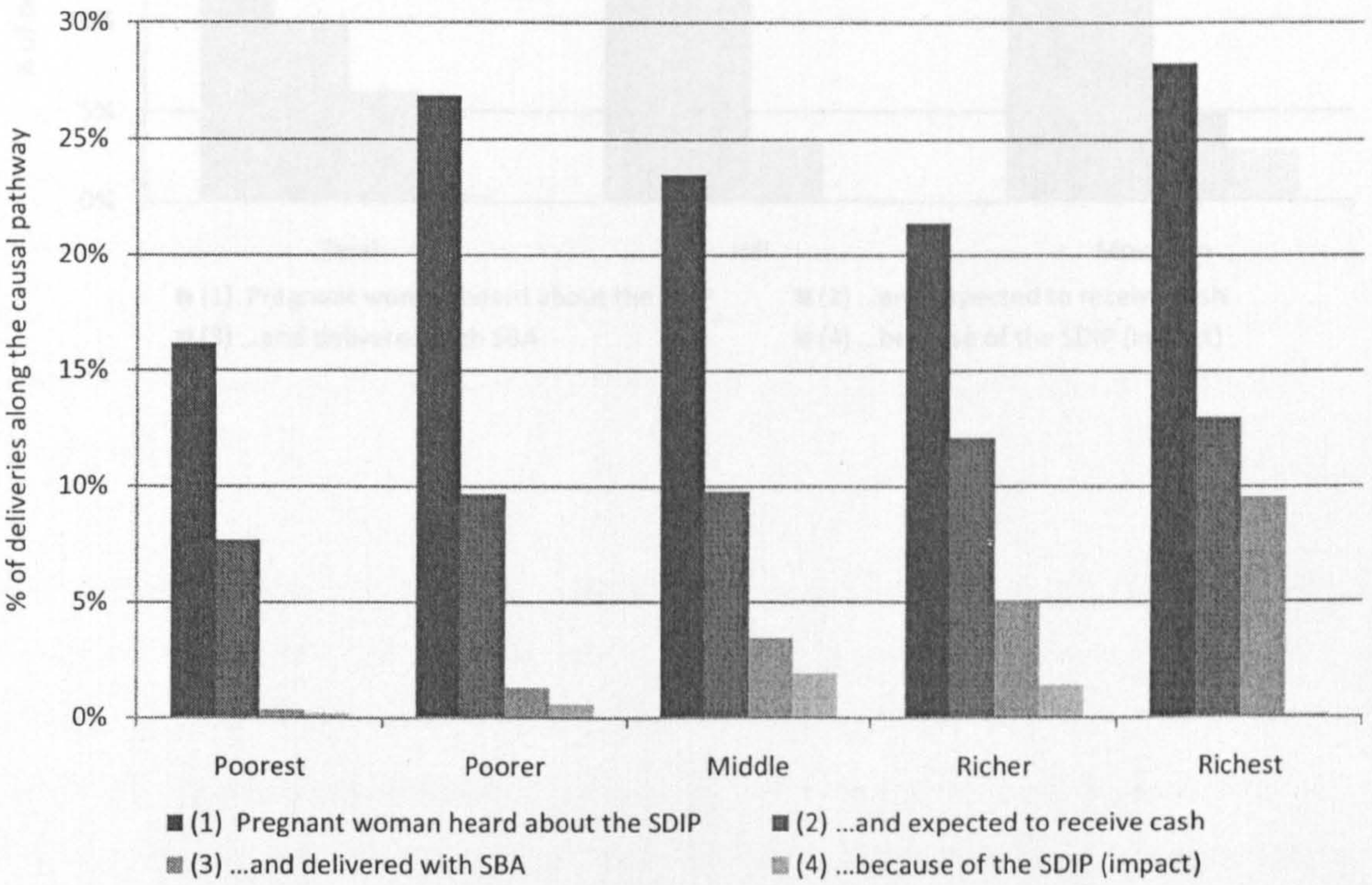
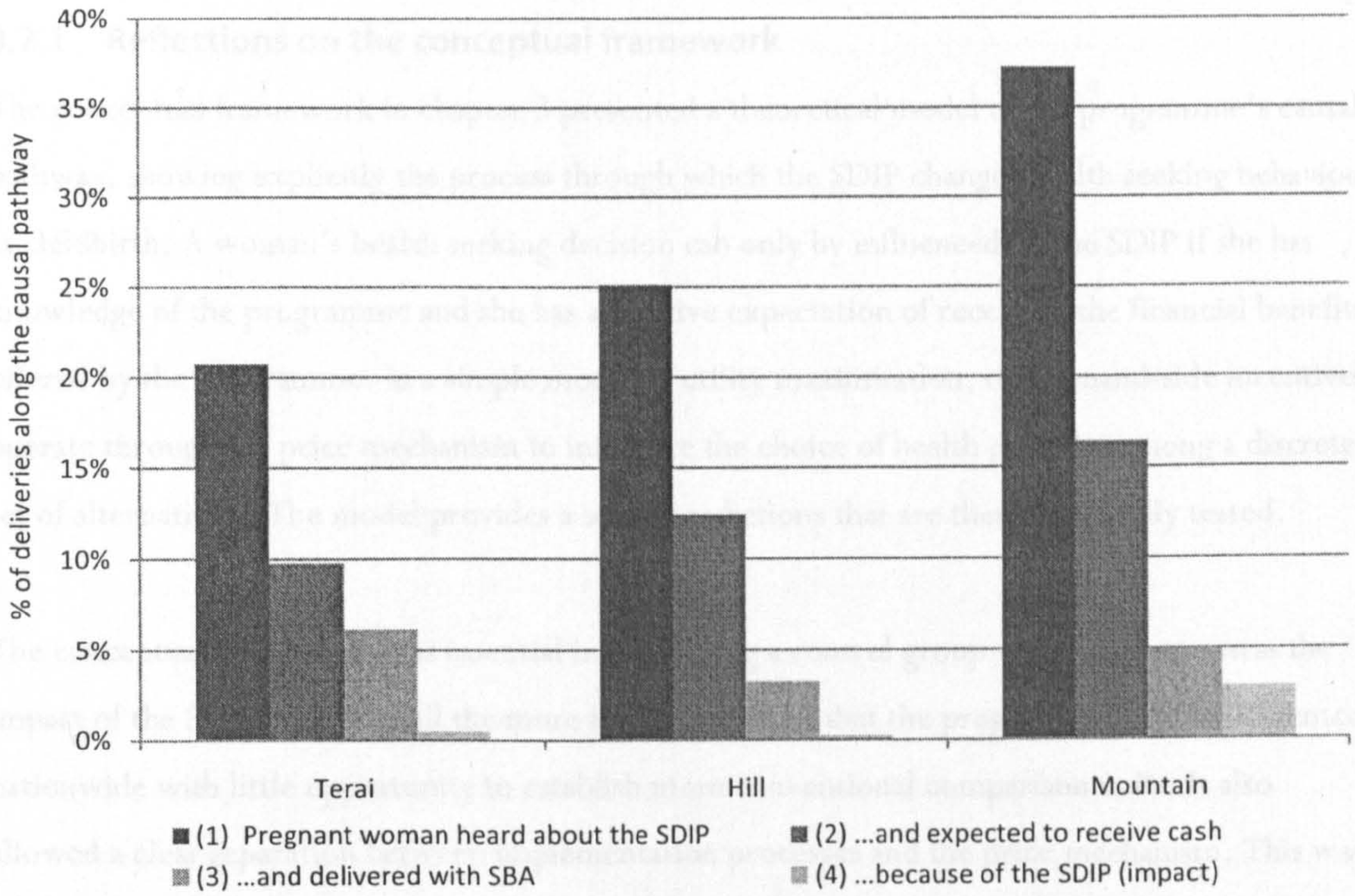


Figure 9.5 shows that uptake was lowest in the tarai districts and highest in the mountain districts. The tarai districts have the highest proportion of women who were both reached by the SDIP and delivered with skilled birth attendance (column 3). However, since the incentives did not have a substantial effect on behaviour, a low proportion of women in this group delivered with skilled birth attendance as a result of the SDIP. The picture is very different in the mountain districts, where the majority of women who were reached by the programme and delivered with skilled birth attendance, did so because of the demand-side incentives. In the hill districts, the impact of the programme on skilled birth attendance is almost zero.

Figure 9.5 Uptake and impact of the SDIP in six districts of Nepal by ecological region



9.2 Limitations

9.2.1 Reflections on the conceptual framework

The conceptual framework in chapter 3 presented a theoretical model of the programme's causal pathway, showing explicitly the process through which the SDIP changes health seeking behaviour at childbirth. A woman's health seeking decision can only by influenced by the SDIP if she has knowledge of the programme and she has a positive expectation of receiving the financial benefits offered by the programme. In a simple model of utility maximisation, the demand-side incentives operate through the price mechanism to influence the choice of health provider among a discrete set of alternatives. The model provides a set of predictions that are then empirically tested.

The conceptual framework was essential in identifying a control group with which to assess the impact of the SDIP. This was all the more important given that the programme was implemented nationwide with little opportunity to establish more conventional comparison units. It also allowed a clear separation between implementation processes and the price mechanism. This was useful in identifying where along the SDIP's causal pathway the main obstacles to programme impacts lay.

The conceptual framework, nonetheless, has its limitations. The first is its representation of the causal chain as a linear series of well-defined stages, when in reality the process is likely to be much more complex and involve multiple interactions (Mills, Gilson et al. 2008; Ravallion 2009). This simple representation of the process can be useful for the reasons outlined above, but can also be misleading. The findings provide frequent examples of this complexity, throwing light on factors that could lead to the development of a new set of hypotheses to be tested. For instance, government promotion of the programme and administration of the payment system were conceived as essentially unconnected steps when in fact the former was heavily influenced by failures in the latter. It suggests that implementation processes are highly interdependent.

A second limitation is the static nature of the model. Processes and even the intervention itself may deviate from stated policy or evolve over time. Local adaptation ensured the programme was often not implemented as planned (see chapter 4). Variation in the intervention means that the theoretical model of the programme's causal pathway, which is based on the design stated in the policy, may lose its relevance. A clear example comes from one of the districts, in which the SDIP

was altered to pay cash to women who give birth at home. In this instance, an assessment of the impact of the intervention on health seeking misses the point; rather the research might seek to uncover why the intervention was changed by district officials so radically, reasons that might be linked to equity concerns or a simple misunderstanding. Analytically, adaptation of the intervention is equivalent to measurement error and makes it more difficult to reject the null hypothesis of no programme impact.

A third limitation refers to the lack of engagement with the theory on implementation. This also reflects a limitation in the scope of the thesis (see section 9.3.2), given that implementation could have been its sole focus. By setting out the main steps in the programme's causal pathway, the model lends itself to an assessment of implementation processes that is broadly descriptive (Sanders and Haines 2006). What is missing is a deeper understanding of the fundamental causes of the weak implementation. While the research findings may be interesting on one level, they are of limited use if they are unable to guide future implementation of other policies in Nepal or similar programmes in other countries. This argues for a strong theoretical framework to develop and test hypotheses, which can throw light on a set of factors that can be generalised.

The literature review highlighted health policy analysis and theories of implementation to guide empirical work in this area (Walt, Shiffman et al. 2008).[77] Alternatively, a framework for analysing capacity may have been used to understand the various dimension of capacity that influenced implementation (Mills, Bennett et al. 2001). Some of the capacity constraints were clearly internal to the implementing institutions, while others were external, perhaps linked to the broader public sector institutional context.

Finally, the utility model of provider choice may not be appropriate for analysing the consequences of the demand-side incentives for welfare. In so much as women may be under-consuming maternity services, an analytical framework that incorporates inconsistent time preferences, intra-household conflict and misguided beliefs may predict more accurately the welfare consequences of the demand-side incentives. But, as Kremer (2009) notes, there is not even an agreed conceptual framework for assessing welfare in such circumstances.

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[77] These are discussed in more detail in the literature review chapter.

9.2.2 Scope of the thesis

The scope of the thesis limits to some extent the conclusions that can be drawn from the findings. No rigorous cost-effectiveness analysis was conducted to judge whether the SDIP is good value for money. In a world of limited resources, information on costs is critical if policymakers are to adopt policies that will reap the greatest benefit for each dollar spent. It seems, however, economic evaluations of demand-side programmes are rare. The literature review identified a few studies, such as a cost-benefit analysis of a conditional cash transfer programme in Colombia (Institute for Fiscal Studies, Econometría et al. 2006).

The thesis did not evaluate the effect of the supply-side incentive. There was a weak suggestion in chapter 8 that the health provider incentive in Makwanpur district had no effect, but this can hardly be regarded as conclusive evidence. The provider incentive has been contentious. Its inclusion in the policy was politically motivated and there have been widespread allegations of fraud (Ensor and Witter 2008). Policymakers in Nepal showed scant interest in wanting to study their effect, nor was there an opportunity to adopt a rigorous approach to evaluate this component of the SDIP. The lessons that can be learnt from this research are thus limited to the demand-side incentives.

Finally, the evaluation was limited to studying the early period of programme implementation only. It is perhaps not surprising that the programme during this period faced difficulties. It was a national programme that was introduced rapidly without time set aside for piloting or detailed planning. The findings that emerge from an evaluation of the SDIP as a mature programme might be quite different, particularly with regards to the implementation process. For example, the administrative system might have adapted to the problems encountered early on. Conversely, the long delays in the disbursement of funds might have masked more deep rooted problems such as corruption that is known to be a major issue in Nepal.

9.2.3 Critical appraisal of empirical methods

Identification of impacts

The most common ways of defining treatment in impact evaluation use enrolment status, eligibility status or geographical controls. However, these conventional approaches were ruled out in this study owing to the nature of the programme and its implementation (see chapter 7).

Alternative approaches to identifying impacts and improving the plausibility of findings were followed. If, however, the evaluation had had more control over the implementation process, it may have sought to use alternative study designs that control for unobservables, or at least some of them. For example, difference-in-difference impact estimators have been popular in the recent literature. This approach looks for differences in changes between treated and untreated individuals before and after the programme's implementation and is able to sweep out correlation with fixed individual unobservables that confound identification of the programme's effect on outcomes.

There are also a number of arguments that could have been made in favour of an experimental design with the district as the unit of randomisation. First, other countries have been successful in conducting cluster randomised controlled trials of similar interventions (Lagarde, Haines et al. 2007). Second, the experiment would not have had to last long, since the behavioural response to the demand-side incentives is immediate, ensuring that control districts would be able to participate within a year or two if the programme was shown to be effective. This may have allayed concerns over equity. Third, if appropriately designed the experiment could have teased out the separate causal effects of the demand-side incentives and the health provider incentives, and ultimately saved resources, in light of the fact that the provider incentive is considered to have been a failure (Ensor and Witter 2008).

Outcomes

The evaluation was limited to an assessment of the SDIP on utilisation of maternity services.[78] Given that the goal of the programme is to improve maternal health, utilisation outcomes do not capture the most important measure of the SDIP's performance. However, it was not feasible to assess the impact of the SDIP on maternal mortality. In the absence of a complete vital registration system, the maternal mortality rate can be measured with a household survey using the sisterhood method. This is the case in Nepal (Government of Nepal 2007). However, the rarity of a maternal death means that survey estimates of maternal mortality typically have extremely wide confidence intervals. Even if the impact of the programme on maternal mortality were expected to be large, the sample size required to detect a statistical difference between the treated and

[78] Although, neonatal mortality was assessed as a secondary outcome in the longitudinal analysis in Makwanpur district.

untreated groups is prohibitively high. As it turned out, the impact of the SDIP on utilisation was such that there is little expectation of any sizeable improvement in maternal mortality.

The maternal mortality measurement problem is widely recognised (Attaran 2005; Graham, Ahmed et al. 2008). Yet, no widely accepted methodological advances seem to have been made. It is the case that national estimates for many of the less developed countries have to be modelled, rather than measured directly (Hill, Thomas et al. 2007). Moreover, only one study assessing the impact of policy on maternal mortality was identified during the literature review – a 30-year cohort study using data from community surveillance in Bangladesh (Chowdhury, Botlero et al. 2007). Concerns might be assuaged if service utilisation indicators were adequate measures of the quantity of interest but they have numerous drawbacks, especially related to quality of care. Unfortunately, maternal health is a complex field and simple indicators, such as immunisation coverage, that translate more directly into health outcomes do not exist. The methodological challenge is to develop service utilisation indicators that incorporate critical elements of the quality of care.

The evaluation also failed to assess the impact of the SDIP on the household cost of care. There is the possibility that health providers raised their prices after the start of the programme to absorb some of the subsidy of the conditional cash transfer as producer surplus. There was indeed some anecdotal evidence to support this hypothesis. In one hospital, patients were charged significantly more for a normal delivery if they received the conditional cash transfer (Powell-Jackson, Neupane et al. 2009). Relatedly, the evaluation did not assess the supply-side consequences of the free care policy in the mountain districts, although it appears these may have been negligible since free care was rarely provided in practice.

Coherence between analyses and data

The thesis involved four separate analyses. By using multiple datasets, which covered different districts in Nepal, the analysis in the thesis is somewhat fragmented, making it more difficult to link the findings into one coherent story. This reflects the opportunistic nature of the research and the reality of doing an impact evaluation when funders engage with researchers long after the policy has been launched. It would have been preferable if the geographical area of the demand model in chapter 5 corresponded to the same six districts as those sampled in the process evaluation (chapter 6) and the assessment of impacts (chapter 7).

In part, the problem is mitigated by the fact that the two analyses in the district of Makwanpur (chapter 5 and chapter 8) are grounded in standard economic theory. Notwithstanding the methodological limitations of both these analyses, they show whether a theoretical mechanism is at work. In this sense, their core insights rather than the precise estimates of the relevant parameters are relevant to the setting of the other analyses.

In addition, stronger linkages between the qualitative data and quantitative data in the process evaluation may have led to a deeper understanding of the unobserved district level factors that seemed to be important determinants of programme uptake. The challenge is to incorporate variables into the statistical analysis when they emerge only through qualitative research methods.

Understanding the heterogeneity in impacts

The variation in the impact of the SDIP across regions is attributed to the size of the demand-side incentives and, to a lesser extent, the baseline service utilisation and supply-side constraints. However, the variation may also reflect other factors linked to implementation. For instance, the provision of the conditional cash transfer to women delivering at home in one of the hill districts has already been mentioned as a reason why there appeared to be no impact in this region.

With a greater number of districts and more district-level information on local implementation of the SDIP and supply-side data on health providers, it may have been possible to shed more light on the district level factors that drive impacts. Wagstaff et al. (2009) provide an excellent example in which administrative data is incorporated into an impact evaluation to understand the causes of variation between administrative units. Unobserved factors may also be important in determining the heterogeneity in impacts, but analysis of the extent to which this is the case requires data from a randomised experiment (Djebbari and Smith 2008).

External validity

The strength of the theory upon which the empirical analysis is based has important implications for any attempt to address the question of external validity. In this respect, the findings on the constraints to implementation are not easily generalised, as already mentioned. It should noted, however, that the challenge to understanding the influence of institutions and contextual factors

on implementation processes is enormous, and research in this area in developing countries is in its infancy.

From an empirical perspective, the thesis had to rely on within-study variation to throw light on factors that might be important for the external validity of the findings. This has limited applicability if the aim is to generalise findings to other countries. One avenue worth exploring is a cross-country comparison of case studies of demand-side incentive programmes, where the focus in on implementation processes and capacity constraints.

9.3 Policy implications

This section addresses the fourth objective of the thesis, which discusses the implications of the empirical findings. It focuses on the policy implications for maternal health care as well as those more specific to demand-side incentive programmes in low-income countries. An important part of the discussion is the external validity of the findings.

9.3.1 External validity

Framework

A number of frameworks have been suggested in the medical literature to assess the external validity of a study (Rothwell 2005; Dekkers, Elm et al. 2009). However, they place considerable emphasis on the eligibility of individuals to participate in randomised controlled trials and are mostly concerned with factors that affect impacts directly, rather than through delivery of the intervention.

A more appropriate framework for assessing the generalisability of the findings in this thesis is provided by the Bonnell et al. (Bonell, Oakley et al. 2006). They posit two questions.[79] First, can the intervention be delivered elsewhere? This refers to whether the intervention is feasible, can reach adequate coverage and is acceptable to the target population. Second, does the intervention meet recipients' needs? In other words, recipients must have the capacity to benefit from the intervention.

From the outset, it is important to state explicitly the target population and setting to which one would want to generalise the study findings. Policymakers in Nepal are interested in knowing whether the findings apply to the entire country. One of the strengths of the evaluation of the SDIP is the fact that the intervention was delivered under "routine" conditions. That is, the demand-side incentives were implemented as a large-scale programme, managed by the government, albeit with some outside technical support. This avoids a common problem of assessing whether the results from a small pilot project managed by a well-resourced organisation apply to a setting in which the intervention is delivered at scale by the government. One concern

[79] Victora et al. (2005) provide an alternative framework, which is similar in the sense that it emphasises both implementation (delivery of the intervention) and factors influencing impacts directly (typically characteristics of the population).

then is whether the study findings are representative of the country.[80] Policymakers may also be interested in knowing whether the findings have relevance for India and Bangladesh, countries which have adopted similar programmes.

Assessment of generalisability

Although the Survey of Women covered only six districts, there are some indications that it is representative of the population of the country. A comparison of a limited set of indicators relating to education, access to the media and ownership of households possessions in chapter 4 showed that the sample in the Survey of Women is reasonably similar to the nationally representative sample used in Demographic and Health Survey in 2006. There are, however, reasons why some of the findings may not apply to the entire country. Uptake of the programme was shown to be driven partly by district level factors. With only six districts sampled in the Survey of Women, the sample is unlikely to be representative of the actions of all seventy-five districts in administering and promoting the programme. Another concern relates to the fact that the estimation of impacts using propensity score matching methods in chapter 8 was unable to accommodate sample weights.

Acceptability

Evidence on the acceptability of the SDIP emerged from the qualitative study in the first phase of the evaluation (Powell-Jackson, Morrison et al. 2009). Among respondents there was widespread support for paying mothers. It was felt both legitimate and helpful. It may also have resonated with the view that women tend to put money to better use than men. There was much less acceptance of the health provider incentive, even among those health workers who benefited. Moreover, the condition to give the cash only to women with two or fewer children was controversial, since poorer women tend to have more children and should not be excluded on grounds of equity.

Feasibility

The findings from the process evaluation on what factors led to the low programme uptake provide evidence regarding the feasibility of the SDIP. However, as noted earlier in the discussion, one's ability to generalise the findings to other settings, such as India and Bangladesh,

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[80] It should be noted that statistical generalisation, strictly speaking, requires some abstraction of a theory that is independent of time and place for scientific generalisation (Rothman, Greenland et al. 2008).

is limited by the absence of a strong theoretical framework underpinning the analysis of implementation. It makes it difficult to judge whether the constraints to implementation are specific to the context in Nepal or do indeed have generalisability to other countries. Nevertheless, a number of fundamental issues stand out.

First, a well-developed communication strategy is imperative if the programme is to reach the target population. Second, a predictable source of funding is required. In this respect, donor funding, which is notoriously unpredictable, may lead to problems. And finally, the strength of the public financial management system is likely to be central to successful administration of the programme. This refers not only to the timely transfer of funds through the various levels of government, but also the system for making payments to women, which needs to be efficient and robust to possible fraud.

Coverage

The findings show that the SDIP achieved low levels of uptake in the population. However, a limitation of the research was its focus on the first few years of implementation, and there were clear signs that uptake of the programme was improving over time, even after controlling for other factors. Thus the process evaluation portrays a rather pessimistic view of implementation when in fact improvements in administration may have overcome some of the key constraints to implementation. But without further research, it is not possible to judge progress during the period since the time of the fieldwork. On the basis of the evidence alone, there are major challenges in achieving high levels of uptake for reasons outlined in the process evaluation.

Target population needs

The findings suggest that the demand-side incentives did influence health seeking behaviour. They provide evidence that the theoretical mechanism underpinning the SDIP is effective. Indeed, because the empirical analyses of the SDIP's impact were based on standard economic theory and a set of derived hypotheses, the results can be generalised to other settings. Moreover, there is an extensive body of evidence from evaluations of conditional cash transfer programmes and policy reforms to remove user fees showing that price has a negative effect on utilisation of health services.

Variation in the response of individuals to the demand-side incentives has implications for the generalisability of the findings. The geographical location was an important determinant of programme impact, although interpretation of this result is not straight forward. Moreover, there was weak evidence that income has a negative influence on the programme impacts. On the basis of these results and economic theory, it seems likely that the effect of demand-side incentives will be greater the larger the incentive relative to both the cost of care and income. Ethnicity was also found to be an important determinant of impacts but in the absence of any theoretical insight it is not clear how to generalise this finding beyond the study context.

9.3.2 Implications for demand-side incentive programmes

The findings in this thesis suggest that demand-side incentives are no magic bullet to the problem of low utilisation of professional care at childbirth in Nepal. Even in the districts where a substantial conditional cash transfer was offered in addition to the free delivery care, almost 70 percent of women reached by the SDIP continued to deliver at home. At best, demand-side incentives should be considered one part of a multi-pronged strategy to reduce the barriers to maternity services. When feasibility of the SDIP is considered, demand-side incentives do not appear to be an attractive policy option, although improvements in implementation over time suggest some patience is needed on this front.

While no rigorous cost-effectiveness analysis was conducted, a crude calculation of the cost per additional visit can be made. Using programme expenditure data, it is estimated that over the first three years of the programme, it cost (converted to US dollars using an average of 70 Nepalese Rupees per dollar) approximately US$ 115 for each additional delivery in a health facility.[81] This should be considered a lower bound estimate since no administration costs, which are likely to be considerable, are included. Given that the demand-side incentives range from $8 in the tarai districts to around $40 in the mountain districts, this estimate gives some sense of the inefficiencies of providing universal financial incentives.

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[81] The cost is based on programme expenditure on the demand-side incentives over the period 2005-2008. It does not include the cost of administration or the cost of technical assistance provided to the programme by the Support to Safe Motherhood Programme. The effect of the SDIP is calculated on the basis of the 1.1 percentage point increase in the number of institutional deliveries attributable to the demand-side incentives. The total number of deliveries is calculated using population projections and estimates of the crude birth rate from the Census 2001 and the Demographic and Health Survey 2006.

The cost of paying for delivery care places a high financial burden on the household budget and this is likely to have implications for the SDIP's effect on welfare. Households that are motivated by the demand-side incentives to seek care at a health facility may face catastrophic health expenditures. The welfare implications of this are not at all obvious but it cannot be presumed that the health benefits of seeking care outweigh the detrimental economic consequences of paying for care.

A range of potential design modifications and implementation strategies emerge from the findings. In light of the discussion on external validity in section 9.4.1, these are likely to have some relevance to other demand-side incentive programmes in low-income countries. First, there seems to be little justification for excluding the non-governmental health providers from the SDIP.[82] As expected, the programme led to some substitution away from non-governmental health providers and there is no evidence to suggest this would have any health benefit. On practical grounds, the inclusion of non-governmental health providers is more contentious. Monitoring would be a challenge given that the currently weak system would need to be expanded to include health facilities who are not accustomed to being monitored. On the other hand, it provides an opportunity to develop a system of accreditation and to incentivise the health facilities in the non-state sector to meet minimum standards of quality.

Second, the results suggest behavioural responses to the conditional cash transfer were modest in the tarai and hill regions of Nepal and that greater subsidies might be required. The removal of user fees for delivery care in these regions is how the government has chosen to proceed but it requires careful planning to address the shortfall in resources which would ensue and to develop implementation strategies. Particular attention needs to be given to monitoring increases in or misreporting of unnecessary care, such as caesarean sections, to ensure there are no incentives for over-medicalisation of obstetric care. After a long debate over user fees in developing countries, on one level there is greater appreciation of the risks involved and the actions to mitigate these risks (Gilson and McIntyre 2005; James, Hanson et al. 2006; Save the Children Fund 2008). For politicians, however, it seems that free health care represents the answer to all the problems – and the risks are all too often overlooked (Brown 2009).

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[82] As already mentioned in chapter 4, the non-state sector in Nepal includes private-for-profit health providers and non-governmental not-for-profit health providers.

Third, the policy in Nepal is unusual in the sense that it provides a universal conditional cash transfer, while similar programmes elsewhere tend to focus on the poor. The results suggest that there are large inefficiencies of providing a universal benefit. A large proportion of women would have delivered in a health facility even in the absence of the SDIP. Targeting may improve efficiency but this would entail additional administrative costs to identify poor recipients. The limited evidence available suggests that the costs of targeting can be as high as 12 percent of programme costs (Grosh, Del Ninno et al. 2008). Moreover, the experience of targeting in low-income countries is not encouraging, implying that policymakers may simply have to accept on practical grounds the inefficiency of providing a universal incentive.

Fourth, there is a case for extending the demand-side incentives to cover the whole continuum of care from antenatal care through to postnatal care or even child health interventions. The SDIP could recognise the importance of a package of priority maternal, newborn and child health interventions and in this regard reflect the latest in international thinking (Bryce, Daelmans et al. 2008). Monitoring whether the mother meets the conditions would become more complex, although it could provide the impetus to invest in a comprehensive administration system.

Fifth, following the example of the conditional cash transfer programmes in Latin America, the SDIP could attach an additional condition of attending health education sessions in an effort to address problems around information.[83] These may focus on the recognition of danger signs in childbirth and stress the importance of making specific preparations before delivery in case of a complication. Currently, almost 50 percent of women in Nepal make no preparation before delivery (Government of Nepal 2007).

Sixth, although the public financial management system is unlikely to be reformed to meet the requirements of just one health programme, there are various ways in which the system for issuing payments to women could be made more efficient and robust. There is no reason why health providers should administer payment and indeed the blurring of responsibilities creates the potential for misuse of funds and ensures that dissatisfaction by patients over payment is directed at health workers. One option would be to use the banking system, at least in areas where this is possible, such as municipalities.

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[83] Perhaps the most feasible and appropriate means of providing information would be at antenatal care visits, which ties in with the previous point about extending the conditions of the demand-side incentive to cover the whole continuum of care.

Where this is not feasible, payment centres should be used. Private sector companies could be contracted to provide this service. For instance, mobile phone companies have a wide network of kiosks and the administrative systems to monitor transactions. In some developing countries now, credit – easily converted into cash – can be loaded on to mobile phones (The Economist 2009). Such a payment mechanism would reduce fiduciary risk and leakage, if carefully designed. There also needs to be a greater role for the community in monitoring the programme. Their engagement could be encouraged through the health management committees of health facilities, which typically include members of the public.

Seventh, strategies to promote the SDIP need to focus on reaching poorer households, who are more likely to be incentivised to seek care by the programme. The use of radio, female community health volunteers and women's groups are likely to be the most effective means of reaching these households. In this regard, central level actors should engage closely with key implementers at lower level district health offices and provide resources to conduct communication activities of their own.

9.3.3 Implications for maternal health care

Financing of maternal health

The findings provide some empirical support for recent moves by the government to remove health facility charges for delivery care. There was a substantial impact of the SDIP in the mountain districts in which this policy operated. This opens up a whole debate of how to finance maternal health and whether piecemeal reforms that are disease-specific are the appropriate response.

One possibility of financing free maternal health is through a tax-based system. Projections of the cost of a policy that removes user charges for maternity services and maintains the conditional cash transfer has been put at US$ 14 million per year in Nepal (Ensor and Witter 2008). This represents approximately 12 percent of the Government of Nepal health budget. It seems unlikely that the government can afford to prioritise the policy to this extent and external donors would need to provide funds to finance the resource gap.

An alternative way to achieve free delivery care is through health insurance schemes. Social health insurance plays a major role in health financing in many of the more developed countries. Such schemes remain, however, underdeveloped in Nepal and does not seem to have been given serious consideration by policymakers. Social health insurance typically operates at the national level and requires compulsory enrolment by segments of the population. In low-income countries, social health insurance may not be appropriate when the majority of the population work in the informal sector and live in rural areas. Community-based insurance is another possibility. It is often small-scale, voluntary and targeted towards rural communities. To-date there is little compelling evidence that it can offer more than small-scale coverage and thus have a substantial impact of the financing of maternal health care (Borghi, Ensor et al. 2006).

Other options include loan funds that seek to reduce the opportunity cost of time associated with seeking care at childbirth. A number of experiences have been documented, including a scheme in Nepal (Chiwuzie, Okojie et al. 1997; Fofana, Samai et al. 1997; Neupane 2003). They are not, however, seen as a viable large-scale solution to the problem of accessing health services. There are question marks over their sustainability, capacity to generate funds, and ability to ensure funds are used for the intended purpose (Borghi, Ensor et al. 2006).

There is the broader question of whether piecemeal financing reforms can address the fundamental question of limited resources. With tax revenue at 10 percent of GDP (World Bank 2009), the government is constrained in its ability to finance the public provision of health services. In addition, the majority of external funds are earmarked (RTI International 2007) and cannot be channelled into health financing reforms. Arguably, there needs to be greater flexibility in the use of donor funds, if governments are to be able to embark on ambitious reforms. There is also the issue of adopting financing reforms for specific diseases and with that the potential for adverse effects on the delivery of other health services. The focus on diseases is closely tied to the preference of donors on what to fund. Health financing reforms should be sector-wide, also giving careful consideration of the implications for non-state health providers.

The findings in this thesis serve to demonstrate that demand-side incentives – while effective in raising service utilisation – have their limits. There are, in other words, other important barriers to accessing care, implying there is a need to address these factors directly. The most important

set of factors seem to be linked to the finding that (self-reported) complications and the woman's level of education drive health seeking behaviour at childbirth.

Information and knowledge

The capacity to benefit from institutional delivery care when there is no obstetric complication is probably not obvious to many women and their families. This suggests a failure in information and interventions might seek to tackle the problem directly. Typically this can be done through the use of community level health workers or educators, who seek to inform families of the benefits of seeking maternity care in a participatory manner.

A partial review of the evidence suggests such interventions have been associated with increases in utilisation (Ensor and Cooper 2004). Nepal has had experiences with women's groups and there is evidence that these have had a modest effect on raising service utilisation at childbirth (Manandhar, Osrin et al. 2004). An intervention that used information on the utilisation and quality of health services to strengthen local accountability in Uganda had a large impact on service utilisation (Bjorkman and Svensson 2009).

Quality of care

Various pieces of evidence point towards quality of care as being a constraint to increased utilisation in Nepal. Women typically only access obstetric care when they are very ill. The Survey of Health Providers in the first phase of the evaluation also found enormous inadequacies in both the process of care and the structural inputs to provide quality maternal health care (Powell-Jackson, Neupane et al. 2008). A dual strategy should be adopted whereby concerns over the supply-side are addressed while continuing to raise demand for health services.

The challenges to improving maternal health services are formidable, not least because the resources required to invest in the health system are likely to be well beyond those available domestically and, based on past performance, external donors are rarely inclined to make such investments, which are hard to measure and take years to yield results. Nonetheless, the case needs to be made that the majority of maternal deaths can only be prevented if women have access to life saving emergency obstetric care.

9.4 Conclusion

9.4.1 Priorities for future research

Continued evaluation of the SDIP

In light of the policy change to provide free delivery care and the focus of this research on the early period of implementation, further evaluation of the SDIP is warranted. It could seek to examine trends in process indicators over time and explore the impact of the SDIP on a refined set of outcomes using alternative, arguably more credible, policy evaluation methods. It will also be important both to understand whether supply-side factors constrain the impact of the programme and to assess the cost.

In future, an instrumental variable approach could be used to identify the impact of the SDIP. Exogenous variation in knowledge of the SDIP generated by the promotion of the programme in random villages (ie. those sampled in the previous household survey) could serve as a valid instrument. A follow-up survey would sample the same villages as previously and, in addition, a random selection of remaining villages in the same six districts. The study would estimate a local average treatment effect – that is, the treatment effect would apply to the subgroup of the population that found out about the SDIP through the information dissemination activites of the previous household survey.

In terms of outcomes, data could be collected on neonatal mortality and measures of health seeking that are likely to be closely linked to health outcomes. One possibility is to use an index that incorporates a number of different components of health seeking at childbirth. They would have to be observable to the woman and might include: delays in seeking care; the type of health worker in attendance; and specific intrapartum care practices that are considered good practice. Alternatively, a composite indicator could be used, including specific interventions provided during intrapartum care (Murray 2007).

Impact of different programme designs

In terms of the design of demand-side incentive programmes, there are a number of areas in which future research could focus. There are a few studies that have reported diminishing marginal returns to the size of incentive, an issue that deserves more attention (Thornton 2008;

Filmer and Schady 2009). Closely linked is the observation that price elasticities seem to be very sensitive around a price of zero, such that small costs and small incentives generate large changes in utilisation (Kremer and Holla 2009). This has huge implications for the efficiency of demand-side incentive programmes. A study could introduce random variation over a whole range of prices and assess the effect on the utilisation of the maternity services.

Demand-side incentive programmes assume health services are available. An interesting area for further research, particularly pertinent to low-income countries, could compare the impact of providing just demand-side incentives with the impact of both providing incentives and upgrading health services. An attempt at doing this was made in Honduras, but owing to implementation problems with the supply-side intervention, the study could report credible estimates only for the demand-side intervention (Morris, Flores et al. 2004).

Implementation research

Implementation research has been neglected in health and, as Sanders and Haines (2006) argue, partly explains why there remains a large gap between knowledge of what works and strategies to deliver health interventions. Functioning health systems are essential to the sustained delivery of interventions. This opens up a whole research agenda around health systems.

More specifically, a comparison of demand-side incentive programmes in low-income countries within a common research framework might provide clues as to the most effective implementation strategies. Case studies would need to be carefully selected to ensure variation in contextual factors that are hypothesised to be important for programme uptake. The study would need to give as much weight to political and bureaucratic factors as it would to technical issues around the design of the programmes. In particular, it may seek to examine whether factors such as governance, accountability, leadership, administrative capacity and donor involvement, are important. Future research in Nepal could also study implementation more generally by exploring strategies to implement a range of different programmes, including the SDIP, in an effort to understand why some programmes reach the target population while others fail.

9.4.2 Evaluation lessons

Various issues arose during the research that are generic to all evaluations, but deserve mention nonetheless with specific reference to the SDIP. First, there was the unavoidable problem of conducting research that gets overtaken by the continued development of the policy. While the evaluation of the SDIP itself led to some changes in the policy, the process has moved so rapidly that policy recommendations emerging from the research become outdated. Partly, this reflects the time it takes to do an impact evaluation, but is also probably an indication that the policy was poorly conceived in the first place, which meant there was a need to make changes soon after it started. Impact evaluations of large-scale interventions, whenever possible, should seek to provide timely results.

Second, the independence of the evaluation, as is often stressed, is critical. While the evaluation of the SDIP itself was not influenced by the funder, the dissemination of findings was carefully managed in light of some negative results. In this regard, sensitivities around the *process* evaluation were greatest since it touches on issues which are closely tied to the management practices of easily identifiable institutions or government departments. Since the dissemination of the research findings in Kathmandu, the Ministry of Health continue to present government data on service utilisation over time as evidence of a successful programme, despite the fact these data have been shown to be inaccurate and inconsistent with the evaluation results. This point highlights the need for communication of the evaluation results that is independent and effective.

Third, an ex-post evaluation does not imply that the evaluation should commence after implementation of the policy has started (Ravallion 2008). Baseline data would have provided more options for a rigorous evaluation of the SDIP. Policy development processes can be very haphazard and, in this case, too rapid to involve the research team sufficiently early to obtain baseline data that were needed in the absence of reliable routine data. There seemed to be a lack of awareness of the need to involve researchers during the policy development phase. Access to third party funding for impact evaluations might help address this problem but, unless the evaluation is requested by the government, external evaluators are unlikely to be welcome.

9.4.3 Concluding remarks

Low utilisation of health services is a familiar problem in low-income countries. Increasingly such countries are adopting demand-side incentives with the encouragement of international donors in

an effort to raise service utilisation. Yet, there is limited evidence on whether demand-side incentives are effective in increasing utilisation of health services in low-income countries, where health services can be costly to access and administrative capacity to implement individual targeted subsidies is low.

In this respect, the thesis makes an important contribution to the literature. In the context of the SDIP in Nepal, it provides evidence on the impact of demand-side incentives and gives reasons for why uptake of the programme was low. From a methodological perspective, the thesis also points towards a feasible approach to evaluating health financing policies. Household knowledge provides a valid indicator of 'treatment' and potentially is simple to manipulate. This opens up the possibility of evaluating health financing policies, such as the removal of user fees that are notoriously difficult to assess rigorously with experimental or quasi-experimental policy evaluation methods (Lagarde and Palmer 2008).

The demand-side incentives were shown to encourage women to give birth in health facilities. The incentive is likely to be more effective the greater it is relative to the cost of health seeking and the income of family. The decision of whether to target the demand-side incentives towards poorer sections of society is thus important. A universal benefit can end up subsidising health care for wealthier households who are more likely to give birth in a health facility irrespective of the demand-side incentives. On the other hand, targeting requires administrative capacity and can be very costly, even if it is likely to increase efficiency.

Effective administration of the payment system and communication of the SDIP to the public are essential if programme inputs are to lead to behavioural change. Uptake of the programme was found to be low, albeit improving over time. This can be attributed to insufficient planning, the unpredictability in donor funding, a weak public financial management system, and the absence of a communication strategy.

The constraints to successful delivery of the SDIP suggest that the promise of financial incentives implied by the experience of conditional cash transfer programmes may not be realised in a low-income country setting. It is likely that a greater proportion of programme budgets will need to be channelled into administration (including relevant capacity building). More robust systems should be explored that rely on the banking system or even mobile phone companies to handle

cash. A communication strategy that ensures information reaches poorer, more marginalised households must be developed and effectively executed.

Policy responses to the problem of low utilisation of maternity services must go beyond the use of financial incentives. Even free maternity care together with a conditional cash transfer is not sufficient to ensure a high proportion of women use services in Nepal. Policy must address two fundamental issues: the poor quality of maternal health services and the lack of information families have about the potential benefits of professional care at childbirth.

REFERENCES

Abadie, A. and G. W. Imbens (2008). "On the Failure of the Bootstrap for Matching Estimators." Econometrica **76**(6): 1537-1557.

Acharya, L. B. and J. Cleland (2000). "Maternal and child health services in rural Nepal: does access or quality matter more?" Health Policy Plan **15**(2): 223-9.

Addai, I. (1998). "Demographic and sociocultural factors influencing use of maternal health services in Ghana." Afr J Reprod Health **2**(1): 73-80.

Addai, I. (2000). "Determinants of use of maternal-child health services in rural Ghana." J Biosoc Sci **32**(1): 1-15.

Afsana, K. (2004). "The tremendous cost of seeking hospital obstetric care in Bangladesh." Reprod Health Matters **12**(24): 171-80.

Afsana, K. and S. F. Rashid (2001). "The challenges of meeting rural Bangladeshi women's needs in delivery care." Reprod Health Matters **9**(18): 79-89.

Ahmed, A., M. Adato, A. Kudat, D. Gilligan, T. Roopnaraine and R. Colasan (2007). Impact evaluation of the conditional cash transfer program in Turkey: Final report. Washington, DC, International Food Policy Research Institute.

Akin, J. S., D. K. Guilkey, C. C. Griffin and B. M. Popkin (1985). The demand for primary health services in the Third World. Totowa, NJ, Rowman and Allanheld.

Akin, J. S., D. K. Guilkey, P. L. Hutchinson and M. T. McIntosh (1998). "Price elasticities of demand for curative health care with control for sample selectivity on endogenous illness: an analysis for Sri Lanka." Health Econ **7**(6): 509-31.

Amooti-Kaguna, B. and F. Nuwaha (2000). "Factors influencing choice of delivery sites in Rakai district of Uganda." Soc Sci Med **50**(2): 203-13.

Andersen, R., N. Harada, V. Chiu and T. Makinodan (1995). "Application of the Behavioral Model to Health Studies of Asian and Pacific Islander Americans." Asian Am Pac Isl J Health **3**(2): 128-141.

Andersen, R. and J. F. Newman (1973). "Societal and individual determinants of medical care utilization in the United States." Milbank Mem Fund Q Health Soc **51**(1): 95-124.

Angrist, A. A. and J. Pischke (2009). Mostly Harmless Econometrics: An Empiricist's Companion. Princeton, Princeton University Press.

Angrist, J. D., G. W. Imbens and D. B. Rubin (1996). "Identification of causal effects using instrumental variables." Journal of the American Statistical Association **91**(434): 444-455.

Annandale, E. and K. Hunt (1998). "Accounts of disagreements with doctors." Soc Sci Med **46**(1): 119-29.

Ansah, E. K., S. Narh-Bana, S. Asiamah, V. Dzordzordzi, K. Biantey, K. Dickson, J. O. Gyapong, K. A. Koram, B. M. Greenwood, A. Mills and C. J. Whitty (2009). "Effect of removing direct payment for health care on utilisation and health outcomes in Ghanaian children: a randomised controlled trial." PLoS Med **6**(1).

Anson, O. (2004). "Utilization of maternal care in rural HeBei Province, the People's Republic of China: individual and structural characteristics." Health Policy **70**(2): 197-206.

Anwar, I., M. Sami, N. Akhtar, M. E. Chowdhury, U. Salma, M. Rahman and M. Koblinsky (2008). "Inequity in maternal health-care services: evidence from home-based skilled-birth-attendant programmes in Bangladesh." Bull World Health Organ **86**(4): 252-9.

Ashenfelter, O. and D. Card (1985). "Using the longitudinal structure of earnings to estimate the effect of training programs." The Review of Economics and Statistics: 648-660.

Ashraf, N., J. Berry and J. Shapiro (2007). Can higher prices stimulate product use? Evidence from a field experiment in Zambia, NBER Working Paper.

Asian Development Bank (2009). Nepal: Critical Development Constraints. Mandaluyong City, Philippines, Asian Development Bank, Department for International Development, and International Labour Organisation.

Attanasio, O., Battistin E, Fitzsimons E, Mesnard A and V.-H. M (2005). How Effective Are Conditional Cash Transfers? Evidence From Colombia. London, England, Institute of Fiscal Studies Briefing Notes.

Attanasio, O., L. Gómez, P. Heredia and M. Vera-Hernández (2005). The short-term impact of a conditional cash subsidy on child health and nutrition in Colombia. London, Institute of Fiscal Studies.

Attanasio, O., C. Meghir and A. Santiago (2005). Education Choices in Mexico: Using a Structural Model and a Randomized Experiment to Evaluate PROGRESA. Working Paper EWP04/04. London, Institute of Fiscal Studies.

Attaran, A. (2005). "An immeasurable crisis? A criticism of the millennium development goals and why they cannot be measured." PLoS Med **2**(10): e318.

Audo, M. O., A. Ferguson and P. K. Njoroge (2005). "Quality of health care and its effects in the utilisation of maternal and child health services in Kenya." East Afr Med J **82**(11): 547-53.

Banerjee, A. (2005). "'New development economics' and the challenge to theory." Economic and Political Weekly **October 1st**: 4340–4.

Banerjee, A. V. and E. Duflo (2008). The Experimental Approach to Development Economics. NBER working paper series no. w14467. Cambridge, Mass., National Bureau of Economic Research.

Barnham, T. (2005). The Impact of the Mexican Conditional Cash Transfer on Immunization Rates. Berkeley, CA, Department of Agriculture and Resource Economics, University of California.

Barnham, T. (2005). Providing a Healthier Start to Life: The Impact of Conditional Cash Transfers on Infant Mortality. Berkeley, CA, Department of Agriculture and Resource Economics, University of California.

Barnham, T. and J. Maluccio (2008). The Effect of Conditional Cash Transfers on Vaccination Coverage in Nicaragua. Health and Society Working Paper. Boulder CO, University of Colorado.

Bartholomew, L., G. Parcel, G. Kok and N. H. Gottlieb (1998). Intervention mapping: A process for developing theory and evidence-based health education programs. New York, McGraw-Hill.

Bawa, S. B., U. S. Umar and M. Onadeko (2004). "Utilization of obstetric care services in a rural community in southwestern Nigeria." Afr J Med Med Sci **33**(3): 239-44.

BBC. (2009). "Nepal raises conflict death toll." Retrieved 27 Oct 2009, from http://news.bbc.co.uk/1/hi/8268651.stm.

Becker, G. S. (1965). "A Theory of the Allocation of Time." The economic journal **75**: 493-517.

Behrman, J. and J. Hoddinott (2005). "Program Evaluation with Unobserved Heterogeneity and Selective Implementation: The Mexican PROGRESA Impact on Child Nutrition." Oxford Bulletin of Economics and Statistics **67**(4): 547-69.

Behrman, J., S. Parker and P. Todd (2005). Long-term impacts of the Oportunidades conditional cash transfer program on rural youth in Mexico. Göttingen, Germany, Ibero-America Institute for Economic Research.

Benabou, R. and J. Tirole (2006). "Belief in a Just World and Redistributive Politics." Quarterly Journal of Economics **121**(2): 699-746.

Bennett, L., D. R. Dahal and P. Govindasamy (2008). Caste, Ethnic and Regional Identity in Nepal: Further Analysis of the 2006 Nepal Demographic and Health Survey. Calverton, Maryland, US, Macro International Inc.

Besley, T. (1988). "A Simple-Model for Merit Good Arguments." Journal of Public Economics **35**(3): 371-383.

Bjorkman, M. and J. Svensson (2009). "Power to the People: Evidence from a Randomized Field Experiment on Community-Based Monitoring in Uganda." Quarterly Journal of Economics **124**(2): 735-769.

Black, N. (1996). "Why we need observational studies to evaluate the effectiveness of health care." BMJ **312**(7040): 1215-8.

Bloom, S. S., D. Wypij and M. Das Gupta (2001). "Dimensions of women's autonomy and the influence on maternal health care utilization in a north Indian city." Demography **38**(1): 67-78.

Blum, L. S., T. Sharmin and C. Ronsmans (2006). "Attending home vs. clinic-based deliveries: perspectives of skilled birth attendants in Matlab, Bangladesh." Reprod Health Matters **14**(27): 51-60.

Blundell, R., L. Dearden and B. Sianesi (2005). "Evaluating the effect of education on earnings: models, methods and results from the National Child Development Survey." Journal of the Royal Statistical Society Series a-Statistics in Society **168**: 473-512.

Bockstael, N. (1999). "The use of random utility in modelling rural health care demand: discussion." American Journal of Agricultural Economics **81**(3): 692-695.

Bolam, A., D. S. Manandhar, P. Shrestha, M. Ellis, K. Malla and A. M. Costello (1998). "Factors affecting home delivery in the Kathmandu Valley, Nepal." Health Policy Plan **13**(2): 152-8.

Bolduc, D., G. Lacroix and C. Muller (1996). "The choice of medical providers in rural Benin: A comparison of discrete choice models." Journal of Health Economics **15**(4): 477-498.

Bolin, K., L. Jacobson and B. Lindgren (2002). "The family as the health producer—when spouses act strategically." Journal of Health Economics **21**(3): 475-495.

Bonell, C., A. Oakley, J. Hargreaves, V. Strange and R. Rees (2006). "Assessment of generalisability in trials of health interventions: suggested framework and systematic review." BMJ **333**(7563): 346-9.

Borah, B. J. (2006). "A mixed logit model of health care provider choice: analysis of NSS data for rural India." Health Econ **15**(9): 915-32.

Borghi, J., T. Ensor, B. Dev Neupane and S. Tiwari (2004). Coping with the burden of the costs of maternal health. Kathmandu, Nepal, Nepal Safer Motherhood Project, Family Health Division, His Majesty's Government of Nepal & Options.

Borghi, J., T. Ensor, B. D. Neupane and S. Tiwari (2006). "Financial implications of skilled attendance at delivery in Nepal." Trop Med Int Health **11**(2): 228-37.

Borghi, J., T. Ensor, A. Somanathan, C. Lissner and A. Mills (2006). "Mobilising financial resources for maternal health." Lancet **368**(9545): 1457-65.

Borghi, J., K. Hanson, C. A. Acquah, G. Ekanmian, V. Filippi, C. Ronsmans, R. Brugha, E. Browne and E. Alihonou (2003). "Costs of near-miss obstetric complications for women and their families in Benin and Ghana." Health Policy Plan **18**(4): 383-90.

Bourguignon, F. and F. Ferreira (2003). Ex-ante Evaluation of Policy Reforms Using Behavioural Models. The impact of economic policies on poverty and income distribution: evaluation techniques and tools. F. Bourguignon and L. Pereira da Silva. New York, Oxford University Press: 123.

Bourguignon, F., M. Fournier and M. Gurgand (2007). "Selection bias corrections based on the multinomial logit model: Monte Carlo comparisons." Journal of Economic Surveys **21**(1): 174-205.

Brennan, G. (1976). "Distributional Implications of Public-Goods." Econometrica **44**(2): 391-399.

Brewer, G. and P. deLeon (1983). The foundations of policy analysis. Monterey CA, Brooks / Cole.

Brighton and Hove NHS Trust (2006). Give it a break stop smoking challenge.

Brooks, L. (2009). A nudge too far. The Guardian. London.

Brown, G. (2009). Speech to UN General Assembly. United Nations General Assembly, New York, Number 10.gov.uk: the official website of the Prime Minister's Office.

Bryce, J., B. Daelmans, A. Dwivedi, V. Fauveau, J. E. Lawn, E. Mason, H. Newby, A. Shankar, A. Starrs and T. Wardlaw (2008). "Countdown to 2015 for maternal, newborn, and child survival: the 2008 report on tracking coverage of interventions." Lancet **371**(9620): 1247-58.

Bryce, J., C. G. Victora, J. P. Habicht, R. E. Black and R. W. Scherpbier (2005). "Programmatic pathways to child survival: results of a multi-country evaluation of Integrated Management of Childhood Illness." Health Policy Plan **20 Suppl 1**: i5-i17.

Bulir, A. and A. Hamann (2001). How volatile and unpredictable are aid flows, and what are the policy implications? IMF Working Paper. Washington DC, International Monetary Fund.

Cameron, A. and P. Trivedi (1998). Regression analysis of count data. Cambridge, Cambridge University Press.

Campbell, O. M. and W. J. Graham (2006). "Strategies for reducing maternal mortality: getting on with what works." Lancet **368**(9543): 1284-99.

Card, D. (2001). "Estimating the return to schooling: Progress on some persistent econometric problems." Econometrica **69**(5): 1127-1160.

Card, D. and D. R. Hyslop (2005). "Estimating the effects of a time-limited earnings subsidy for welfare-leavers." Econometrica **73**(6): 1723-1770.

Cartwright, N. (2007). "Are RCTs the gold standard." Biosocieties **2**: 11-20.

Castro-Leal, F., J. Dayton, L. Demery and K. Mehra (2000). "Public spending on health care in Africa: do the poor benefit?" Bull World Health Organ **78**(1): 66-74.

Celik, Y. and D. R. Hotchkiss (2000). "The socio-economic determinants of maternal health care utilization in Turkey." Soc Sci Med **50**(12): 1797-806.

Chakraborty, N., M. A. Islam, R. I. Chowdhury and W. Bari (2002). "Utilisation of postnatal care in Bangladesh: evidence from a longitudinal study." Health Soc Care Community **10**(6): 492-502.

Chakraborty, N., M. A. Islam, R. I. Chowdhury, W. Bari and H. H. Akhter (2003). "Determinants of the use of maternal health services in rural Bangladesh." Health Promot Int **18**(4): 327-37.

Chang, F. R. (1996). "Uncertainty and investment in health." Journal of Health Economics **15**(3): 369-376.

Chattopadhyay, R. and E. Duflo (2004). "Women as policy makers: Evidence from a randomized policy experiment in India." Econometrica **72**(5): 1409-1443.

Chima, R. I., C. A. Goodman and A. Mills (2003). "The economic impact of malaria in Africa: a critical review of the evidence." Health Policy **63**(1): 17-36.

Ching, P. (1995). "User fees, demand for children's health care and access across income groups: the Philippine case." Soc Sci Med **41**(1): 37-46.

Chiwuzie, J., O. Okojie, C. Okolocha, S. Omorogbe, A. Oronsaye, W. Akpala, B. Ande, B. Onoguwe and E. Oikeh (1997). "Emergency loan funds to improve access to obstetric care in Ekpoma, Nigeria. The Benin PMM Team." Int J Gynaecol Obstet **59 Suppl 2**: S231-6.

Chowdhury, M. E., R. Botlero, M. Koblinsky, S. K. Saha, G. Dieltiens and C. Ronsmans (2007). "Determinants of reduction in maternal mortality in Matlab, Bangladesh: a 30-year cohort study." Lancet **370**(9595): 1320-8.

Chowdhury, M. E., C. Ronsmans, J. Killewo, I. Anwar, K. Gausia, S. Das-Gupta, L. S. Blum, G. Dieltiens, T. Marshall, S. Saha and J. Borghi (2006). "Equity in use of home-based or facility-based skilled obstetric care in rural Bangladesh: an observational study." Lancet **367**(9507): 327-32.

Chowdhury, R. I., M. A. Islam, J. Gulshan and N. Chakraborty (2007). "Delivery complications and healthcare-seeking behaviour: the Bangladesh Demographic Health Survey, 1999-2000." Health Soc Care Community **15**(3): 254-64.

Coady, D. and S. Parker (2004). "Cost-Effectiveness Analysis of Demand- and Supply-Side Education Interventions: The Case of PROGRESA in Mexico " Review of Development Economics **8**(3): 440-451.

Cochran, W. G. and D. B. Rubin (1973). "Controlling Bias in Observational Studies." Sankhya-the Indian Journal of Statistics Series A **35**(Dec): 417-446.

Cohen, J. and P. Dupas (2008). "Free Distribution or Cost-Sharing? Evidence from a Malaria Prevention Experiment." NBER Working Paper.

Conner, M. and P. Sparks (1995). Theory of planned behaviour and health behaviour. Predicting health behaviour. M. Conner and P. Norman. Buckingham, Open University Press: 121-162.

Cook, T. and D. Campbell (1979). Quasi-experimentation. Design and analysis issues for field settings. Boston, Houghton Mifflin Co.

Cookson, R. (2008). "Should disadvantaged people be paid to take care of their health? Yes." BMJ **337**: a589.

Craig, P., P. Dieppe, S. Macintyre, S. Michie, I. Nazareth and M. Petticrew (2008). "Developing and evaluating complex interventions: the new Medical Research Council guidance." BMJ **337**: a1655.

Crump, R. K., V. J. Hotz, G. W. Imbens and O. A. Mitnik (2008). "Nonparametric tests for treatment effect heterogeneity." Review of Economics and Statistics **90**(3): 389-405.

Dardanoni, V. and A. Forcina (1999). "Inference for Lorenz curve orderings." The Econometrics Journal 2(1): 49-75.

De Brouwere, V. and W. Van Lerberghe (2001). Safe motherhood strategies: a review of the evidence. Antwerp, Belgium, ITG Press.

de Janvry, A. and E. Sadoulet (2006). "Making conditional cash transfer programs more efficient: designing for maximum effect of conditionality." World Bank Econ Rev **20**(1): 1-29.

de Mel, S., D. McKenzie and C. Woodruff (2009). "Returns to Capital in Microenterprises: Evidence from a Field Experiment (Vol 123, Pg 1329, 2008)." Quarterly Journal of Economics **124**(1): 423-423.

Dearden, L. (1999). "The effects of families and ability on men's education and earnings in Britain." Labour Economics **6**(4): 551-567.

Deaton, A. and M. Grosh (2000). Consumption. Washington DC, World Bank.

Deaton, A. S. (2009). Instruments of development: Randomization in the tropics, and the search for the elusive keys to economic development. NBER working paper series no. w14690. Cambridge, Mass., National Bureau of Economic Research.

Deininger, K. and P. Mpuga (2004). Economic and welfare effects of the abolition of health user fees: Evidence from Uganda. Washington DC, World Bank.

Dekkers, O. M., E. V. Elm, A. Algra, J. A. Romijn and J. P. Vandenbroucke (2009). "How to assess the external validity of therapeutic trials: a conceptual approach." Int J Epidemiol.

Demery, L. (2000). Benefits incidence: a practitioner's guide. Washington DC, Poverty and Social Development Group, Africa Region, World Bank.

Devadasan, N., M. A. Elias, D. John, S. Grahacharya and L. Ralte (2008). A conditional cash assistance programme for promoting institutional deliveries among the poor in India: process evaluation results. Reducing financial barriers to obstetric care in low-income countries. F. Richard, S. Witter and V. de Brouwere. Antwerp, ITM: 167-198.

Devarajan, S., L. Squire and S. SuthiwartNarueput (1997). "Beyond rate of return: Reorienting project appraisal." World Bank Research Observer **12**(1): 35-46.

Diaz, J. J. and S. Handa (2006). "An assessment of propensity score matching as a nonexperimental impact estimator - Evidence from Mexico's PROGRESA program." Journal of Human Resources **41**(2): 319-345.

Djebbari, H. and J. Smith (2008). "Heterogeneous impacts in PROGRESA." Journal of Econometrics **145**(1-2): 64-80.

Donabedian, A. (1988). "The quality of care. How can it be assessed?" JAMA **260**(12): 1743-8.

Dor, A., P. Gertler and J. van der Gaag (1987). "Non-price rationing and the choice of medical care providers in rural Cote d'Ivoire." Journal of Health Economics **6**(4): 291-304.

Dor, W. (1999). "Flexible discrete choice demand models consistent with utility maximization: an application to health care demand." American Journal of Agricultural Economics **81**(3): 680-685.

Dow, W. (1995). Discrete choice estimation of price-elasticities: the benefits of a flexible behavioural model of health care demand, RAND and Yale University: 97-01.

Dow, W., P. Gertler, R. F. Schoeni, J. Strauss and D. Thomas (2001). "Health care prices, health and labor outcomes: experimental evidence." Santa Monica: RAND: 97-01.

Dow, W. H. (1999). "Flexible discrete choice demand models consistent with utility maximization: An application to health care demand." American Journal of Agricultural Economics 81(3): 680-685.

Duan, N., W. Manning Jr, C. Morris and J. Newhouse (1983). "A comparison of alternative models for the demand for medical care." Journal of Business & Economic Statistics: 115-126.

Duflo, E., R. Glennerster and M. Kremer (2008). Using Randomization in Development Economic research: A Toolkit. Handbook of Development Economics. T. P. Schultz and J. Strauss. Amsterdam, North-Holland. **4:** 3895–962.

Dugger, C. (2004). To Help Poor Be Pupils, Not Wage Earners, Brazil Pays Parents. New York Times. New York City.

Duong, D. V., C. W. Binns and A. H. Lee (2004). "Utilization of delivery services at the primary health care level in rural Vietnam." Soc Sci Med **59**(12): 2585-95.

Eichler, R. and R. Levine (2009). Performance Incentives for Global Health: Potential and Pitfalls. Washington DC, Center for Global Development.

Eldridge, S., A. Spencer, C. Cryer, S. Parsons, M. Underwood and G. Feder (2005). "Why modelling a complex intervention is an important precursor to trial design: lessons from studying an intervention to reduce falls-related injuries in older people." J Health Serv Res Policy **10**(3): 133-42.

Elo, I. T. (1992). "Utilization of maternal health-care services in Peru: the role of women's education." Health Transit Rev **2**(1): 49-69.

Ensor, T. (2004). "Consumer-led demand side financing in health and education and its relevance for low and middle income countries." Int J Health Plann Manage **19**(3): 267-85.

Ensor, T., S. Clapham and D. P. Prasai (2009). "What drives health policy formulation: insights from the Nepal maternity incentive scheme?" Health Policy **90**(2-3): 247-53.

Ensor, T. and S. Cooper (2004). "Overcoming barriers to health service access: influencing the demand side." Health Policy Plan **19**(2): 69-79.

Ensor, T. and S. Witter (2008). Proposed revision to the SDIP - strengthening a major national initiative for safe motherhood in Nepal. Oxford, Oxford Policy Management.

Eriksson, C. (2000). "Learning and knowledge-production for public health: a review of approaches to evidence-based public health." Scand J Public Health **28**(4): 298-308.

Falkingham, J. (2003). "Inequality and changes in women's use of maternal health-care services in Tajikistan." Stud Fam Plann **34**(1): 32-43.

Filmer, D. and L. Pritchett (1998). Estimating wealth effects with no expenditure data - or tears: an application to educational enrollment in states of India. Washington DC, World Bank.

Filmer, D. and N. Schady (2009). Who Benefits? Scholarships, School Enrollment and Work of Recipients and Their Siblings. Washington DC, World Bank.

Fiszbein, A., N. Schady, F. H. Ferreira, M. Grosh, N. Kelleher, P. Olinto and E. Skoufias (2008). Conditional cash transfers: reducing present and future poverty, IBRD/The World Bank.

Fofana, P., O. Samai, A. Kebbie and P. Sengeh (1997). "Promoting the use of obstetric services through community loan funds, Bo, Sierra Leone. The Bo PMM Team." Int J Gynaecol Obstet 59 **Suppl 2**: S225-30.

Folland, S., A. C. Goodman and M. Stano (1997). The economics of health and health care, Prentice Hall Upper Saddle River, NJ.

Freeland, N. (2007). "Superfluous, pernicious, atrocious and abominable? The case against conditional cash transfers." IDS Bulletin **38**(3): 75-78.

Freemantle, N. (2001). "Interpreting the results of secondary end points and subgroup analyses in clinical trials: should we lock the crazy aunt in the attic?" BMJ **322**(7292): 989-91.

Fuchs, V. R. (1982). Time preference and health: an exploratory study. Economic aspects of health. V. R. Fuchs. Chicago, University of Chicago Press: 93-120.

Furuta, M. and S. Salway (2006). "Women's position within the household as a determinant of maternal health care use in Nepal." Int Fam Plan Perspect **32**(1): 17-27.

Gabrysch, S. and O. M. Campbell (2009). "Still too far to walk: Literature review of the determinants of delivery service use." BMC Pregnancy Childbirth **9**(1): 34.

Galasso, E. (2007). With their effort and one opportunity: Alleviating extreme poverty in Chile. Washington DC, World Bank.

Gertler, P. (2000). Final report: the impact of PROGESA on health. Washington DC, International Food Policy Research Institute.

Gertler, P. (2004). "Do conditional cash transfers improve child health? Evidence from PROGRESA's control randomised experiment." American Economic Review **94**: 336-341.

Gertler, P. (2004). "Do conditional cash transfers improve child health? Evidence from PROGRESA's control randomized experiment." American Economic Review **94**(2): 336-341.

Gertler, P., L. Locay and W. Sanderson (1987). "Are user fees regressive? The welfare implications of charging for medical care in Peru." Journal of Econometrics **36 (supp)**: 67-68.

Gertler, P. and J. Van der Gaag (1990). The willingness to pay for medical care: evidence from two developing countries. Baltimore and London, Johns Hopkins University Press.

Gertler, P. J. and J. S. Hammer (1997). Strategies for pricing publicly provided health services. Washington DC, World Bank.

Gilson, L. (2003). "Trust and the development of health care as a social institution." Soc Sci Med **56**(7): 1453-68.

Gilson, L., J. Doherty, S. Lake, D. McIntyre, C. Mwikisa and S. Thomas (2003). "The SAZA study: implementing health financing reform in South Africa and Zambia." Health Policy Plan **18**(1): 31-46.

Gilson, L. and D. McIntyre (2005). "Removing user fees for primary care in Africa: the need for careful action." BMJ **331**(7519): 762-5.

Gimnig, J. E., J. M. Vulule, T. Q. Lo, L. Kamau, M. S. Kolczak, P. A. Phillips-Howard, E. M. Mathenge, F. O. Ter Kuile, B. L. Nahlen and A. W. Hightower (2003). "Impact of permethrin-treated bed nets on entomologic indices in an area of intense year-round malaria transmission." The American journal of tropical medicine and hygiene **68**(90040): 16-22.

Glass, G. V. (1997). Complementary methods for research in education. Complementary Methods for Research in Education. R. Jaeger and T. Barone. Washington DC, American Educational Research Association.

Glassman, A., J. Todd and M. Gaarder (2009). Latin America: Cash Transfers to Support Better Household Decisions. Performance Incentives for Global Health: Potential and Pitfalls. R. Eichler and R. Levine. Washington DC, Center for Global Development.

Glei, D. A., N. Goldman and G. Rodriguez (2003). "Utilization of care during pregnancy in rural Guatemala: does obstetrical need matter?" Soc Sci Med **57**(12): 2447-63.

Government of Nepal (2001). Nepal Demographic and Health Survey. Kathmandu, Nepal, ORC Macro, MD, USA.

Government of Nepal (2001). Population Census 2001 of Nepal. Kathmandu, National Planning Commission Secretariat, His Majesty's Government of Nepal, Central Bureau of Statistics.

Government of Nepal (2004). Nepal living standards survey 2003/04. Kathmandu, Central Bureau of Statistics, Government of Nepal.

Government of Nepal (2005). Nepal Millennium Development Goals: Progress Report 2005. Kathmandu, Nepal, Government of Nepal and United Nations Country Team of Nepal.

Government of Nepal (2005). Operational guidelines on incentives for safe delivery services. Kathmandu, Government of Nepal, Ministry of Health and Population.

Government of Nepal (2006). Information kit on cost sharing scheme for the promotion of safe delivery service. Kathmandu, Ministry of Health and Population, Government of Nepal and Support to Safe Motherhood Programme.

Government of Nepal (2006). Resilience Amidst Conflict: An Assessment of Poverty in Nepal, 1995-96 and 2003-04. Kathmandu, Nepal, Government of Nepal (Central Bureau of Statistics), World Bank, DFID, and ADB.

Government of Nepal (2007). Nepal Demographic and Health Survey. Kathmandu, Nepal, ORC Macro, MD, USA.

Graham, W. J., S. Ahmed, C. Stanton, C. Abou-Zahr and O. M. Campbell (2008). "Measuring maternal mortality: an overview of opportunities and options for developing countries." BMC Med **6**: 12.

Graham, W. J., J. Cairns, S. Bhattacharya, C. H. W. Bullough, Z. Quayyum and K. Rogo (2006). Maternal and perinatal conditions. Disease control priorities in developing countries. D. T. Jamison, J. G. Breman, A. R. Meashamet al. Washington DC and New York, World Bank and Oxford University Press.

Greene, W. (2008). Econometric Analysis. Upper Saddle River, NJ, Prentice-Hall.

Griffiths, P. and R. Stephenson (2001). "Understanding users' perspectives of barriers to maternal health care use in Maharashtra, India." J Biosoc Sci **33**(3): 339-59.

Grosh, M., C. Del Ninno, E. Tesliuc and A. Ouerghi (2008). For Protection and Promotion: The design and implementation of effective safety nets. Washington DC, World Bank.

Grossman, M. (1972). The demand for health: a theoretical and empirical investigation, Columbia University Press New York.

Grossman, M. (1972). "On the concept of health capital and the demand for health." Journal of Political economy **80**(2): 223.

Grossman, M. (2000). The Human Capital Model. Handbook of health economics. A. J. Culyer and J. P. Newhouse. Amsterdam, Elsevier North Holland.

Grossman, M. (2004). "The demand for health, 30 years later: a very personal retrospective and prospective reflection." J Health Econ **23**(4): 629-36.

Gwatkin, D. R. (2003). "How well do health programmes reach the poor?" Lancet **361**(9357): 540-1.

Gwatkin, D. R. (2004). "Assessing inequalities in maternal mortality." Lancet **363**(9402): 5.

Gyimah, S. O., B. K. Takyi and I. Addai (2006). "Challenges to the reproductive-health needs of African women: on religion and maternal health utilization in Ghana." Soc Sci Med **62**(12): 2930-44.

Habicht, J. P., C. G. Victora and J. P. Vaughan (1999). "Evaluation designs for adequacy, plausibility and probability of public health programme performance and impact." Int J Epidemiol **28**(1): 10-8.

Habyarimana, J. and W. Jack (2008). Heckle and Chide: Results of a Randomized Road Safety Intervention in Kenya. Washington DC, Georgetown University.

Hanson, K., T. Marchant, R. Nathan, H. Mponda, C. Jones, J. Bruce, H. Mshinda and J. A. Schellenberg (2009). "Household ownership and use of insecticide treated nets among target groups after implementation of a national voucher programme in the United Republic of Tanzania: plausibility study using three annual cross sectional household surveys." BMJ **339**: b2434.

Hausman, J. and D. Mcfadden (1984). "Specification Tests for the Multinomial Logit Model." Econometrica 52(5): 1219-1240.

Hausman, J. A. (1978). "Specification Tests in Econometrics." Econometrica 46(6): 1251-1271.

Hausmann-Muela, S., J. Ribera and I. Nyamongo (2003). Health-seeking behaviour and the health system response. DCCP Working Paper.

Heckman, J., H. Ichimura, J. Smith and P. Todd (1998). "Characterizing selection bias using experimental data." Econometrica 66(5): 1017-1098.

Heckman, J., H. Ichimura and P. Todd (1997). "Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme." Review of Economic Studies 64(4): 605-654.

Heckman, J., H. Ichimura and P. Todd (1998). "Matching as an econometric evaluation estimator." Review of Economic Studies: 261-294.

Heckman, J. J. (1979). "Sample Selection Bias as a Specification Error." Econometrica 47(1): 153-161.

Heckman, J. J. (1992). Randomization and social program evaluation. Evaluating welfare and training programs. C. F. Manski and I. Garfinkel. Cambridge, MA. Harvard, Harvard Univ Press: 201-30.

Heckman, J. J. (2008). Econometric causality. NBER Working Paper 13934. Cambridge, MA, National Bureau of Economic Research.

Heckman, J. J., L. Lochner and C. Taber (1998). "General-equilibrium treatment effects: A study of tuition policy." American Economic Review 88(2): 381-386.

Heckman, J. J., J. Smith and N. Clements (1997). "Making the most out of programme evaluations and social experiments: Accounting for heterogeneity in programme impacts." Review of Economic Studies 64(4): 487-535.

Heckman, J. J. and J. A. Smith (1995). "Assessing the case for social experiments." The Journal of Economic Perspectives: 85-110.

Heckman, J. J. and E. J. Vytlacil (2007). Econometric evaluation of social programs, Part 1: Causal models, structural models and econometric policy evaluation. Handbook of Econometrics, Volume 6B. J. J. Heckman and E. Leamer. Amsterdam, Elsevier: 4780-4867.

Heckman, J. J. and E. J. Vytlacil (2007). Econometric evaluation of social programs, Part 2: Using the marginal treatment effect to organize alternative econometric estimators to evaluate social programs, and to forecast their effects in new environments. Handbook of Econometrics, Volume 6B. J. J. Heckman and E. Leamer. Amsterdam, Elsevier: 4875–5143.

Heller, P. S. (1982). "A model of the demand for medical and health services in Peninsular Malaysia." Soc Sci Med 16(3): 267-84.

Hernández, B., D. Ramírez, H. Moreno and N. Laird (2005). Evaluacion del impacto de Oportunidades en la mortalidad materna e infantil. External Evaluation of the Impact of the

Human Development Program Oportunidades. B. Hernández and M. Hernández. Mexico, National Institute of Public Health.

Higgins, J. and S. Green, Eds. (2005). Cochrane handbook for systematic reviews of interventions 4.2. 5. Updated May 2005. Chichester, England, John Wiley and Sons Ltd.

Hill, K., K. Thomas, C. AbouZahr, N. Walker, L. Say, M. Inoue and E. Suzuki (2007). "Estimates of maternal mortality worldwide between 1990 and 2005: an assessment of available data." Lancet **370**(9595): 1311-9.

Hoddinott, J. (2008). Nutrition and Conditional Cash Transfer (CCT) Programs in Conditional Cash Transfers in Latin America. Washington DC, International Food Policy Research Institute (IFPRI).

Hodgkin, D. (1996). "Household characteristics affecting where mothers deliver in rural Kenya." Health Econ **5**(4): 333-40.

Hoffmann, V. (2009). "Intrahousehold Allocation of Free and Purchased Mosquito Nets." American Economic Review **99**(2): 236-241.

Holland, P. W. (1986). "Statistics and causal inference." Journal of the American Statistical Association **81**(396): 945-960.

Hotchkiss, D. R. (1998). "The tradeoff between price and quality of services in the Philippines." Soc Sci Med **46**(2): 227-42.

Hurley, J. (2000). An overview of the normative economics of the health sector. Handbook of Health Economics. A. J. Culyer and J. P. Newhouse. Amsterdam, North-Holland. **17:** 1803–62.

Ikeako, L. C., H. E. Onah and G. C. Iloabachie (2006). "Influence of formal maternal education on the use of maternity services in Enugu, Nigeria." J Obstet Gynaecol **26**(1): 30-4.

Imbens, G. W. (2009). Better LATE Than Nothing: Some Comments on Deaton (2009) and Heckman and Urzua (2009). NBER working paper series no. w14896. Cambridge, Mass., National Bureau of Economic Research.

Imbens, G. W. and J. D. Angrist (1994). "Identification and estimation of local average treatment effects." Econometrica **62**(2): 467-475.

Imbens, G. W. and J. M. Wooldridge (2009). "Recent Developments in the Econometrics of Program Evaluation." Journal of Economic Literature **47**(1): 5-86.

Institute for Fiscal Studies, Econometría and Sistemas Especializados de Información (2006). Evaluación del Impacto del Programa Familias en Acción–Subsidios Condicionados de la Red de Apoyo Social. Bogotá, Colombia, National Planning Department.

Institute of Medicine (2001). Crossing the quality chasm: A new health system for the 21st century. Washington DC, National Academy Press.

Institute of Policy Studies (2001). Equity in financing and delivery of health services in Bangladesh, Nepal and Sri Lanka: results of a tri-country study. Colombo, Institute of Policy Studies with Data International, Dhaka and Nepal Health Economics Association.

International Crisis Group (2006). Nepal: From People Power to Peace? Brussels, International Crisis Group.

International Crisis Group (2009). Nepal's Future: In Whose Hands? Brussels, International Crisis Group.

Islam, M. A., R. I. Chowdhury and H. H. Akhter (2006). "Complications during pregnancy, delivery, and postnatal stages and place of delivery in rural Bangladesh." Health Care Women Int **27**(9): 807-21.

Jack, A. (2008). World Bank backs anti-Aids experiment. Financial Times. London.

Jack, W. (1999). Principles of health economics for developing countries, A World Bank Publication.

Jacobsson, F., J. Carstensen and L. Borgquist (2005). "Caring externalities in health economic evaluation: how are they related to severity of illness?" Health Policy **73**(2): 172-182.

James, C. D., K. Hanson, B. McPake, D. Balabanova, D. Gwatkin, I. Hopwood, C. Kirunga, R. Knippenberg, B. Meessen, S. S. Morris, A. Preker, Y. Souteyrand, A. Tibouti, P. Villeneuve and K. Xu (2006). "To retain or remove user fees?: reflections on the current debate in low- and middle-income countries." Appl Health Econ Health Policy **5**(3): 137-53.

Johnson, K. and S. E. K. Bradley (2008). Trends in Economic Differentials in Population and Health Outcomes: Further Analysis of the 2006 Nepal Demographic and Health Survey. Calverton, Maryland, USA, Macro International.

Kakwani, N., A. Wagstaff and E. vanDoorslaer (1997). "Socioeconomic inequalities in health: Measurement, computation, and statistical inference." Journal of Econometrics **77**(1): 87-103.

Kaufman, D., A. Kraay and M. Mastruzzi (2009). Governance Matters VIII: Aggregate and Individual Governance Indicators, 1996-2008. Washington DC, World Bank.

Koblinsky, M., Z. Matthews, J. Hussein, D. Mavalankar, M. K. Mridha, I. Anwar, E. Achadi, S. Adjei, P. Padmanabhan, B. Marchal, V. De Brouwere and W. van Lerberghe (2006). "Going to scale with professional skilled care." Lancet **368**(9544): 1377-86.

Koenig, M. A., K. Jamil, P. K. Streatfield, T. Saha, A. Al-Sabir, S. El Arifeen, K. Hill and Y. Haque (2007). "Maternal health and care-seeking behavior in bangladesh: findings from a national survey." Int Fam Plan Perspect **33**(2): 75-82.

Kowalewski, M., P. Mujinja and A. Jahn (2002). "Can mothers afford maternal health care costs? User costs of maternity services in rural Tanzania." Afr J Reprod Health **6**(1): 65-73.

Kremer, M. and A. Holla (2009). Pricing and Access: Lessons from Randomized Evaluations in Education and Health. Washington DC, Center for Global Development.

Kremer, M. and E. Miguel (2007). "The Illusion of Sustainability." The Quarterly Journal of Economics **122**(3): 1007-1065.

Kyomuhendo, G. B. (2003). "Low use of rural maternity services in Uganda: impact of women's status, traditional beliefs and limited resources." Reprod Health Matters **11**(21): 16-26.

Lagarde, M., A. Haines and N. Palmer (2007). "Conditional cash transfers for improving uptake of health interventions in low- and middle-income countries: a systematic review." JAMA 298(16): 1900-10.

Lagarde, M. and N. Palmer (2008). "The impact of user fees on health service utilization in low- and middle-income countries: how strong is the evidence?" Bull World Health Organ 86(11): 839-848.

Laibson, D. (1997). "Golden Eggs and Hyperbolic Discounting." Quarterly Journal of Economics 112(2): 443-477.

Lasswell, H. (1956). The decision process. College Park MD, University Maryland Press.

Lawn, J. E., S. Cousens and J. Zupan (2005). "4 million neonatal deaths: when? Where? Why?" Lancet 365(9462): 891-900.

Le Grand, J. (2008). "The giants of excess: a challenge to the nation's health." Journal of the Royal Statistical Society Series a-Statistics in Society 171: 843-856.

Leonard, D. K., Ed. (2000). Africa's Changing Markets for Health and Veterinary Services: The New Institutional Issues. Houndmills, Basingstoke, Hampshire and London, MacMillan Press Ltd.

Leonard, K. L. (2003). Incentives in Rural Health Care Delivery: Cameroon I. Africa's Changing Markets for Health and Veterinary Services: The New Institutional Issues. D. K. Leonard. Houndmills, Basingstoke, Hampshire and London, MacMillan Press Ltd: Chapters 1, 4 & 10.

Letamo, G. and S. D. Rakgoasi (2003). "Factors associated with non-use of maternal health services in Botswana." J Health Popul Nutr 21(1): 40-7.

Leuven, E. and B. Sianesi (2003). PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing.

Levy, D. and J. Ohls (2007). Evaluation of Jamaica's PATH Program: Final Report. Washington DC, Mathematica Policy Research.

Lewis, G. (2007). The Confidential Enquiry into Maternal and Child Health (CEMACH). Saving Mothers' Lives: reviewing maternal deaths to make motherhood safer - 2003-2005. The Seventh Report on Confidential Enquiries into Maternal Deaths in the United Kingdom. London, CEMACH.

Li, M. (1996). The demand for medical care: Evidence from urban areas in Bolivia. Washington DC, World Bank.

Lindelow, M. (2004). "Understanding spatial variation in the utilization of health services: does quality matter?" Centre for the Study of African Economies Working Paper Series.

Lindelow, M. (2005). "The Utilisation of Curative Healthcare in Mozambique: Does Income Matter?" Journal of African Economies 14(3): 435.

Lindert, K., A. Linder, J. Hobbs and B. Briere (2007). The nuts and bolts of Brazil's Bolsa Familia Program: Implementing conditional cash transfers in a decentralised context. Washington DC, World Bank.

Lipsky, M. (1983). Street-level bureaucracy: Dilemmas of the individual in public services. New York, Russell Sage Foundation Publications.

Macours, K., N. Schady and R. Vakis (2008). Cash Transfers, Behavioral Changes, and the Cognitive Development of Young Children: Evidence from a Randomized Experiment. Washington DC, World Bank.

Magadi, M., I. Diamond and R. N. Rodrigues (2000). "The determinants of delivery care in Kenya." Soc Biol **47**(3-4): 164-88.

Magadi, M. A., A. O. Agwanda and F. O. Obare (2007). "A comparative analysis of the use of maternal health services between teenagers and older mothers in sub-Saharan Africa: evidence from Demographic and Health Surveys (DHS)." Soc Sci Med **64**(6): 1311-25.

Maluccio, J. and R. Flores (2005). Impact evaluation of a conditional cash transfer program: the Nicaraguan Red de Protección Social. Washington DC, International Food Policy Research Insitute.

Manandhar, D. S., D. Osrin, B. P. Shrestha, N. Mesko, J. Morrison, K. M. Tumbahangphe, S. Tamang, S. Thapa, D. Shrestha, B. Thapa, J. R. Shrestha, A. Wade, J. Borghi, H. Standing, M. Manandhar and A. M. Costello (2004). "Effect of a participatory intervention with women's groups on birth outcomes in Nepal: cluster-randomised controlled trial." Lancet **364**(9438): 970-9.

Manning, W. G., J. P. Newhouse, N. Duan, E. B. Keeler and A. Leibowitz (1987). "Health insurance and the demand for medical care: evidence from a randomized experiment." The American Economic Review: 251-277.

Mariko, M. (2003). "Quality of care and the demand for health services in Bamako, Mali: the specific roles of structural, process, and outcome components." Soc Sci Med **56**(6): 1183-96.

Marteau, T. M., R. E. Ashcroft and A. Oliver (2009). "Using financial incentives to achieve healthy behaviour." BMJ **338**: b1415.

Marteau, T. M., A. Oliver and R. E. Ashcroft (2008). "Changing behaviour through state intervention." BMJ **337**: a2543.

Matthews, Z., J. Ramakrishna, S. Mahendra, A. Kilaru and S. Ganapathy (2005). "Birth rights and rituals in rural south India: care seeking in the intrapartum period." J Biosoc Sci **37**(4): 385-411.

Mayhew, M., P. M. Hansen, D. H. Peters, A. Edward, L. P. Singh, V. Dwivedi, A. Mashkoor and G. Burnham (2008). "Determinants of skilled birth attendant utilization in Afghanistan: a cross-sectional study." Am J Public Health **98**(10): 1849-56.

McFadden, D. (1981). Econometric models of probabilistic choice. Stuctural analysis of discrete data with Econometric application. C. Manski and M. D. Cambridge, MA, MIT Press.

McGlynn, E. A. (1997). "Six challenges in measuring the quality of health care." Health Aff (Millwood) **16**(3): 7-21.

McKee, M., A. Britton, N. Black, K. McPherson, C. Sanderson and C. Bain (1999). "Methods in health services research. Interpreting the evidence: choosing between randomised and non-randomised studies." BMJ **319**(7205): 312-5.

McNamara, P. E. (1999). "Welfare Effects of Rural Hospital Closures: A Nested Logit Analysis of the Demand for Rural Hospital Services." American Journal of Agricultural Economics **81**(August): 686-691.

Mekonnen, Y. and A. Mekonnen (2003). "Factors influencing the use of maternal healthcare services in Ethiopia." J Health Popul Nutr **21**(4): 374-82.

Mills, A., S. Bennett and S. Russell (2001). The Challenge of Health Sector Reform: What Must Governments Do? Basingstoke, Palgrave Macmillan.

Mills, A., L. Gilson, K. Hanson, N. Palmer and M. Lagarde (2008). "What do we mean by rigorous health-systems research?" Lancet **372**(9649): 1527-9.

Morduch, J. (1995). "Income Smoothing and Consumption Smoothing." Journal of Economic Perspectives **9**(3): 103-114.

Morris, S., R. Flores, P. Olinto and J. M. Medina (2004). "Monetary incentives in primary health care and effects on use and coverage of preventive health care interventions in rural Honduras: cluster randomised trial." Lancet **364**: 2030-2037.

Morris, S. S., P. Olinto, R. Flores, E. A. Nilson and A. C. Figueiro (2004). "Conditional cash transfers are associated with a small reduction in the rate of weight gain of preschool children in northeast Brazil." J Nutr **134**(9): 2336-41.

Murray, C. J. (2007). "Towards good practice for health statistics: lessons from the Millennium Development Goal health indicators." Lancet **369**(9564): 862-73.

Mwabu, G. M. and W. M. Mwangi (1986). "Health care financing in Kenya: A simulation of welfare effects of user fees." Social Science & Medicine **22**(7): 763-767.

Nabyonga, J., M. Desmet, H. Karamagi, P. Y. Kadama, F. G. Omaswa and O. Walker (2005). "Abolition of cost-sharing is pro-poor: evidence from Uganda." Health Policy Plan **20**(2): 100-8.

Nahar, S. and A. Costello (1998). "The hidden cost of 'free' maternity care in Dhaka, Bangladesh." Health Policy Plan **13**(4): 417-22.

Neupane, B. D. (2003). Performance, management, utilisation and sustainability of community-based emergency funds: Nepal Safer Motherhood Project. Kathmandu, Family Health Division, Ministry of Health and Options.

New Era (2008). An Analytical Report on National Survey of Female Community Health Volunteers of Nepal. Kathmandu, Nepal, New Era and Macro International.

Newhouse, J. P. (1993). "Free for all? Lessons from the RAND Health Insurance Experiment." A RAND Study.

Neyman, J. (1923). "Statistical problems in agricultural experiments." Journal of the Royal Statistical Society **2**: 107-180.

North East Essex NHS Trust (2009). Food vouchers incentives to pregnant smokers.

O'Donnell, O., E. van Doorslaer, A. Wagstaff and M. Lindelow (2008). Analysing health equity using household survey data: a guide to techniques and their implementation. Washington DC, World Bank.

O'Donoghue, T. and M. Rabin (1999). "Doing it now or later." American Economic Review: 103-124.

Oakley, A., V. Strange, C. Bonell, E. Allen and J. Stephenson (2006). "Process evaluation in randomised controlled trials of complex interventions." BMJ **332**(7538): 413-6.

Onwujekwe, O., K. Hanson and J. Fox-Rushby (2006). "Some indicators of socio-economic status may not be reliable and use of indices with these data could worsen equity." Health Econ 15(6): 639-44.

Pant, P. D., B. K. Suvedi, A. Pradhan, L. Hulton, Z. Matthews and M. Makskey (2008). Investigating Recent Improvements in Maternal Health in Nepal: Further Analysis of the 2006 Nepal Demographic and Health Survey. Calverton, Maryland, USA, Macro International.

Parkhurst, J. O. and S. A. Rahman (2007). "Life saving or money wasting? Perceptions of caesarean sections among users of services in rural Bangladesh." Health Policy **80**(3): 392-401.

Parkhurst, J. O., S. A. Rahman and F. Ssengooba (2006). "Overcoming access barriers for facility-based delivery in low-income settings: insights from Bangladesh and Uganda." J Health Popul Nutr **24**(4): 438-45.

Paul, B. K. and D. J. Rumsey (2002). "Utilization of health facilities and trained birth attendants for childbirth in rural Bangladesh: an empirical study." Soc Sci Med **54**(12): 1755-65.

Pawson, R., T. Greenhalgh, G. Harvey and K. Walshe (2005). "Realist review--a new method of systematic review designed for complex policy interventions." J Health Serv Res Policy **10 Suppl 1**: 21-34.

Pawson, R. and N. Tilley (1997). Realistic evaluation, Sage Publications Ltd.

Paxson, C. and N. Schady (2008). Does money matter? The effects of cash transfers on child health and development in rural Ecuador. Washington DC, World Bank.

Penfold, S., E. Harrison, J. Bell and A. Fitzmaurice (2007). "Evaluation of delivery-fee exemption policy in Ghana: Population estimates of changes in delivery service utilisation in two regions." Ghana Medical Journal 3(41): 100-109.

Phoxay, C., J. Okumura, Y. Nakamura and S. Wakai (2001). "Influence of women's knowledge on maternal health care utilization in southern Laos." Asia Pac J Public Health 13(1): 13-9.

Piketty, T. (1995). "Social mobility and redistributive politics." The Quarterly Journal of Economics **110**(3): 551-584.

Pitchforth, E., E. van Teijlingen, W. Graham, M. Dixon-Woods and M. Chowdhury (2006). "Getting women to hospital is not enough: a qualitative study of access to emergency obstetric care in Bangladesh." Qual Saf Health Care 15(3): 214-9.

Popay, J. (2008). "Should disadvantaged people be paid to take care of their health? No." BMJ **337**: a594.

Powell-Jackson, T., J. Morrison, S. Tiwari, B. D. Neupane and A. M. Costello (2009). "The experiences of districts in implementing a national incentive programme to promote safe delivery in Nepal." BMC Health Serv Res **9**: 97.

Powell-Jackson, T., B. Neupane, S. Tiwari, K. Tumbahangphe, D. Manandhar and A. Costello (2009). The impact of Nepal's national incentive progamme to promote safe delivery in the district of Makwanpur. Innovations in health system finance in developing and transitional economies. D. Chernichovsky and K. Hanson. Bingley, Emerald.

Powell-Jackson, T., B. D. Neupane, S. Tiwari, J. Morrison and A. Costello (2007). Process Evaluation of the Safe Delivery Incentive Programme. Kathmandu, Support to Safe Motherhood Programme, Nepal.

Powell-Jackson, T., B. D. Neupane, S. Tiwari, J. Morrison and A. Costello (2008). Evaluation of the Safe Delivery Incentive Programme: Final Report of the Evaluation. Kathmandu, Support to Safe Motherhood Programme, Nepal.

Pradhan, A., R. Aryal, G. Regmi, B. Ban and P. Govindasamy (1997). Nepal Family Health Survey 1996. Calverton, Maryland and Kathmandu, Government of Nepal, Ministry of Health, New Era; Macro International Inc.

Pradhan, R. (2002). Ethnicity, caste and a pluralist society. State of Nepal. K. M. Dixit and S. Ramachandaran. Kathmandu, Nepal, Himal Books.

Prevention of Maternal Mortality Network (1992). "Barriers to treatment of obstetric emergencies in rural communities of West Africa." Stud Fam Plann **23**(5): 279-91.

Quandt, R. E. (1972). "New Approach to Estimating Switching Regressions." Journal of the American Statistical Association **67**(33): 306-310.

Raghupathy, S. (1996). "Education and the use of maternal health care in Thailand." Soc Sci Med **43**(4): 459-71.

Rahman, M. H., W. H. Mosley, S. Ahmed and H. H. Akhter (2007). "Does Service Accessibility Reduce Socioeconomic Differentials in Maternity Care Seeking? Evidence from Rural Bangladesh." J Biosoc Sci: 1-15.

Ravallion, M. (2008). Evaluating anti-poverty programs. Handbook of Development Economics Volume 4. T. P. Schultz and J. Strauss. Amsterdam, North-Holland. **4**.

Ravallion, M. (2009). "Evaluation in the Practice of Development." World Bank Research Observer **24**(1): 29-53.

Rivera, J. A., D. Sotres-Alvarez, J. P. Habicht, T. Shamah and S. Villalpando (2004). "Impact of the Mexican program for education, health, and nutrition (Progresa) on rates of growth and anemia in infants and young children: a randomized effectiveness study." JAMA **291**(21): 2563-70.

Rodrik, D. (2009). The New Development Economics: We Shall Experiment, but How Shall We Learn? What Works in Development? Thinking Big and Thinking Small. J. Cohen and W. Easterly. Washington, Brookings Institution Press.

Rosenbaum, P. and D. Rubin (1983). "The central role of the propensity score in observational studies for causal effects." Biometrika **70**(1): 41.

Rosenbaum, P. and D. Rubin (1984). "Reducing bias in observational studies using subclassification on the propensity score." Journal of the American Statistical Association: 516-524.

Rosenbaum, P. and D. Rubin (1985). "Constructing a control group using multivariate matched sampling methods that incorporate the propensity score." The American Statistician **39**(1): 33-38.

Rossi, P., M. Lipsey and H. Freeman (2004). Evaluation: A systematic approach, Sage Publications, Inc.

Rothman, K., S. Greenland and T. Lash (2008). Modern epidemiology, Lippincott Williams & Wilkins.

Rothwell, P. M. (2005). "External validity of randomised controlled trials: "to whom do the results of this trial apply?"." Lancet **365**(9453): 82-93.

Roy, A. (1951). "Some thoughts on the distribution of earnings." Oxford Economic Papers **3**(2): 135-146.

RTI International (2007). Budget Analysis 2007-08 Ministry of Health and Population. Research Triangle Park, NC, RTI International.

Rubin, D. and N. Thomas (2000). "Combining Propensity Score Matching with Additional Adjustments for Prognostic Covariates." Journal of the American Statistical Association **95**(450).

Rubin, D. B. (1974). "Estimating Causal Effects of Treatments in Randomized and Nonrandomized Studies." Journal of Educational Psychology **66**(5): 688-701.

Rubin, D. B. (1978). "Bayesian Inference for Causal Effects: The Role of Randomization." Annals of Statistics **6**(1): 34-58.

Sabatier, P. (2007). Theories of the policy process. Boulder CO, Westview Press.

Saetren, H. (2005). "Facts and myths about research on public policy implementation: Out-of-fashion, allegedly dead, but still very much alive and relevant." Policy Studies Journal **33**(4): 559-582.

Sanders, D. and A. Haines (2006). "Implementation research is needed to achieve international health goals." PLoS Med **3**(6): e186.

Sauerborn, R., I. Ibrango, A. Nougtara, M. Borchert, M. Hien, J. Benzler, E. Koob and H. J. Diesfeld (1995). "The economic costs of illness for rural households in Burkina-Faso." Tropical Medicine and Parasitology **46**(1): 54-60.

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APPENDIX A1

ADDITIONAL TABLES

Table A1. Average number of days women were paid late

Variable	Days late in receipt of cash	p-value	N
District			
Morang	14.3	< 0.001	75
Sankhuwasabha	184.9		58
Myagdi	47.8		59
Rupandehi	0.8		37
Jumla	9.7		41
Achham	7.0		5
Type of health facility			
Hospital	22.6	0.1046	221
Primary health centre	71.8		37
Health post	67.7		16
Accessibility to health facility			
Walk < 1hr	40.1	< 0.001	127
Walk 1hr < 4 hr	37.7		126
Walk 4hr < 1 day	5.0		20
Walk > 1 day	0.0		2
Ethnicity			
Brahmin, Chhetri, Newar	36.8	< 0.001	186
Madheshi	47.1		14
Dalit	46.7		26
Janajati	49.1		46
Muslim	2.8		3
Education			
No education	35.4	0.9812	58
Primary education	40.3		35
Secondary education	36.0		95
Higher education	32.8		87
Year of implementation			
SDIP 1st Year	94.1	< 0.001	69
SDIP 2nd Year	38.3		120
SDIP 3rd Year	8.1		86
Total	35.5		275

Note: Source of data is the Survey of Women. P-value is provided for the test of the hypothesis that the means within the subgroup are similar to each other. Standard errors corrected for within cluster correlation

Table A2. Probit model results for the estimation of the propensity score

Variable	Coefficient	Std error	z-Stat
Constant	7.029	5.420	1.30
Age of woman	-0.007	0.004	-1.94
Ln(wealth asset score)	-14.183	7.565	-1.87
Ln(wealth asset score)^2	7.596	3.862	1.97
Ln(wealth asset score)^3	-1.698	0.855	-1.99
Ln(wealth asset score)^4	0.138	0.069	1.99
Primary education	0.255	0.065	3.94
Secondary education	0.294	0.061	4.78
Higher education	0.529	0.083	6.40
Woman works in agriculture	0.134	0.062	2.18
Woman is salaried or government worker	0.265	0.145	1.82
Woman has small business	0.016	0.099	0.16
Woman is a waged worker	0.102	0.095	1.08
Woman has other work	-0.060	0.374	-0.16
Terai & Madeshi Other Castes	0.042	0.083	0.51
Dalit	-0.054	0.064	-0.84
Newar	-0.020	0.124	-0.16
Janajati	-0.198	0.061	-3.25
Muslim	-0.639	0.206	-3.10
Other Castes	-0.142	0.081	-1.75
Walk to facility 1hr < 4 hr	-0.158	0.057	-2.76
Walk to facility 4hr < 1 day	-0.422	0.076	-5.52
Walk to facility > 1 day	-0.670	0.105	-6.36
Urban	0.125	0.078	1.59
Woman had a previous delivery during SDIP	0.130	0.074	1.76
Active female community health volunteer	2.829	0.192	14.74
Active women's groups	0.161	0.043	3.74
Sankhuwasabha	0.854	0.086	9.99
Myagdi	0.600	0.083	7.25
Rupandehi	0.546	0.098	5.57
Jumla	0.020	0.074	0.27
Achham	0.651	0.104	6.25
Time	0.336	0.023	14.54
N	5905		
Pseudo R^2	0.1765		
Log likelihood	-2745.6		

Table A3. Balancing of the covariates by type of matching estimator

	Before matching		After kernel matching			After mahalanobis matching			After nearest neighbour matching		
Variable	Bias (%)	t-Stat	Bias (%)	t-Stat	% reduction in bias	Bias (%)	t-Stat	% reduction in bias	Bias (%)	t-Stat	% reduction in bias
Age of woman	-22.0	-7.13	-1.2	-0.33	94.6	1.6	0.47	92.8	-1.7	-0.48	92.3
Ln(wealth asset score)	22.7	7.52	2.3	0.64	89.8	3.2	0.90	85.7	3.0	0.83	86.9
Ln(wealth asset score)^2	21.2	7.08	2.4	0.66	88.6	3.5	0.96	83.4	3.2	0.87	84.9
Ln(wealth asset score)^3	19.7	6.67	2.4	0.65	87.6	3.7	0.98	81.5	3.3	0.89	83.1
Ln(wealth asset score)^4	18.5	6.31	2.4	0.63	86.9	3.7	0.98	79.9	3.4	0.89	81.6
Primary education	4.9	1.66	-1.2	-0.32	75.2	3.8	1.04	21.7	-2.6	-0.67	47.5
Secondary education	18.1	6.22	-1.7	-0.44	90.6	-1.4	-0.37	92.1	-1.3	-0.33	93.0
Higher education	32.2	11.83	4.9	1.17	84.8	3.8	0.90	88.2	4.3	1.03	86.7
Woman works in agriculture	-3.8	-1.26	-0.3	-0.09	90.7	-3.6	-0.99	3.2	-0.5	-0.12	87.9
Woman is salaried worker	12.3	4.61	3.1	0.75	74.5	0.0	0.00	100.0	1.8	0.42	85.5
Woman has small business	8.6	3.01	-3.5	-0.85	59.7	1.2	0.30	86.5	-4.6	-1.10	47.3
Woman is a waged worker	-8.1	-2.62	-2.8	-0.79	65.6	1.8	0.54	77.7	-0.4	-0.12	94.8
Woman has other work	2.5	0.91	1.0	0.25	61.0	0.0	0.00	100.0	1.0	0.26	58.9
Terai & Madeshi Other Castes	-6.3	-2.04	-1.3	-0.38	78.9	1.0	0.30	83.4	-2.9	-0.81	53.5
Dalit	-6.9	-2.26	0.6	0.16	92.0	1.6	0.46	76.8	1.7	0.48	75.7
Newar	16.1	6.10	1.0	0.22	94.1	0.0	0.00	100.0	0.2	0.05	98.7
Janajati	-7.9	-2.59	0.2	0.06	97.3	-0.7	-0.19	91.3	0.5	0.14	93.7
Muslim	-18.4	-5.28	-0.2	-0.11	98.8	0.0	0.00	100.0	0.1	0.03	99.7
Other Castes	-18.0	-5.69	-1.1	-0.33	94.1	0.2	0.07	98.8	-0.9	-0.28	94.9
Distance to facility 1 > 4 hr	8.4	2.81	-0.2	-0.04	98.2	-6.7	-1.86	20.7	0.7	0.20	91.2
Distance to facility 4 > 24 hr	-19.6	-6.24	-0.3	-0.10	98.3	2.3	0.70	88.4	-0.8	-0.24	96.0
Distance to facility > 1 day	-29.9	-8.89	-0.3	-0.12	98.9	0.5	0.21	98.2	-0.8	-0.32	97.2
Urban	12.1	4.22	3.2	0.83	73.6	5.1	1.33	57.8	3.6	0.93	70.2
Previous delivery during SDIP	11.5	4.04	1.5	0.37	87.2	11.7	3.20	-1.6	-1.0	-0.26	91.1
Active FCHV	62.1	22.20	-2.9	-0.69	95.3	12.8	3.18	79.3	-4.3	-1.01	93.2
Active women's groups	13.8	4.66	3.6	0.96	73.9	9.5	2.57	31.0	2.7	0.70	80.7
Sankhuwasabha	25.1	8.83	-2.0	-0.51	91.8	1.0	0.26	95.9	-1.8	-0.44	92.9
Myagdi	5.8	1.95	1.3	0.36	76.6	1.3	0.35	77.3	1.0	0.26	83.0
Rupandehi	14.7	5.05	-1.9	-0.48	87.3	0.3	0.09	97.7	-2.6	-0.65	82.6
Jumla	-21.5	-6.82	0.3	0.08	98.8	-1.1	-0.35	94.7	0.8	0.25	96.2
Achham	-16.5	-5.29	3.0	0.92	81.5	-0.4	-0.11	97.8	2.8	0.85	82.9
Time	40.5	13.06	-1.4	-0.38	96.6	22.8	6.64	43.7	-0.1	-0.02	99.9

Table A4. Impact estimates by matching procedure

	Kernel		Mahalanobis		Nearest neighbour	
Variable	ATT	t-Stat	ATT	t-Stat	ATT	t-Stat
Place of delivery						
Health facility	0.040***	2.70	0.039**	2.06	0.046***	3.04
Government health facility	0.043***	3.28	0.045**	2.65	0.048***	3.52
NGO hospital	-0.011*	-1.86	-0.009	-1.17	-0.011*	-1.73
Private health facility	0.008	1.40	0.003	0.48	0.009	1.57
Type of attendant						
Doctor, nurse or midwife (SBA)	0.042***	2.72	0.042**	2.11	0.048***	3.00
Any professional health worker	0.052***	3.17	0.045**	2.16	0.058***	3.43
Procedure at delivery						
Caesarean section	0.012*	1.83	0.018**	2.13	0.013*	1.83
Caesarean section or assisted	0.019**	2.02	0.032***	2.67	0.022**	2.25

Note: *** denotes significance at 1%, ** at 5%, and * at 10%. NGO = non-governmental organisation. SBA = skilled birth attendant.

APPENDIX A2

QUESTIONNAIRE OF THE

COMMUNITY SURVEILLANCE SYSTEM

IN MAKWANPUR DISTRICT

MIRA, Makwanpur

Mother and Newborn Care Programme

SERMI Questionnaire

1. Household ID No.

VDC ☐☐ WARD ☐

Tole.....

Sector ☐ HH No. ☐☐☐

Interviewer ID. ☐☐☐

Interveiw Date

day ☐☐ month ☐☐ year ☐☐

Observed ☐ Checked ☐

Name of MW.....

Respondent's Name .....

MW ID ☐☐☐☐☐☐☐

Date of Birth :

day ☐☐ month ☐☐ year ☐☐

a. Have you had ever attended the mothers' group meeting ? ○ Yes ○ No

b. If yes, how many times ? ☐☐ Times *(if no go to question no. c)*

c. Did you play perinatal picture card game in your tole ? ○ Yes ○ No *(if no go to question no.2)*

d. If yes , whom did you play with ? ○ Facilitator ○ Mini Facilitator ○ Both

---

Religion and Ethnicity *(if the woman had already been asked the SERMI, skip to 24))*

2. What is your ethnic group / caste ?

○ Tamang ○ Magar ○ Gurung ○ Newar ○ Praja ○ Majhi ○ Rai (Danuwar) ○ Bankariya

○ Bahun ○ Chhetri ○ Thakuri ○ Sanyasi ○ Gharti ○ Kami ○ Sarki ○ Damai

○ Others.....

3. What is your religion ?

○ Hindu ○ Buddhist ○ Muslim ○ Christian ○ Other.....

(If SERMI Questionnaire has already been asked in this household, go to question number 17 without asking quesion number 4 to 16)

House and Household Possession

4. Is this house your own ? ○ Yes ○ No *(If no go to question no. 8)*

5. What the house is made of ?

○ Cement & Bricks ○ Mud & Bricks ○ Mud & Stone ○ Planks ○ Brushwood

○ Thatch ○ Others.....

6. How manay people live in your house ? ☐☐ No/s.

7. How many sleeping rooms are there in your house ? ☐ No/s.

8. Which things do you have in your house ?

a) Electricity ○ Yes ○ No b)Radio ○ Yes ○ No c)Television ○ Yes ○ No

d) Bicycle ○ Yes ○ No e) Telephone ○ Yes ○ No

9. What type of fuel does your household mainly use for cooking ?

☐ Electricity ☐ LPG ☐ BIOGAS ☐ Kerosene ☐ Coal ☐ Firewood/Straw

☐ Dung ☐ Others.....

10. What is the principle source of drinking water ?

☐ Piped drinking water in residence ☐ Well in residence ☐ Public piped tap

☐ Well with handpump in yard/plot ☐ Public well with handpump ☐ Traditional public well

☐ River,canal or surface water for drinking ☐ Other source of drinking water

11. What is the principal type of toilet facility used by members of your household ?

☐ Flush toilet ☐ Use a pan as a latrine ☐ Bush,field as latrine ☐ Pit latrine

☐ Other type of latrine

12. What is the major occupation of your household ?

○ Agriculture ○ Salaried or Government ○ Small Business ○ Waged labour

13. Do you have your own land ? ○ Yes ○ No *(if no go to question no. 15)*

14. if yes, how much wet land and how much dry upland ?

Wet land ☐☐ Kattha or ☐☐ Bigaha or ☐☐ Ropani

Dry upland ☐☐ Kattha or ☐☐ Bigaha or ☐☐ Ropani

15. How many months of the year does the main occupation support enough food ? ☐☐ Months

(if there is enough for 12 months, go to question no. 17)

16. What do you do to cope with the rest of months ?

○ Agriculture ○ Salary or Govt. Work ○ Small business ○ Waged labour ○ Others.....

Education

17. What is the highest grade did you study ? ☐☐ Class ○ No

(ask to read the sentence)

18. Could you read this Sentence ?

○ Read Easily ○ Read Hardly ○ Can not read

19. How old were you when you got married ? ☐☐ Years

20. Have you or your husband used any temproary contraceptive ever before ? ○ Yes ○ No

(if no go to question no. 22)

21. If yes, which one did you use ?

☐ Depo ☐ Norplant ☐ Pills ☐ I.U.D ☐ Condom ☐ Others.....

22. Have you ever had pregnancy before even if it ended early or the baby was a stillbirth ?

○ Yes ○ No

(If no go to question no. 24)

Past Pregnancies

23. Married Woman(MW) full maternity history :- (Now I am going to ask your pregnancies which include born alive, born dead or lost before birth. Please start with the first pregnancy you had)

1 a) Was there multiple pregnancy ? ○ Yes ○ No

☐ Born Dead <7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead >7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex ○ Boy ○ Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex ○ Boy ○ Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

2 a) Was there multiple pregnancy ? O Yes O No 3

☐ Born Dead < 7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead > 7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex O Boy O Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex O Boy O Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

3 a) Was there multiple pregnancy ? O Yes O No

☐ Born Dead < 7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead > 7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex O Boy O Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex O Boy O Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

4 a) Was there multiple pregnancy ? O Yes O No

☐ Born Dead < 7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead > 7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex O Boy O Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex O Boy O Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

5 a) Was there multiple pregnancy ? O Yes O No

☐ Born Dead < 7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead > 7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex O Boy O Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex O Boy O Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

6 a) Was there multiple pregnancy ? O Yes O No 4

☐ Born Dead < 7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead > 7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex O Boy O Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex O Boy O Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

7 a) Was there multiple pregnancy ? O Yes O No

☐ Born Dead < 7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead > 7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex O Boy O Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex O Boy O Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

8 a) Was there multiple pregnancy ? O Yes O No

☐ Born Dead < 7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead > 7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex O Boy O Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex O Boy O Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

9 a) Was there multiple pregnancy ? O Yes O No

☐ Born Dead < 7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead > 7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex O Boy O Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex O Boy O Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

10 a) Was there multiple pregnancy ? O Yes O No 5

☐ Born Dead < 7 months Miscarrage Date of Miscarrage ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born Dead > 7 months Stillbirth Date of Stillbirth ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

☐ Born aLive Still Alive Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby..... Sex O Boy O Girl
(now go to next baby if there is)

☐ Born aLive Now Dead Date of Birth ☐☐ day ☐☐ Month ☐☐ Year

Name of Baby.....

Sex O Boy O Girl Date of Death ☐☐ day ☐☐ Month ☐☐ Year
(now go to next baby if there is)

Antenatal Care

24.Did you go for check-up during this pregnancy ? O Yes O No *(if yes go to question no. 26)*

25. Why did not you go ?

.....

.....

.....

(Now go to question no. 33)

26. Why did you go for ANC for the first time ?

O For a problem O Just for a check up

27. Where did you go for the check-up ?

☐ Hetauda Hospital ☐ Hospital ☐ P.H.C ☐ Health Post ☐ Sub Health Post

☐ Mobile Clinic ☐ Family Planning ☐ Private Clinic ☐ Medical Shop ☐ Others

28. How may months pregnat were you when you went for first check-up ? ☐☐ Months

29. How many times did you go for a check-up ? ☐☐ Times

30. During this pregnancy, were any of the following done at least once ?

a) Were you weighted ? O Yes O No

b) Was your height measured ? O Yes O No

c) Was your blood pressure measured ? O Yes O No

d) Did you give a urine sample ? O Yes O No

e) Did you give a blood sample ? O Yes O No

f) Did a health worker get you to lie down and feel the position of the baby ? O Yes O No

31. Were you told about signs of pregnancy complication ? O Yes O No O Don't know
(if no or do not know go to question no. 33)

32. Were you told where to go if you had these complication ? O Yes O No O Don't know

33. Did you have T.T injection during this pregnancy ? O Yes O No O Do not know

34. During this pregnancy, were you given or did you buy any iron tablets or iron syrup ? *(Show table/syrup)*

O Given O Bought O Do not know O Didn't take
(if didn't take to question no. 36)

35. During the whole pregnancy for how many days did you take the tables/syrup ?

☐☐☐ days ☐☐ weeks ☐☐ months ○ Do not know

Promblems

36. Did you have any problems during pregnancy or after delivery ? ○ Yes ○ No

(if no go to question no. 58)

37. What was the problem ? ☐ Serious Promblems ☐ Common Promblems

(if there is no serious problems go for common problems)

A. Serious Problems

☐ Any vaginal bleeding during pregnancy, before delivery

☐ Any vaginal bleeding after delivery, so much you thought you would die

☐ Fit/Convulsion : unconscious, jerking arms, legs (not just shivering or shaking)

☐ Obstructed labour/ baby stuck

☐ Placenta stuck you thought it would not come out

☐ Fever, very sick

☐ Swollen Face ☐ Other

38) Did you take treatment for serious problems ? ○ Yes ○ No

if no, why not.....

.....

.....

(if no go for Common Problems)

39. Who did you consult with at first ?

○ Doctor ○ Staff Nurse ○ HA ○ ANM ○ AHW

○ Medical shopkeeper ○ MCHW ○ FCHV ○ TBA ○ Dhami

○ Others

40. Where did you go for treatment ?

○ Health Institution ○ Medical shop ○ Shaman ○ Call Health worker at home ○ Other

41. How did you get there ? *(if Health worker was called at home , go to 42)*

☐ Walked ☐ Carried ☐ Ambulence ☐ Car / Tempo / Bus / Rickshaw

☐ Stretcher (MIRA) ☐ Stretcher (Other) ☐ Doko

42. How long after you became ill did you get treatment ? ☐☐ After hour/s or ☐☐ After day/s

43. Did you go to another place after the first place ? ○ Yes ○ No *(if no go for Common Problems)*

44. If yes, were you suggested (reffered) to go there or you just decided yourself to go there ?

○ Reffered ○ Just go

45. Where did you go for treatment ?

☐ Health Institution ☐ Medical shop ☐ Shaman ☐ Call Health worker at home ☐ Other

46. How did you get there ?

☐ Walked ☐ Carried ☐ Ambulence ☐ Car / Tempo / Bus / Rickshaw

☐ Stretcher (MIRA) ☐ Stretcher (Other) ☐ Doko

B. Common minor Problems

☐ Headache, Constipation, Nausea, Backache, Weakness, Bloated stomach, Indigestion, Cramps, Itching, diarrohes, Stomach pain, Vaginal discharge, Burning urine

☐ Nightblindness

☐ Breathlessness doing regular household activities

☐ Other.....

47) Did you take treatment for common minor problems ? O Yes O No

if no, why not.....

.....

.....

(if woman had taken treatment for Serious problem but even she did not take treatment for Common Problem, go to 56)

48. Who did you consult with at first ?

O Doctor O Staff Nurse O HA O ANM O AHW

O Medical shopkeeper O MCHW O FCHV O TBA O Dhami

O Others

49. Where did you go ?

O Health Institution O Medical shop O Shaman O Call Health worker at home O Other

50. How did you get there ?

☐ Walked ☐ Carried ☐ Ambulence ☐ Car / Tempo / Bus / Rickshaw

☐ Stretcher (MIRA) ☐ Stretcher (Other) ☐ Doko

51. How long after you became ill did you get treatment ? ☐☐ After hour/s or ☐☐ After day/s

52. Did you go to another place after the first place ? O Yes O No *(if no go to 56)*

53. If yes, were you suggested (reffered) to go there or you just decided yourself to go there ?

O Reffered O Just go

54. Where did you go for treatment ?

☐ Health Institution ☐ Medical shop ☐ Shaman ☐ Call Health worker at home ☐ Other

(if Health worker was called at home , go to 56)

55. How did you get there ?

☐ Walked ☐ Carried ☐ Ambulence ☐ Car / Tempo / Bus / Rickshaw

☐ Stretcher (MIRA) ☐ Stretcher (Other) ☐ Doko

56. How much did you paid in total for transportation and treatment ? Rs.....

57. How did you get money ?

☐ Wages Rs.....

☐ Saving Rs.....

☐ Sale of Land Rs.....

☐ Sale of Livestock Rs.....

☐ Borrowed money from relatives Rs.....

☐ Borrowed money from Lender Rs.....

☐ Borrowed money from MCH Fund (MIRA) Rs.....

☐ Borrowed money from Other Fund Rs.....

☐ Other Organization Rs.....

☐ From Donation Rs.....

58. Did you have long labour more than 24 hours ? O Yes O No

59. Did you have check-up after delivery ? O Yes O No *(if no go to question no. 62)*

60. If yes, when did you go ? ☐☐ After day/s

61. Whom did you consult with ?

O Doctor O Staff Nurse O HA O ANM O AHW
O Medical shopkeeper O MCHW O FCHV O TBA O Dhami
O Others

62. Have you been given vitamin A capsuls since the delivery ? O Yes O No
(if there is no living baby stop interview)

Newborn Baby

63. Name of Baby..... Weight ☐.☐☐☐ Kg

64. Date of Birth ☐☐ Day ☐☐ Month ☐☐ Year O Son O Daughter

65. How many complete months of pregnancy did the baby born ? ☐☐ Months

66. Is the baby twin ? O Yes O No *(if no go to question no.68)*

67. Was the baby born first or second ? O First O Second

Newborn Care

68. Where was the baby born ?

O At home O Hetauda Hospital O Other Hospital O P H C O H P
O S H P O Private clinic O Medical Shop O Area around home O Field / Jungle
O Shed O Others.....

69. How was the baby delivered ?

O Normally O Manually O Forceps O Operatively
(if baby was delivered at hospital or phc and operatively go to question no. 82)

70. Which part of baby came out first?

O Head O Buttock O Hands/Foot O Cord
O Don't know

71. Was there a fire, stove or other form of heating in the delivery room ?

O Before baby was born O After baby was born O Before and after baby was born
O No O Don't know

72. Who helped with the delivery ?

☐ Doctor ☐ Nurse ☐ ANM ☐ HA / AHW / CMA
☐ TBA ☐ MCHW ☐ VHW ☐ FCHV
☐ Mother in law ☐ Family Member ☐ Neighbours / Friends ☐ None (Alone)
(if she was alone, go to 74)
☐ Others.....

73. Did the person who helped, have washed his/her hands ?

O Yes O No O Don't know

74 Do you know what is this ? *(Show delivery kit)* O Yes O No *(if no go to question no.77)*

75. Did you use this ? O Yes O No *(if no go to question no.77)*

76. If yes, which one did you use ? O MCH Product O Mother's Group Product
(iShow Safte Delivery Kit)

77. What was the cord cut with ?

O Boild Blade O Unboiled Blade O knife / scissors O Sickle / woodknife O Bamboo
O Don't know O Others.....

78. Did you tie cord ? O Yes O No

79 What was put on the cord stump after it was cut ?

O Oil O Turmeric O Unwashed cloth / cotton O Washed cloth / cotton O Medicin /dettole
O Powder O Mud O Nothing O Don't know O Other.....

80. How long after birth was the baby wrapped up ?

☐☐ After minutes or ☐☐ After hour/s

81. How long after birth was the baby bathed ?

☐☐ After minutes or ☐☐ After hour/s or ☐☐ After day/s

82. What was the first food given to the baby ?

O Mother's milk O Other mother's milk O Cow /buffalo milk O Furmola/ Lactozine
O Milk food O Ghee/Sugar/ Honey O Oil O Don't know
O Others.....

Breastfeeding

83. Have you breastfeed your baby ? O yes O No *(If no go to question no. 86)*

84. How long after the birth did you first feed the baby ?

☐☐ After minutes or ☐☐ After hour/s or ☐☐ After day/s

85. Did you throw first milk before you feed the baby first ? O Yes O No

86. Are you feeding the baby only mother's milk or are you giving some other things like : water, lacto-gen, cow's/buffalo milk as well ?

O Mother's milk O Other things too

87. Has your baby had the BCG immunization ? O Yes O No O Don't know

Illness in Infant

88. Has the baby had caugh ? O Yes O No *(if no go to question no. 90)*

89. How many days continuously did the caugh last ? ☐ Day/s

90. Has the baby had fast breathing for more than 6 hours ? O Yes O No

91. Has the baby had chest recession ? O Yes O No O Don't know

92. Has the baby had difficulty in feeding ? O Yes O No

93. Has the baby had diarrhoea more than 3 times a day ? O Yes O No
(if no go to question no. 95)

94. For how many day did the diarrhoea last ? ☐ Day/s

95. Did the baby vomitted repeatedly ? O Yes O No

96. Has the baby had a high fever ? O Yes O No *(if no go to question no. 98)*

97. How many days did the fever last ? ☐ Day/s

98. Has the baby had infection in umbilical cord ? ○ Yes ○ No

99. Has the baby had jaundice ? ○ Yes ○ No

100. Has the baby had any other illness that you are worried about ?

○ Yes ○ No

(if there is no any illness in this section , stop interview)

if yes,.....

.....

.....

Treatment of the baby

(if baby had fever, diarrhoea, jaundice, cord infection and caughing ask the following questions)

101. Did you seek treatment when the baby was sick ?

○ Yes ○ No *(if yes go to question no. 103)*

102. if not,why did not you go ?

.....

.....

.....

103. Who did you consult with at first ? *(stop interview)*

○ Doctor ○ Staff Nurse ○ HA ○ ANM ○ AHW

○ Medical shopkeeper ○ MCHW ○ FCHV ○ TBA ○ Dhami

○ Others

104. Where did you go for treatment ?

○ Health Institution ○ Medical shop ○ Shaman ○ Call Health worker at home ○ Other

(If Health worker was called at home, go to 106)

105. How did you get there ?

☐ Walked ☐ Carried ☐ Ambulence ☐ Car / Tempo / Bus / Rickshaw

☐ Stretcher (MIRA) ☐ Stretcher (Other) ☐ Doko

106. Did they treat the baby ? ○ Yes ○ No *(if no go to question no. 109)*

107. What did they do ?

.....

.....

.....

108. How long was it from the start of the baby's illness to receive treatment ?

☐☐ After hours or ☐☐ After day or ☐☐ After week

109. Did you then consult anyone else ? ○ Yes ○ No *(If No go to 117)*

110. Who did you consult with ?

○ Doctor ○ Staff Nurse ○ HA ○ ANM ○ AHW

○ Medical shopkeeper ○ MCHW ○ FCHV ○ TBA ○ Dhami

○ Others

111. Where did you go for treatment ?

☐ Health Institution ☐ Medical shop ☐ Shaman ☐ Call Health worker at home ☐ Other

(If Health worker was called at home, go to 113)

112. How did you get there ?

☐ Walked ☐ Carried ☐ Ambulence ☐ Car / Tempo / Bus / Rickshaw

☐ Stretcher (MIRA) ☐ Stretcher (Other) ☐ Doko

113. Were you reffered or did you just decide to go ? ○ Reffered ○ Just decided to go

114. Did they treat the baby ? ○ Yes ○ No *(if no, go to 117)*

115. What did they do ?

.....

.....

.....

116. How long was it from the start of the baby's illness to receive treatment ?

☐☐ After hours or ☐☐ After day or ☐☐ After week

117.Did you or your family member give a treatment without consulting anyone else ?

○ Yes ○ No

118. How much did you paid in total for transportation and treatment ? Rs.....

119. How did you get money ?

☐ Wages Rs.....

☐ Saving Rs.....

☐ Sale of Land Rs.....

☐ Sale of Livestock Rs.....

☐ Borrowed money from relatives Rs.....

☐ Borrowed money from Lender Rs.....

☐ Borrowed money from MIRA MCH Fund Rs.....

☐ Borrowed money from Other Fund Rs.....

☐ Other Organization Rs.....

☐ From Donation Rs.....

APPENDIX A3

QUESTIONNAIRE OF THE

COST OF DELIVERY CARE SURVEY

IN MAKWANPUR SISTRICT

EVALUATION OF SAFE DELIVERY INCENTIVE PROGRAMME
POVERTY AND COST OF DELIVERY SURVEY QUESTIONNAIRE

IDENTIFICATION AND INTERVIEW ELIGIBILITY

NAME AND CODE OF VDC _____	
WARD NUMBER	
SECTOR NUMBER	
HOUSEHOLD ID NUMBER	
PREGNANCY ID ___ ___ ___ ___ ___ ___ ___ ___ ___	
NAME OF MARRIED WOMAN _____	
NAME OF RESPONDENT _____	
INTERVIEW ELIGIBILITY ..... [DID THE WOMAN DELIVER IN A GOVERNMENT HEALTH FACILITY?] (YES=1, NO=2) **IF NO, DO NOT START QUESTIONNAIRE**	
OTHER MEMBERS OF HOUSEHOLD PRESENT .... MULTIPLE CHOICE (MOTHER=1, HOUSEHOLD HEAD=2, MOTHER-IN-LAW=3)	

INTERVIEWER VISITS

	1	2	3
DATE	.....	.....	.....
TIME STARTED	.....	.....	.....
TIME FINISHED	.....	.....	.....
INTERVIEWER'S NAME	.....	.....	.....
RESULT*	.....	.....	.....

*RESULT CODES:

1 COMPLETED
2 NO HOUSEHOLD MEMBER AT HOME OR NO ABLE PERSON AT HOME AT TIME OF VISIT
3 ENTIRE HOUSEHOLD ABSENT FOR EXTENDED PERIOD OF TIME
4 POSTPONED
5 REFUSED
6 DWELLING VACANT OR ADDRESS NOT A DWELLING
7 DWELLING DESTROYED
8 DWELLING NOT FOUND
9 OTHER _____
(SPECIFY)

INTERVIEWER	SUPERVISOR	ENTERED BY
NAME _____	NAME _____	___ ___ ___
DATE _____	DATE _____	

READ TO THE RESPONDENT

Hello, my name is _____ and I am working as part of a research team with MIRA. As you know we interviewed you a month ago and would be grateful if we could ask you a few further questions. We would very much appreciate your participation in this survey. We would like to ask a few questions about your household expenditures and the costs of delivery care during childbirth. Please try and answer every question, but if you are not sure then please give the best answer you can. The information you provide will be strictly confidential. The interview will take approximately 20 minutes. This study has been approved by the Ministry of Health and Population.

Participation in this survey is voluntary, and if we should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time without having to give a reason. However, we hope that you will participate in this survey since your views are important to us.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

If so, please sign or mark the consent form to indicate you are willing to be interviewed?

FOOD EXPENSES AND HOME PRODUCTION

1.	HOME PRODUCTION				FOOD PURCHASES				IN-KIND
	2.	3.		4.	5.	6.		7.	8.
Have you consumed ..[FOOD].. during the past 12 months? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR EACH FOOD ITEM. IF THE ANSWER TO Q. 1 IS YES, ASK Q. 2-8.	How many months in the past 12 months did you consume ..[FOOD].. that you grew or produced yourself? IF NONE, WRITE ZERO AND →5	In a typical month during which you ate ..[FOOD].., how much did your household consume ..[FOOD]..?		How much would your household have to spend in the market to buy this quantity of ..[FOOD].. (i.e. the amount consumed in a typical month)?	How many months in the past 12 months did you purchase ..[FOOD].. ? IF NONE WRITE ZERO AND →8	In a typical month during which you purchased ..[FOOD].. how much did you purchase?		How much would you normally have to spend in total to buy this quantity?	What is the total value of ..[FOOD].. consumed that you received in-kind over the past 12 months (wages for work, etc.)? IF NONE WRITE ZERO
	MONTHS	QUANTITY	UNIT	RUPEES	MONTHS	QUANTITY	UNIT	RUPEES	RUPEES

	NO	YES	CODE								
1. GRAINS AND CEREALS			010								
Fine rice			011								
Coarse rice			012								
Beaten, flattened rice			013								
Maize			014								
Maize flour			015								
Wheat flour			016								
Millet			017								
Other grains/cereals(Buckwheat, Barley, Sorghum, etc.)			018								
2. PULSES AND LEGUMES			020								
Black gram (*Mas*)			021								
Lentil (*Musuro*)			022								
Red gram (*Rahar*)			023								
Horse gram (*Chana*)			024								
Other pulses (Green gram, *Masyang*, Coarse gram, Grass pea, etc.)			025								
Other beans (Soybean, Pea, Bean, etc.)			026								

FOOD EXPENSES AND HOME PRODUCTION (CONTD.)

1. Have you consumed ..[FOOD].. during the past 12 months? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR EACH FOOD ITEM. IF THE ANSWER TO Q. 1 IS YES, ASK Q. 2-8.				HOME PRODUCTION				FOOD PURCHASES				IN-KIND
	NO	YES	CODE	2. How many months in the past 12 months did you consume ..[FOOD].. that you grew or produced yourself? IF NONE WRITE ZERO AND →5 MONTHS	3. In a typical month during which you ate ..[FOOD].., how much did your household consume ..[FOOD]..? QUANTITY	UNIT	4. How much would your household have to spend in the market to buy this quantity of ..[FOOD].. (i.e. the amount consumed in a typical month)? RUPEES	5. How many months in the past 12 months did you purchase ..[FOOD].. ? IF NONE WRITE ZERO AND →8 MONTHS	6. In a typical month during which you purchased ..[FOOD]. how much did you purchase? QUANTITY	UNIT	7. How much would you normally have to spend in total to buy this quantity? RUPEES	8. What is the total value of the ..[FOOD].. consumed that you received in-kind over the past 12 months (wages for work, etc.)? IF NONE WRITE ZERO RUPEES
3. EGGS AND MILK PRODUCTS			030									
Eggs			031									
Milk			032									
Condensed milk			033									
Baby milk/Powder milk			034									
Curd/Whey			035									
Other milk products (Cheese, *Paneer*, etc.)			036									
4. COOKING OILS			040									
Ghee			041									
Vegetable oil			042									
Mustard oil			043									
Other oil (Soybean, Sunflower, Corn, etc.)			044									
5. VEGETABLES			050									
Potatoes/Colocasia			051									
Onions			052									
Cauliflower/Cabbage			053									
Tomatoes			054									
Green leafy vegetables			055									
Other vegetables (Brinjal, Pointed gourd, Bitter gourd, etc.)			056									

FOOD EXPENSES AND HOME PRODUCTION (CONTD.)

1. Have you consumed ..[FOOD].. during the past 12 months? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR EACH FOOD ITEM. IF THE ANSWER TO Q. 1 IS YES, ASK Q. 2-8.				HOME PRODUCTION				FOOD PURCHASES				IN-KIND
	NO	YES	CODE	2. How many months in the past 12 months did you consume ..[FOOD].. that you grew or produced yourself? IF NONE WRITE ZERO AND →5 MONTHS	3. In a typical month during which you ate ..[FOOD].., how much did your household consume ..[FOOD]..? QUANTITY	UNIT	4. How much would your household have to spend in the market to buy this quantity of ..[FOOD].. (i.e. the amount consumed in a typical month)? RUPEES	5. How many months in the past 12 months did you purchase ..[FOOD].. ? IF NONE WRITE ZERO AND →8 MONTHS	6. In a typical month during which you purchased ..[FOOD]. how much did you purchase? QUANTITY	UNIT	7. How much would you normally have to spend in total to buy this quantity? RUPEES	8. What is the total value of the ..[FOOD].. consumed that you received in-kind over the past 12 months (wages for work, etc.)? IF NONE WRITE ZERO RUPEES
6. FRUITS AND NUTS			060									
Bananas			061									
Citrus fruits (Oranges, Lemon, Lime, Sweet orange, Pummelo, etc.)			062									
Mangoes			063									
Apples			064									
Pineapple			065									
Papaya			066									
Other fruits (Grape, Pomegranate, etc.)			067									
Dried fruits (Walnut, Coconut, etc.)			068									
7. FISH AND MEAT			070									
Fish			071									
Mutton			072									
Buffalo meat			073									
Chicken			074									
Other meats (Pig, Boar, Duck, etc.)			075									

FOOD EXPENSES AND HOME PRODUCTION (CONTD.)

1. Have you consumed ..[FOOD].. during the past 12 months? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR EACH FOOD ITEM. IF THE ANSWER TO Q. 1 IS YES, ASK Q. 2-8.				HOME PRODUCTION				FOOD PURCHASES				IN-KIND
	NO	YES	CODE	2. How many months in the past 12 months did you consume ..[FOOD].. that you grew or produced yourself? IF NONE WRITE ZERO AND →5 MONTHS	3. In a typical month during which you ate ..[FOOD].., how much did your household consume ..[FOOD]..? QUANTITY	UNIT	4. How much would your household have to spend in the market to buy this quantity of ..[FOOD].. (i.e. the amount consumed in a typical month)? RUPEES	5. How many months in the past 12 months did you purchase ..[FOOD].. ? IF NONE WRITE ZERO AND →8 MONTHS	6. In a typical month during which you purchased ..[FOOD]. how much did you purchase? QUANTITY	UNIT	7. How much would you normally have to spend in total to buy this quantity? RUPEES	8. What is the total value of the ..[FOOD].. consumed that you received in-kind over the past 12 months (wages for work, etc.)? IF NONE WRITE ZERO RUPEES
8. SPICES AND CONDIMENTS			080									
Salt			081									
Cumin seed/Black pepper			082									
Turmeric			083									
Ginger/Garlic			084									
Chilies			085									
Other spices and condiments (Coriander, Nutmeg, Clove, etc.)			086									
9. SWEETS AND CONFECTIONERY			090									
Sugar			091									
Gur (*Sakhar*)			092									
Sweets (*Mithai*)			093									
Other sweets (Sugar candy, Chocolate, etc.)			094									
10. NON-ALCOHOLIC BEVERAGES			100									
Tea (dried leaves)			101									
Coffee (ground, instant)			102									
Fruit juices/Carbonated drinks (Coca cola, Pepsi cola, etc.)			103									
Other non-alcoholic drinks (Mineral water, *Sarbat*, etc.)			104									

FOOD EXPENSES AND HOME PRODUCTION (CONTD.)

1. Have you consumed ..[FOOD].. during the past 12 months? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR EACH FOOD ITEM. IF THE ANSWER TO Q. 1 IS YES, ASK Q. 2-8.	NO	YES	CODE	HOME PRODUCTION 2. How many months in the past 12 months did you consume ..[FOOD].. that you grew or produced yourself? IF NONE WRITE ZERO AND →5 MONTHS	HOME PRODUCTION 3. In a typical month during which you ate ..[FOOD].., how much did your household consume ..[FOOD]..? QUANTITY	HOME PRODUCTION 3. UNIT	HOME PRODUCTION 4. How much would your household have to spend in the market to buy this quantity of ..[FOOD].. (i.e. the amount consumed in a typical month)? RUPEES	FOOD PURCHASES 2. How many months in the past 12 months did you purchase ..[FOOD].. ? IF NONE WRITE ZERO AND →8 MONTHS	FOOD PURCHASES 6. In a typical month during which you purchased ..[FOOD]. how much did you purchase? QUANTITY	FOOD PURCHASES 6. UNIT	FOOD PURCHASES 7. How much would you normally have to spend in total to buy this quantity? RUPEES	IN-KIND 8. What is the total value of the ..[FOOD].. consumed that you received in-kind over the past 12 months (wages for work, etc.)? IF NONE WRITE ZERO RUPEES
11. ALCOHOLIC BEVERAGES			110										
Wine			111										
Gin, Whiskey, Rum			112										
Beer/Jandh			113										
Other alcoholic drinks (Tadi, etc.)			114										
12. TOBACCO & TOBACCO PRODUCTS			120										
Cigarettes			121										
Bindis			122										
Tobacco			123										
Other (Jarda, Khaini, Betel nut, Tamakhu, etc.)			124										
13. MISC. FOOD PRODUCTS			130										
Meals/Snacks taken outside home			131										
Bread/Biscuits/Noodles			132										
Misc. other food expenditures			133										
Total (1+2+3+4+5+6+7+8+9+10+11+12+13)			140										
ASK RESPONDENT TO ESTIMATE AVERAGE MONTHLY EXPENDITURE ON FOOD, VALUE OF HOME PRODUCED FOOD, AND FOOD RECEIVED IN KIND			150										

SECTION 2 NON-FOOD EXPENDITURES AND INVENTORY OF DURABLE GOODS PART A

FREQUENT NON-FOOD EXPENDITURES

1. Were any of the following items purchased or received in-kind over the past 12 months? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR ALL ITEMS. IF THE ANSWER IS YES, ASK Q 2-3.	NO	YES	CODE	What is the money value of the amount purchased or received in-kind by your household during the past: AMOUNT IN RUPEES 2. 30 DAYS	3. 12 MONTHS
21. FUELS			210		
Wood (bundle wood, logwood, sawdust)			211		
Kerosene oil			212		
Coal, charcoal			213		
Cylinder gas (LPG)			214		
Matches, candles, lighters, lanterns, etc.			215		
22. APPAREL AND PERSONAL CARE ITEMS			220		
Ready-made clothing and apparel			221		
Cloth, wool, yarn, and thread for making clothes and sweaters			222		
Tailoring expenses			223		
Footwear (shoes, slippers, sandals, etc.)			224		
Toilet soap			225		
Toothpaste, tooth powder, toothbrush, etc.			226		
Other personal care items (shampoo, combs, cosmetics, etc.)			227		
Dry cleaning and washing expenses			228		
Personal services (haircuts, shaving, shoeshine, etc.)			229		

1. Were any of the following items purchased or received in-kind over the past 12 months? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR ALL ITEMS. IF THE ANSWER IS YES, ASK Q 2-3.	NO	YES	CODE	What is the money value of the amount purchased or received in-kind by your household during the past: AMOUNT IN RUPEES 2. 30 DAYS	3. 12 MONTHS
23. OTHER FREQUENT EXPENSES			230		
Public transportation (buses, taxis, rickshaws, train tickets, etc.)			231		
Petrol, diesel, motor oil (for personal vehicle only)			232		
Entertainment (cinema, cassette/CD rentals, etc.)			233		
Newspapers, books, stationery supplies(except educational expenses)			234		
Pocket money to children			235		
Educational and professional services			236		
Modern medicines and health services (doctor fees, hospital charges, etc.)			237		
Traditional medicines and health services (traditional healers, etc.)			238		
Wages paid to watchman, servant, gardener, driver, etc.			239		
Light bulbs, shades, batteries, etc.			241		
Household cleaning articles (soap, bleach, washing powder, etc.)			242		

TOTAL: (210 + 220 + 230) 250			
ASK RESPONDENT TO ESTIMATE AVERAGE MONTHLY AND ANNUAL EXPENDITURE ON FREQUENTLY PURCHASED NON-FOOD ITEMS	260		

INFREQUENT NON-FOOD EXPENDITURES

1. Were any of the following items purchased or received in-kind over the past 12 months? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR ALL ITEMS. IF THE ANSWER IS YES, ASK Q 2.	NO	YES	CODE	2. What is the money value of the amount purchased or received in-kind by your household during the past 12 months: AMOUNT IN RUPEES 12 MONTHS
31. INFREQUENT EXPENSES			310	
Legal expenses and insurance (life, car, etc.)			311	
Income taxes, land taxes, housing and property taxes			312	
Repair and other expenses for personal vehicle(registration, fines)			313	
Postal expenses, telegrams, fax, telephone			314	
Excursion, holiday, (including travel and lodging)			315	
Toys, sports goods			316	
Repair and maintenance of the house			317	
Repair and servicing of household effects			318	
Home improvements and additions			319	
32. MISCELLANEOUS EXPENSES			320	
Marriages, births, and other ceremonies			321	
Dowry & bride price given			322	
Dowry & bride price received			323	
Funeral and death related expenses			324	
Expenditure on religious ceremonies			325	
Charity			326	
Cash losses			327	
Gifts and donations			328	

1. Were any of the following items purchased or received in-kind over the past 12 months? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR ALL ITEMS. IF THE ANSWER IS YES, ASK Q 2.	NO	YES	CODE	2. What is the money value of the amount purchased or received in-kind by your household during the past: AMOUNT IN RUPEES 12 MONTHS
41. DURABLE GOODS			410	
Crockery, cutlery and kitchen utensils (household use)			411	
Kitchen appliances (refrigerator, cooking range, blenders, etc.)			412	
Pillows, mattresses, blankets, etc.			413	
Jewelry, watches			414	
Furniture and fixtures			415	
Electric fans			416	
Heaters (electric, gas, kerosene)			417	
Sewing machine			418	
Iron (electric or other)			419	
Television/VCR			421	
Washing machine			422	
Radio, tape, etc.			423	
Camera			424	
Bicycle			425	
Motorcycle/Scooter			426	
Motor car or other such vehicle			427	
Other durable goods (bullock/he buffalo carts, etc.)			428	

OWN ACCOUNT PRODUCTION OF GOODS

1. Were any of the following items produced and consumed by your household over the past 12 months? [PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR ALL ITEMS. IF THE ANSWER IS YES, ASK Q. 2 AND 3.]			
SELF PRODUCED AND CONSUMED ITEMS	NO	YES	CODE
EXPENDITURES ON SELF PRODUCED AND CONSUMED ITEMS:			600
Dalo, Nanglo, Doko, Namlo, Rope, *Mudha*, etc.			601
Mandro, Mat, Sukul, Bhakari, Ghum, Chitro, Broom, etc.			602
Radi, Pakhi, Homespun clothes, etc.			603
Firewood/Dung collection			604
Furniture and allied wooden materials			605
Sickle, *Chulesi*, Knife, etc.			606
Tailoring			607
Shoe making/repairing			608
Water fetching			609
Minor house repairing			610
Biogas			611
Pickle, Gundruk, Masyaura, Titaura, Jam, Mada, etc.			612
Other (Communal construction, Duna, Tapari, Batti, etc.)			613

2. What is the monetary value in the local market of the items produced and consumed yourself during the past: AMOUNT IN RUPEES	
2. 30 DAYS	3. 12 MONTHS

SECTION 3 DELIVERY CARE EXPENSES AND THE MATERNITY INCENTIVE SCHEME

1. Where did you deliver your most recent baby?

HETAUDA HOSPITAL	1	OTHER HOSPITAL	2
PHC	3	HP	4
SHP	5		

2. What was the name of the health facility you delivered your baby in?

NAME: _____

3. Which district is that health facility in?

MAKWANPUR	1	OTHER (SPECIFY):	_____

4. Was this health facility the first place you sought care? PROBE TO SEE IF WOMAN WAS REFERRED.

YES	1	NO, REFERRED	2

5. Before seeking care at the health facility, did you see a dhaami jhankri or lama jhankri while you were in labour?

YES	1	NO	2 [→7]

6. How much did you pay the dhaami jhankri or lama jhankri? IF IN KIND, ESTIMATE VALUE OF GIFT.

AMOUNT IN RUPEES: _____

7. Approximately how much did you pay your delivery service provider(s) for your most recent delivery? (include registration fee, delivery fee, drugs, supplies, inpatient stay, lab tests etc). IF REFERRED, INCLUDE EXPENDITURE IN ALL HEALTH FACILITIES VISITED.

AMOUNT IN RUPEES: _____

8. Did your household spend anything on the following items when you delivered your baby in the health facility: PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR EACH ITEM. IF THE ANSWER TO QX IS YES, ASK QX.				9. How much did you spend on the following items at all the health facilities you visited: IF PAYMENT WAS IN-KIND, ESTIMATE VALUE IN RUPEES
	YES	NO	CODE	RUPEES
AT THE HEALTH FACILITY			701	
Registration fee			702	
Delivery fee			703	
Fee for use of operating theatre			704	
Drugs and supplies bought inside facility			705	
Lab tests, x-rays and ultrasound			706	
Accommodation / inpatient stay			707	
OUTSIDE THE HEALTH FACILITY			708	
Drugs and supplies bought at an outside pharmacy or shop			709	
Transport to health facility (include accompanying household members)			710	
Transport home after discharge (include accompanying household members)			711	
Accommodation / lodging of accompanying household members			712	
Food of accompanying household members			713	
OTHER ITEMS			714	
Other (specify)……..			715	
Other (specify)……..			716	
TOTAL SPENDING (SUM EACH LINE ITEM)			717	

10. In addition to what you paid for services you received, is there any amount you have yet to pay?

YES 1 NO 2 [→12]

11. How much money is still outstanding?

AMOUNT IN RUPEES: _____

12. Where did you obtain the money to pay for your delivery care? Was it from: PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR EACH ITEM. IF THE ANSWER TO QX IS YES, ASK QX.				13. How much money came from this source: IF PAYMENT WAS IN-KIND, ASK FOR VALUE IN RUPEES RUPEES	14. Do you have to pay this money back? PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR EACH ITEM.		
	YES	NO	CODE	RUPEES	YES	NO	CODE
Household members			801				901
Neighbours / friends			802				902
Relatives			803				903
Savings			804				904
Money lender / bank			805				905
NGO			806				906
Women's group / community			807				907
Landlord			808				909
Sold possessions			809				909
Other…….			810				910
Other…….			811				911
TOTAL (SUM 801-811)			**812**				**912**

15. How much time did you spend away from home to receive delivery care, including time at the health facility and the time it took to travel there and back?.

HOURS __ __ DAYS __ __ WEEKS __ __

16. What would you normally have been doing during the time you were away receiving delivery care? CIRCLE ALL THAT APPLY.

HOUSEHOLD CHORES	1	AGRICULTURE	2
SALARIED GOVERNMENT	3	SMALL BUSINESS	4
WAGED LABOUR	5	OTHER	6

17. How much time have you taken away from work / household chores since you delivered your baby?

DAYS __ __ WEEKS __ __

18. Have you lost any income as a result of being away from home or unable to work? If yes, how much?

AMOUNT IN RUPEES: _____ NO -2

19. Did any person(s) take over your household chores / work while you were away or unable to work?

YES 1 NO 2 [→21] DON'T KNOW 3 [→21]

20. Have you paid the person(s) for this work? If yes, how much? IF IN-KIND, ESTIMATE VALUE IN RUPEES. PROBE TO SEE IF THEY EXCHANGED LABOUR.

AMOUNT IN RUPEES: _____ LABOUR EXCHANGE -2 NO -3

21. Did any of the following household members accompany you to the health facility or visit while you were in the health facility: PUT A CHECK (✓) IN THE APPROPRIATE BOX FOR EACH ITEM. IF THE ANSWER TO QX IS YES, ASK QX.			22. Did [...] forgo any income by coming with you or visiting you at the health facility?		23. Approximately how much income did [...] forgo?
	YES	NO	YES	NO	RUPEES
Your husband					
Your mother					
Your mother-in-law					
Your children					
Other (specify).....					
Other (specify).....					

24. At any time after you gave birth, have you received cash from the health facility as part of a new government scheme to help mothers? PROBE TO SEE IF WOMAN HAS CLAIMED FOR THE MONEY BUT NOT YET RECEIVED.

YES 1 NO, CLAIMED 2 [→END] NO, NOT CLAIMED 3 [→END]

25. Was the money deducted from your bill at the health institution? IF DEDUCTED, PROBE: Was the money fully or partly deducted?

FULLY DEDUCTED 1 [→END] PARTLY DEDUCTED 2 NO 3

26. How much money did you receive?

AMOUNT IN RUPEES: _____

END OF QUESTIONNAIRE

APPENDIX A4

QUESTIONNAIRE OF THE

SURVEY OF WOMEN

EVALUATION OF MATERNITY INCENTIVE SCHEME (MIS)
HOUSEHOLD INTERVIEW OF WOMEN WHO DELIVERED IN THE PAST THREE YEARS (SINCE START OF YEAR 2062)

IDENTIFICATION AND INTERVIEW ELIGIBILITY

NAME AND CODE OF DISTRICT _____ ___ ___

NAME AND CODE OF VDC / MUNICIPALITY _____ ___ ___ ___

WARD NUMBER ..... ___ ___

CLUSTER NUMBER ..... ___ ___

HOUSEHOLD ID NUMBER ..... ___ ___ ___ ___ ___ ___

CITY / TOWN / RURAL ..... ___
(CITY=1, TOWN=2, RURAL=3)

NAME OF HOUSEHOLD HEAD _____

NAME OF RESPONDENT _____

INTERVIEW ELIGIBILITY ..... ___
ASK: Does any woman who gave birth after that start of 2062 AND more than two months ago live in this household?
(YES=1, NO=2)
IF NO, DO NOT START QUESTIONNAIRE AND VISIT NEXT HOUSEHOLD

OTHER MEMBERS OF HOUSEHOLD PRESENT .... ___ ___ ___
MULTIPLE CHOICE (MOTHER=1, HOUSEHOLD HEAD=2, MOTHER-IN-LAW=3)

INTERVIEWER VISITS

	1	2	3
DATE	.....	.....	.....
TIME STARTED	.....	.....	.....
TIME FINISHED	.....	.....	.....
INTERVIEWER'S NAME	.....	.....	.....
RESULT*	.....	.....	.....

*RESULT CODES:

1 COMPLETED
2 NO HOUSEHOLD MEMBER AT HOME OR NO ABLE PERSON AT HOME AT TIME OF VISIT
3 ENTIRE HOUSEHOLD ABSENT FOR EXTENDED PERIOD OF TIME
4 POSTPONED
5 REFUSED
6 DWELLING VACANT OR ADDRESS NOT A DWELLING
7 DWELLING DESTROYED
8 DWELLING NOT FOUND
9 OTHER _____
(SPECIFY)

TOTAL PERSONS IN HOUSEHOLD ___ ___

NUMBER OF ELIGIBLE WOMEN IN HOUSEHOLD ___ ___

INTERVIEWER	SUPERVISOR	ENTERED BY
NAME _____	NAME _____	___ ___ ___
DATE _____	DATE _____	

INFORMATION

READ TO THE RESPONDENT

Hello, my name is _____ and I am working as part of a research team under the Support to Safe Motherhood Programme (SSMP) in the Ministry of Health and Population. We are carrying out a survey of women to assess how well a Government health programme is working and would very much appreciate your participation in the survey. We would like to ask a few questions about your experiences of childbirth. Please try and answer every question, but if you are not sure then please give the best answer you can. The information you provide will be strictly confidential. The interview will take approximately 20 minutes. This study has been approved by the Ministry of Health and Population.

Participation in this survey is voluntary, and if we should come to any question you don't want to answer, just let me know and I will go on to the next question; or you can stop the interview at any time without having to give a reason. However, we hope that you will participate in this survey since your views are important to us.

At this time, do you want to ask me anything about the survey?

May I begin the interview now?

If so, please sign or mark the consent form to indicate you are willing to be interviewed?

उत्तरदाता लाई पढेर सुनाउनुहोस

नमस्कार, मेरो नाम ..... हो र म स्वास्थ्य मन्त्रालय अन्तर्गत सुरक्षित मातृत्व सहयोग कार्यक्रम (एस.एस.एम.पि) को एक अनुसन्धान टोलीको सदश्यको रुपमा काम गर्दैछु। हामी सरकारी स्वास्थ्य सेवा कार्यक्रम कत्तिको राम्रो सगकाम गरीरहेको छ भन्ने बुझ्नको लागि महिलाहरुको सर्भेक्षण गर्दैछौं। अनि यस सर्भेक्षणमा तँपाईले भाग लिनु हुन्छ भन्ने विश्वास लिएका छौं। तँपाईले बच्चा जन्माउँदाको अनुभव बारे हामी केही प्रश्न सोध्न चाहन्छौं। कृपया हामीले सोधेका सबै प्रश्नका उत्तर दिनु होला। तर, कुनै प्रश्नका उत्तर दिन असजिलो भएमा अफुले सकेसम्म उत्तर दिनु होला। तँपाईले दिनु भएका उत्तरहरु सबै गोप्य राखिने छन। यो अन्तर्वार्ताको लागि लगभग बिस मिनेट देखी आधा धण्टा जती लाग्छ होला। यस अनुसन्धान कार्यक्रमलाई सरकारी स्विकृती प्राप्त छ।

यस सर्भेक्षणमा तँपाईको सहभागिता स्वेच्छिक हो र यस क्रममा कुनै पनि प्रश्नको उत्तर दिन तँपाईलाई मन नलागेमा कृपया मलाई भन्नु होला र हामी अर्को प्रश्न सोध्ने छौं। साथै तँपाईले यस अन्तर्वार्तालाई कुनै पनि बेला रोक्न सक्नु हुनेछ तर यस सर्भेक्षको लागि तँपाईका विचारहरु अतिनै महत्वपूर्ण हुने हुँदा यस अन्तर्वार्तामा तँपाईको पूर्ण सहभागिता हुनेछ भन्ने बिश्वास लिएका छौं।

यस सर्भेक्षणको बारेमा तँपाईलाई केही थप जान्नु छ अब मलाई प्रश्न सोध्न सक्नु हुन्छ।

अब हामी अन्तर्वार्ता सुरु गरौं त? त्यसो भए, अन्तर्वार्ताको लागि तँपाईको स्विकृती स्वरुप यस सहमती पत्रमा हस्ताक्षर गरीदिनु होला। (अथवा स्विकृती चिन्ह लगाउनु होला)

SECTION 1: HOUSEHOLD CHARACTERISTICS

NO.	QUESTION	CODING CATEGORIES	SKIP	सि.न	प्रश्न	संकेतको वर्गिकरण	मा जाने
101	How old were you at your last birthday?	AGE IN COMPLETED YEARS ___ ___		१०१	तँपाईको उमेर कति भयो?	पुरा भएको उमेर बर्ष ___ ___	
102	What is your religion?	HINDU 1 BUDDHIST 2 MUSLIM 3 CHRISTIAN 4 OTHER _____ 6 (SPECIFY)		१०२	तँपाई कुन धर्म मान्नु हुन्छ?	हिन्दू १ बौध्द २ मुस्लीम ३ कृश्चियन ४ अन्य _____ ६ (खुलाउनुहोस)	
103	What is your ethnicity / caste? WRITE CODE USING CODING SHEET.	ETHNICITY ___ ___		१०३	तँपाई कुन जात/जातीमा पर्नु हुन्छ? **(संकेत पत्र अनुसार संकेत बुलाउनु होस)**	जात / जाती ___ ___	
104	Have you ever attended school?	YES 1 NO 2	→106	१०४	तँपाई कहिल्यै स्कूल भर्ना हुनु भएको थियो?	थिएं १ थिएन २	→१०६
105	What was the highest grade you completed?	GRADE ___ ___ NO GRADE COMPLETED 98		१०५	कति कक्षा सम्मको पढाई पुरा गर्नु भएको छ?	पुरा गरेको कक्षा ___ ___ कुनै पनि कक्षा पुरा नगरेको ९८	
106	Do you read a newspaper or magazine almost every day, once a week, less than once a week, not at all?	ALMOST EVERY DAY 1 AT LEAST ONCE A WEEK 2 LESS THAN ONCE A WEEK 3 NOT AT ALL 4		१०६	तँपाई कहिले/कहिले पत्र पत्रिकाहरु पढने गर्नु हुन्छ?	प्राय संधै जसो १ कमसेकम हप्तामा एक पटक २ हप्तामा एक पटक भन्दा कम ३ कहिल्यै पढदिन ४	
107	Do you listen to the radio almost every day, once a week, less than once a week, not at all?	ALMOST EVERY DAY 1 AT LEAST ONCE A WEEK 2 LESS THAN ONCE A WEEK 3 NOT AT ALL 4		१०७	तँपाई कहिले/कहिले रेडियो सुन्ने गर्नु हुन्छ?	प्राय संधै जसो १ कमसेकम हप्तामा एक पटक २ हप्तामा एक पटक भन्दा कम ३ कहिल्यै सुन्दिन ४	
108	Do you watch television almost every day, once a week, less than once a week, not at all?	ALMOST EVERY DAY 1 AT LEAST ONCE A WEEK 2 LESS THAN ONCE A WEEK 3 NOT AT ALL 4		१०८	तँपाई कहिलेकहिले टेलिभिजन हेर्नु हुन्छ?	प्राय संधै जसो १ कमसेकम हप्तामा एक पटक २ हप्तामा एक पटक भन्दा कम ३ कहिल्यै हेर्दिन ४	
109	How many people live in your house?	PERSONS LIVING IN HOUSE ___ ___		१०९	तँपाईको घरमा कति जना जहान छन?	घरका जहानको संख्या ___ ___	

NO.	QUESTION	CODING CATEGORIES	SKIP	सि.न	प्रश्न	संकेतको वर्गिकरण	मा जाने
110	What is your marital status?	CURRENTLY MARRIED 1 MARRIED, GAUNA NOT PERFORMED 2 WIDOWED 3 DIVORCED 4 SEPARATED 5 NEVER MARRIED 6	 →112 →112 →112 →115	११०	तँपाईको बैवाहिक स्थिती के हो?	विवाहित १ बिवाहित तर गौना नभएको २ विधवा ३ पारपाचुके गरेको ४ छुट्टै बस्ने गरेको ५ अविवाहित ६	 →११२ →११२ →११२ →११५
111	What is your husband's occupation? That is, what kind of work does he mainly do?	AGRICULTURE 1 SALARIED OR GOVERNMENT 2 SMALL BUSINESS 3 WAGED LABOUR 4 NOT WORKING 5 OTHER _____ 6 (SPECIFY)		१११	तँपाईको श्रीमानको पेशा के हो (के काम गर्नु हुन्छ)?	खेतिपाती १ तलवीजागिरे/सरकारी २ सानो व्यापार ३ बनीबुतो ४ हाल कुनै काम नगरेको ५ अन्य _____ ६ (खुलाउनुहोस)	
112	How old were you when you (first) got married?	AGE ___ ___		११२	पहिलो बिवाह हुदां तँपाई कति बर्षको हुनुहुन्थ्यो?	उमेर ___ ___	
113	Did your (last) husband ever attend school	YES 1 NO 2	 →115	११३	तँपाईको (पछिल्लो) श्रीमान कहिल्यै स्कूल भर्ना हुनुभएको थियो?	थियो १ थिएन २	 →११५
114	What was the highest grade he completed?	GRADE ___ ___ NO GRADE COMPLETED 98		११४	वहांले कति कक्षा सम्मको पढाई पुरा गर्नु भयो?	पुरा गरेको कक्षा ___ ___ कुनै पनि कक्षा पुरा नगरेको ९८	
115	Aside from your household work, have you done any work in the past seven days?	YES 1 NO 2	→119	११५	घर धन्धा बाहेक गएको सात दिन भित्र तँपाईले अन्य कुनै काम गर्नु भएको थियो?	थिए १ थिएन २	→११९
116	As you know, some women take up jobs for which they are paid in cash or kind. Others sell things, have a small business or work on the family farm or in the family business. In the last seven days, have you done any of these things or any other work?	YES 1 NO 2	→119	११६	तँपाईलाई थहा भएकै हो, केहि महिलाहरु नगद या जिन्सी ज्याला पाउने काम गर्छन भने कोहि कोहि सानोतीनो व्यापार पनि गर्छन, र कोहि चाहि आफ्नै खेतमा पनि काम गर्छन या परीवारकै व्यापारमा काम गर्छन। गएको सात दिनमा तँपाईले यस्ता या अन्य कुनै काम गर्नु भएको छ?	छ १ छैन २	→११९
117	Although you did not work in the last seven days, do you have any job or business from which you were absent for leave, illness, vacation, maternity leave or any other such reason?	YES 1 NO 2	→119	११७	गएको सात दिनमा कुनै काम नगरे पनि विरामी परेर, बिदा बसेर, सुत्केरी भएर या अन्य कुनै कारणले गर्दा जान नसकेको कुनै काम या व्यापार केही छ कि?	छ १ छैन २	→११९
118	Have you done any work in the last 12 months?	YES 1 NO 2	→201	११८	गएको एक वर्ष भित्र तँपाईले केहि काम गर्नु भएको छ?	छ १ छैन २	→२०१

NO.	QUESTION	CODING CATEGORIES	SKIP	सि.न	प्रश्न	संकेतको वर्गिकरण	मा जाने
119	What is your occupation, that is, what kind of work do you mainly do?	AGRICULTURE 1 SALARIED OR GOVERNMENT 2 SMALL BUSINESS 3 WAGED LABOUR 4 OTHER _____ 6 (SPECIFY)		११९	तँपाईको पेशा के हो, तँपाई खास गरी कस्तो खालको काम गर्नु हुन्छ?	खेतीपाती १ तलवी जागिरे/सरकारी २ सानो ब्यापार ३ बनीवुतो ४ अन्य _____ ६ (खुलाउनुहोस)	
120	Are you paid in cash or kind for this work or are you not paid at all?	CASH ONLY 1 CASH AND IN-KIND 2 IN-KIND ONLY 3 NOT PAID 4 LABOUR EXCHANGE 5		१२०	तँपाईले गर्नेकामको लागि नगद ज्याला पाउनु हुन्छ कि केही पनि पाउनु हुन्न?	नगद मात्र १ नगद र जिन्सी दुवै २ जिन्सी मात्र ३ केही पनि पाइदैन ४ पर्म ५	

SECTION 2: HOUSEHOLD ASSETS

NO.	QUESTION	CODING CATEGORIES	SKIP
201	What is the main source of drinking water for members of your household?	PIPED WATER PIPED INTO HOUSE 11 PIPED TO YARD/PLOT 12 PUBLIC TAP/STANDPIPE 13 TUBE WELL OR BOREHOLE 21 DUG WELL PROTECTED WELL 31 UNPROTECTED WELL 32 WATER FROM SPRING PROTECTED SPRING 41 UNPROTECTED SPRING 42 RAINWATER 51 TANKER TRUCK 61 SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/ IRRIGATION CANAL) 71 STONE TAP/DHARA 81 BOTTLED WATER 91 OTHER _____ 96 (SPECIFY)	
202	What kind of toilet facility do members of your household normally use? OBSERVE IF NECESSARY.	FLUSH OR POUR FLUSH TOILET FLUSH TO PIPED SEWER SYSTEM 11 FLUSH TO SEPTIC TANK 12 FLUSH TO PIT LATRINE 13 FLUSH TO SOMEWHERE ELSE 14 FLUSH, DON'T KNOW WHERE 15 PIT LATRINE VENTILATED IMPROVED PIT LATRINE 21 PIT LATRINE WITH SLAB 22 PIT LATRINE WITHOUT SLAB/ OPEN PIT 23 COMPOSTING TOILET 31 BUCKET TOILET 41 NO FACILITY/BUSH/FIELD 51 OTHER _____ 96 (SPECIFY)	

सि.न	प्रश्न	संकेतको वर्गिकरण	मा जाने
२०१	तपाईका घरको खानेपानीको मुख्य श्रोत के हो ?	**पाईपको पानी** घरभित्र ११ आंगन/कम्पाउण्डमा १२ सार्वजनिक धारास्ट्/याण्ड पाइप १३ ट्युववेल/बोरि २१ **इनारको पानी** सुरक्षित इनार ३१ असुरक्षित इनार ३२ **छ्रागोंरुभ/नाको पानी** सुरक्षित छ्रागों/झरना ४१ असुरक्षित छ्रागा/झरना ४२ बर्षा/परेको पानी ५१ टेङ्करको पानी ६१ जमिन माथीको पानी (नदी,बांध,पोखरी,कुलो ताल/पैनी) ७१ डुंगे धारारधारा ८१ सिसी/बोतलको पानी ९१ अन्य _____ ९६ (खुलाउनुहोस)	
२०२	तपाईको घरमा कस्तो किसिमको चर्पी (शौचालय) छ? **(आवश्यक परेमा अवलोकन गरेर निश्चित गर्नुहोस)**	**फ्लस चर्पी** फ्लस/पाईपको पानीले ढल प्रणालीमा वगाउन मिल्ने ११ सेफ्टी ट्याकीमा वगाउन मिल्ने १२ वगाउन मिल्ने परम्परागत चर्पी १३ अन्यत्र कतै वगाउन मिल्ने १४ वगाउन मिल्ने तर कहां जान्छ थाहा छैन १५ **खाल्डे चर्पी** हावादारी, सुधारिएको खाल्डे चर्पी २१ वस्ने ठाउं (स्ल्याव भएको) खाल्डे चर्पी २२ वस्ने ठाउं (स्ल्याव नभएकोरखुल्ला) खाल्डे चर्पी २३ दिसा कम्पोष्ट हुने चर्पी ३१ वाल्टिन/टीन चर्पी ४१ चर्पी छैन/झाडीरखेतमा जाने ५१ अन्य _____ ९६ (खुलाउनुहोस)	

NO.	QUESTION	CODING CATEGORIES			SKIP	सि.न	प्रश्न	संकेतको वर्गिकरण			मा जाने
203	Does your household have:		YES	NO		२०३	तँपाईको घरमा तलका सामान हरु छन?		छ	छैन	
	Electricity?	ELECTRICITY	1	2			बिजुली?	बिजुली	१	२	
	A radio?	RADIO	1	2			रेडियो?	रेडियो	१	२	
	A television?	TELEVISION	1	2			टेलिभिजन?	टेलिभिजन	१	२	
	A mobile telephone?	MOBILE TELEPHONE	1	2			मोबाइल फोन?	मोबाइल फोन	१	२	
	A non-mobile telephone?	NON-MOBILE TELEPHONE	1	2			फोन?	फोन	१	२	
	A refrigerator?	REFRIGERATOR	1	2			रेफिजरेटर?	रेफिजरेटर	१	२	
	A table?	TABLE	1	2			टेबुल?	टेबुल	१	२	
	A chair?	CHAIR	1	2			मेच?	मेच	१	२	
	A bed?	BED	1	2			खाट?	खाट	१	२	
	A sofa?	SOFA	1	2			सोफा सेट?	सोफा सेट	१	२	
	A cupboard?	CUPBOARD	1	2			दराज?	दराज	१	२	
	A computer?	COMPUTER	1	2			कम्पुटर?	कम्पुटर	१	२	
	A watch/clock?	CLOCK	1	2			घडी/भित्ते घडी?	घडी/भित्ते घडी	१	२	
	A fan?	FAN	1	2			पंखा?	पंखा	१	२	
	A dhiki/janto?	DHIKI/JANTO	1	2			ढिकि/जाँतो?	ढिकि/जाँतो	१	२	
204	What type of fuel does your household mainly use for cooking?	ELECTRICITY		01		२०४	तँपाईको घरमा खाना पकाउन मुख्यतया कुन प्रकारको इन्धनको प्रयोग गरीन्छ?	बिजुली		०१	
		LPG		02				एल.पि.ग्यास (ग्यास सिलिण्डर)		०२	
		NATURAL GAS		03				प्राकृतिक ग्यास		०३	
		BIOGAS		04				गोवर ग्यास		०४	
		KEROSENE		05				मटितेल		०५	
		COAL, LIGNITE		06				पत्थर कोइला		०६	
		CHARCOAL		07				कोइला		०७	
		WOOD		08				दाउरा/काठ		०८	
		STRAW/SHRUBS/GRASS		09				झारपात र स्याउला		०९	
		AGRICULTURAL CROP		10				कृषि उत्पादनको बोट		१०	
		ANIMAL DUNG		11				गोबर		११	
		NO FOOD COOKED IN HOUSEHOLD		95				घरमा खाना नपकाउने		९६	
		OTHER _____ (SPECIFY)		96				अन्य _____ (खुलाउनुहोस)		९६	
205	How many rooms in this household are used for sleeping?	ROOMS ___ ___				२०५	तँपाईको घरमा कति वटा सुत्ने कोठा छन?	कोठाको संख्या ___ ___			

NO.	QUESTION	CODING CATEGORIES			SKIP	सि.न	प्रश्न	संकेतको वर्गिकरण			मा जाने
206	Does any member of this household own:		YES	NO		२०६	तँपाईको परीवारका कुनै सदश्य संग तलका कुरा छ?		छ	छैन	
	A bicycle/rickshaw?	BICYCLE/RICKSHAW	1	2			साइकल?	साइकल	१	२	
	A motorcycle or motor scooter?	MOTORCYCLE/SCOOTER	1	2			मोटर साइकल या स्कुटर?	मोटर साइकल या स्कुटर	१	२	
	A tempo?	TEMPO	1	2			टेम्पो?	टेम्पो	१	२	
	An animal-drawn cart?	ANIMAL-DRAWN CART	1	2			गोरु/राँगाले तान्ने गाडा?	गोरु/राँगाले तान्ने गाडा	१	२	
	A car or truck?	CAR/TRUCK	1	2			मोटर कार या टक?	मोटर कार या ट्रक	१	२	
	A tractor?	TRACTOR	1	2			ट्रेक्टर?	ट्रेक्टर	१	२	
207	MAIN MATERIAL OF THE FLOOR. RECORD OBSERVATION.	NATURAL FLOOR EARTH/MUD 11 DUNG 12 RUDIMENTARY FLOOR WOOD PLANKS 21 PALM/BAMBOO 22 FINISHED FLOOR PARQUET OR POLISHED WOOD 31 VINYL OR ASPHALT STRIPS 32 CERAMIC TILES 33 CEMENT 34 CARPET 35 OTHER _____ 96 (SPECIFY)				२०७	**घरको भुँइमा प्रयोग गरीएको सामग्री** **(अवलोकन गरेर याकीन गर्नुहोस ।)**	**प्राकृतिक भुँइ** माटो ११ माटो/गोवर १२ **साधारण भुँइ** फल्याक २१ बांस २२ **परिस्कृत भुँइ** पार्केट या पालिस गरीएको काठ ३१ भिनाइल या लिनोलियम ३२ टायल ३३ सिमेन्ट ३४ कार्पेट ३५ अन्य _____ ९६ (खुलाउनुहोस)			
208	MAIN MATERIAL OF THE ROOF. RECORD OBSERVATION.	NATURAL ROOFING NO ROOF 11 THATCH/STRAW 12 RUDIMENTARY ROOFING RUSTIC MAT 21 BAMBOO 22 WOOD PLANKS 23 CARDBOARD 24 FINISHED ROOFING GALVANIZED SHEET 31 WOOD 32 ASBESTOS 33 CERAMIC TILES/SLATE 34 CEMENT 35 ROOFING SHINGLES 36 OTHER _____ 96 (SPECIFY)				२०८	**छानोको मुख्य सामाग्री** **(अवलोकन गरेर याकीन गर्नुहोस ।)**	**प्राकृतिक छानो** छाना नभएको ११ फुसको (परालरछ्वालीरखररस्याउला) १२ **साधारण छानो** गुन्द्रीरमान्द्रा २१ बांस २२ फल्याक र काठ २३ कार्डबोर्ड २४ **परिस्कृत छानो** टिनरजस्ता पाता ३१ काठ ३२ सिमेन्टको जस्ता आकारको छानो (एस्वेष्टोस्) ३३ टायल, ढुंगा, खपडा, झिंगटी ३४ सिमेन्ट ३५ काठको टायल ३६ अन्य _____ ९६ (खुलाउनुहोस)			

NO.	QUESTION	CODING CATEGORIES	SKIP
209	MAIN MATERIAL OF THE EXTERIOR WALLS. RECORD OBSERVATION.	NATURAL WALLS NO WALLS 11 CANE/PALM/TRUNKS 12 MUD/SAND 13 RUDIMENTARY WALLS BAMBOO WITH MUD 21 STONE WITH MUD 22 PLYWOOD 23 CARDBOARD 24 REUSED WOOD 25 FINISHED WALLS CEMENT 31 STONE WITH LIME/CEMENT 32 BRICKS 33 CEMENT BLOCKS 34 WOOD PLANKS 35 OTHER _____ 96 (SPECIFY)	
210	Does any member of this household own any agricultural land?	YES 1 NO 2	→212
211	How many kattha/bighas/ropani of agricultural land do members of this household own? CIRCLE '1' FOR KATTHA, '2' FOR BIGHAS AND '3' FOR ROPANI	KATTHA 1 ___ ___ BIGHAS 2 ___ ___ ROPANI 3 ___ ___ 99 OR MORE BIGHAS/ROPANI 995 DON'T KNOW 998	
212	Does this household own any livestock, herds, other farm animals, or poultry?	YES 1 NO 2	→214

सि.न	प्रश्न	संकेतको वर्गिकरण	मा जाने
२०९	**बाहिरी भित्ता को मुख्य सामाग्री** **(अवलोकन गरेर यकीन गर्नुहोस ।)**	**प्राकृतिक भित्तो** भित्तो नभएको ११ वेत,सन्टी,सिर्कना र हांगाविगां १२ माटोरबालुवा १३ **साधारण भित्ता** बांस र माटो २१ ढुंगा र माटो २२ प्लाईउड २३ कार्डबोर्ड २४ पुरानो (पुनः प्रयोग गरेको) काठ २५ **पक्की भित्ता** सिमेन्ट ढुंगा र सिमेन्ट ३२ इंटा ३३ सिमेन्ट ब्लक ३४ काठको टायल ३५ अन्य _____ ९६ (खुलाउनुहोस)	
२१०	तँपाईको घरपरीवारको कुनै सदश्यको नाममा खेती योग्य जमिन छ?	छ १ छैन २	→ २१२
२११	तपाईको घरपरिवारको सदस्यहरुको नाममा जम्मा कति जग्गारजमिन छ ? **(कठ्ठाको लागि १, विगाहाको लागि २ र रोपनीको लागि३ मा गोलो चिन्ह लगाएर उत्तर लेख्ने ।)**	कठ्ठा १ ___ ___ विगाहा. २ ___ ___ रोपनी ३ ___ ___ ९९विगाह,रोपनी वा सो भन्दा वढी थाहा छैन ९९५ ९९८	
२१२	यस घरपरिवारसंग कुनै जन्तुरजनावर वा पशुरपंक्षि कति छन् ?	छन् १ छैनन् २	→ २१४

NO.	QUESTION	CODING CATEGORIES	SKIP	सि.न	प्रश्न	संकेतको वर्गिकरण	मा जाने
213	How many of the following animals does this household own? IF NONE, ENTER '00'. IF MORE THAN 95, ENTER '95'. IF UNKNOWN, ENTER '98'. Buffalo Milk cows/bulls or oxen? Horses, donkeys, or mules? Goats? Sheep? Chickens? Ducks? Pigs Yaks?	BUFFALO ___ ___ COWS/BULLS/OXEN ___ ___ HORSES/DONKEYS/MULES ___ ___ GOATS ___ ___ SHEEP ___ ___ CHICKENS ___ ___ DUCKS ___ ___ PIGS ___ ___ YAKS ___ ___		२१३	यस घरपरिवारसंग तलका जन्तु, जनावर वा पशुरपंक्षि कति छन् ? (यदि छैन भने ०० लेख्ने । यदि ९५ भन्दा बढी भए ९५ लेख्ने । थाहा छैन भने ९८ लेख्ने ।) भैंसी? दुहुनो गाइ, गोरु र बयल? घोडा, गधा या खच्चर? बाखा, खसी, बोका? भेडा? कुखुरा? हांस? सुंगुर या बंगुर? याक या चौरी?	भैंसी ___ ___ दुहुनो गाइ, गोरु र बयल ___ ___ घोडा, गधा या खच्चर ___ ___ बाखा, खसी, बोका ___ ___ भेडा ___ ___ कुखुरा ___ ___ हांस ___ ___ सुंगुर या बंगुर ___ ___ याक या चौरी ___ ___	
214	What is the main occupation of the household head?	EMPLOYED AGRICULTURAL 11 EMPLOYED NON AGRICULTURAL 12 SELF-EMPLOYED AGRICULTURAL 21 SELF-EMPLOYED NON AGRICULTURAL 22 LOOKING FOR WORK 31 NOT WORKING AND NOT LOOKING TO WORK 95 OTHER _____ 96 (SPECIFY)		२१४	घरमुलीको मुख्य पेशा के हो?	कृषि सम्बन्धि काममा जागीरे ११ गैर कृषि जागीरे १२ आफ्नै खेतीमा काम गर्ने २१ र कृषिग जगारी २२ कामको खोजीमा रहेको ३१ काम नगरेको र खोजी पनि नगरेको ९५ अन्य _____ ९६ (खुलाउनुहोस)	
215	How much money (cash) comes to the household from all sources in a typical month? IF HESISTANT, ASK: How much money came to the household last month?	AMOUNT: ___ ___ ___ ___ ___ ___ ___ NRS DON'T KNOW 9999998		२१५	आम्दानीका सवै श्रोत बाट महिनामा सालाखाला कति जति रुपैंया घरमा भित्रीन्छ? (**जबाफ दिन अलमल गरेमा** अघिल्लो महिना घरमा कति पैसा आयो सोध्नु होस)	रकम: ___ ___ ___ ___ ___ ___ ___ रु थहा छैन ९९९९९९८	

NO.	QUESTION	CODING CATEGORIES	SKIP	सि.न	प्रश्न	संकेतको वर्गिकरण	मा जाने
216	How long does it take you to walk from your house to the district (zonal) hospital?	LESS THAN1 HOUR 1 BETWEEN 1 TO 4 HOURS 2 BETWEEN 4 HOURS TO 1 DAY 3 MORE THAN 1 DAY 4 DON'T KNOW 8		२१६	तँपाईको घर वाट जिल्ला/अञ्चल अस्पताल सम्म हिंडेरै पुग्न कति समय लाग्छ?	एक घण्टा भन्दा कम १ एक देखि चार घण्टा सम्म २ चर घण्टा देखि एक दिन सम्म ३ एक दिन भन्दा बढि ४ थहा छैन ८	
217	What is your nearest government health facility which provides delivery care services?	HEALTH POST 1 PRIMARY HEALTH CARE CENTRE 2 DISTRICT HOSPTIAL 3 ZONAL HOSPITAL 4	→ 301	२१७	तँपाई घर वाट सबै भन्दा नजिकै पर्ने प्रसूती स्याहार सेवा प्रदान गर्ने स्वास्थ्य संस्था कुन हो?	हेल्थ पोष्ट १ प्राथमिक स्वास्थ्य केन्द्र २ जिल्ला अस्पताल ३ अञ्चल अस्पताल ४	→ ३०१
218	How long does it take you to walk from your house to this health facility? ENTER DAYS / HOURS / MINUTES IF UNKNOWN, ENTER '98 / 98 / 98'.	TIME TO WALK ___ ___/___ ___/___ ___		२१८	तँपाईको घर वाट माथि उल्लेख गर्नु भएको स्वास्थ्य संस्था सम्म हिंडेरै पुग्न कति बेर लाग्छ? **(दिन/घण्टा/मिनेट उल्लेख गर्नु होस यदि थहा नभएको भए, ९८/९८/९८ लेख्नुहोस)**	हिंडन लाग्ने समय ___ ___/___ ___/___ ___	

SECTION 3: AWARENESS OF MATERNITY INCENTIVE SCHEME

NO.	QUESTION	CODING CATEGORIES	SKIP
	READ TO RESPONDENT In July 2005 the Government began a health programme to encourage women to deliver their baby in a government health institution. It is called the Maternity Incentive Scheme. When a woman delivers her baby in a health institution, the health worker gives the woman cash (500 NRS in the terai, 1000 NRS in hills districts and 1500 NRS in mountain districts) before she leaves to go home.		
301	Have you ever heard about the Maternity Incentive Scheme, which I just described to you?	YES 1 NO 2	→401
302	How did you first hear about the scheme?	FRIENDS/RELATIVES 01 FCHV 02 OTHER HEALTH WORKER 03 TELEVISION 04 RADIO 05 NEWSPAPER 06 WOMEN'S GROUP 07 TBA 08 OTHER _____ (SPECIFY) 96 DON'T KNOW 98	
303	Do you know anyone, such as friends or neighbours, who has received this money when she delivered in government health institution?	YES 1 NO 2	

सि.न	प्रश्न	संकेतको वर्गिकरण	मा जाने
	उत्तरदाता लाई पढेर सुनाउनुहोस सरकारी स्वास्थ्य संस्थामा गएर बच्चा जन्माउन उत्प्रेरीत गर्ने उद्धेश्यले, २०६२ को साउन महिना देखी सरकारले सुत्केरी महिलाहरुलाई भत्ता दिने एक स्वास्थ्य कार्यक्रमको शुरुवात गरेको थियो । महिलाले स्वास्थ्य संस्थामा बच्चा जन्माएपछि घर जानको लागि स्वास्थ्य संस्थाबाट छुट्टी हुने बेलामा स्वास्थ्य कर्मिले महिलालाई (तराइ मा रु ५००, पहाडमा रु १००० र हिमाली क्षेत्रमा रु १५००) प्रदान गर्छन ।		
३०१	मैले भरखरै भने अनुसारको सुत्केरी भत्ताको वारेमा तँपाईले कहिल्यै सुन्नु भएको थियो?	थिंए १ थिएन २	→४०१
३०२	सबै भन्दा पहिले भत्ताको वारेमा कसरी सुन्नु भयो?	साथी या नातेदार ०१ महिला स्वास्थ्य स्वंयसेविका ०२ अन्य स्वास्थ्य कर्मी ०३ टेलिभिजन ०४ रेडियो ०५ पत्रपत्रिका ०६ महिला समूह ०७ सुंडेनी ०८ अन्य _____ (खुलाउनुहोस) ९६ थहा छैन ९८	
३०३	तँपाईका साथी या छिमेकी मध्ये कसैले सरकारी स्वास्थ्य संस्थामा सुत्केरी भए पछि भत्ता रकम पाएका तँपाई लाई थहा छ?	छ १ छैन २	

SECTION 4: PREGNANCY HISTORY AND EXPERIENCE OF MATERNITY INCENTIVE SCHEME

NO.	QUESTION	CODING CATEGORIES	SKIP
401	How many children have you ever given birth to that were either alive or dead at the time of birth?	NUMBER OF CHILDREN ___ ___	
402	How many children have you given birth to in the last three years that were either alive or dead at the time of birth?	NUMBER OF CHILDREN ___	

सि.न	प्रश्न	संकेतको वर्गिकरण	मा जाने
४०१	अहिले सम्म जिउदै या मरेका सबै गरेर कति जना बच्चालाई जन्म दिनु भयो?	बच्चाको संख्या ___ ___	
४०२	गएको ३ वर्षमा जिउदै या मरेका कति बच्चालाई जन्म दिनु भयो?	बच्चाको संख्या ___ ___	

READ TO RESPONDENT
Now I would like to ask you some questions about all your previous deliveries since the start of 2062. We will talk about each one separately, starting with the most recent delivery.

उत्तरदाता लाइ पढेर सुनाउनु होस
अब म तँपाई संग २०६२ को सुरु देखि अहिले सम्म तँपाईले जन्माउनु भएका बच्चाहरुको बारेमा केहि प्रश्नहरु गर्न चाहन्छु। सबै भन्दा पछिल्लो सुत्केरी बाट सुरु गरेर सबै सुत्केरी बारेमा सोध्दै जान्छु।

NO.	QUESTION	LAST BIRTH	NEXT TO LAST BIRTH	2ND FROM LAST BIRTH
403	When you were pregnant, how many living children did you have at the time?	CHILDREN ___ ___	CHILDREN ___ ___	CHILDREN ___ ___
404	In what month and year did the delivery take place?	MONTH ___ ___ YEAR ___ ___ ___ ___	MONTH ___ ___ YEAR ___ ___ ___ ___	MONTH ___ ___ YEAR ___ ___ ___ ___

सि.न	प्रश्न	अघिल्लो जन्म	त्यो भन्दा पहिलेको	त्यो भन्दा पनि अघिल्लो
४०३	तँपाई गर्भबती हुदां कति जना जिउदै बच्चाहरु थिए?	बच्चा ___ ___	बच्चा ___ ___	बच्चा ___ ___
४०४	तँपाई कुन महिनामा सुत्केरी हुनु भएको थियो?	महिना ___ ___ वर्ष ___ ___ ___ ___	महिना ___ ___ वर्ष ___ ___ ___ ___	महिना ___ ___ वर्ष ___ ___ ___ ___

NO.	QUESTION	LAST BIRTH	NEXT TO LAST BIRTH	2ND FROM LAST BIRTH	सि.न	प्रश्न	अघिल्लो जन्म	त्यो भन्दा पहिलेको	त्यो भन्दा पनि अघिल्लो
405	Where did the delivery take place? PROBE TO IDENTIFY THE TYPE OF PLACE AND CIRCLE THE APPROPRIATE CODE. WRITE NAME OF FACILITY __________	HOME YOUR HOME 11 OTHER HOME 12 IN THE FIELD 13 GOVT SECTOR GOVT HOSPITAL 21 PHC CENTER 22 HEALTH POST 23 SUB-HEALTH POST 24 OTHER GOVT 26 __________ (SPECIFY) NON-GOVT SECTOR UMN/RED CROSS 31 OTHER GOVT 36 __________ (SPECIFY) PRIVATE MED SECTOR PVT HOSPITAL/ CLINIC 41 OTHER PRIVATE MED 46 __________ (SPECIFY) OTHER 96 __________ (SPECIFY)	HOME YOUR HOME 11 OTHER HOME 12 IN THE FIELD 13 GOVT SECTOR GOVT HOSPITAL 21 PHC CENTER 22 HEALTH POST 23 SUB-HEALTH POST 24 OTHER GOVT 26 __________ (SPECIFY) NON-GOVT SECTOR UMN/RED CROSS 31 OTHER GOVT 36 __________ (SPECIFY) PRIVATE MED SECTOR PVT HOSPITAL/ CLINIC 41 OTHER PRIVATE MED 46 __________ (SPECIFY) OTHER 96 __________ (SPECIFY)	HOME YOUR HOME 11 OTHER HOME 12 IN THE FIELD 13 GOVT SECTOR GOVT HOSPITAL 21 PHC CENTER 22 HEALTH POST 23 SUB-HEALTH POST 24 OTHER GOVT 26 __________ (SPECIFY) NON-GOVT SECTOR UMN/RED CROSS 31 OTHER GOVT 36 __________ (SPECIFY) PRIVATE MED SECTOR PVT HOSPITAL/ CLINIC 41 OTHER PRIVATE MED 46 __________ (SPECIFY) OTHER 96 __________ (SPECIFY)	४०५	तँपाईले वच्चा कहां जन्माउनु भयो? **सुत्केरी भएको स्थान पत्ता लगाउन थप प्रश्न गर्नु होस र उपयुक्त संकेतमा गोलो लगाउनु होस ।** **स्वास्थ्य संस्थाको नाम लेख्नु होस ।** __________	**घर** आफ्नै ११ अरुकै १२ खेतीपाती १३ **सरकारी क्षेत्र** सरकारी अस्पताल २१ प्रास्वाके २२ हेपो २३ उस्वाचौ २४ अन्य सरकारी २६ __________ (खुलाउनुहोस) **गैसस क्षेत्र** युएमएन/रेडकस ३१ अन्य गैसस ३६ __________ (खुलाउनुहोस) **नीजी क्षेत्र** नीजी अस्पताल /क्लिनीक ४१ अन्य नीजी सेवा केन्द्र ४६ __________ (खुलाउनुहोस) अन्य कुनै ९६ __________ (खुलाउनुहोस)	**घर** आफ्नै ११ अरुकै १२ खेतीपाती १३ **सरकारी क्षेत्र** सरकारी अस्पताल २१ प्रास्वाके २२ हेपो २३ उस्वाचौ २४ अन्य सरकारी २६ __________ (खुलाउनुहोस) **गैसस क्षेत्र** युएमएन/रेडकस ३१ अन्य गैसस ३६ __________ (खुलाउनुहोस) **नीजी क्षेत्र** नीजी अस्पताल /क्लिनीक ४१ अन्य नीजी सेवा केन्द्र ४६ __________ (खुलाउनुहोस) अन्य कुनै ९६ __________ (खुलाउनुहोस)	**घर** आफ्नै ११ अरुकै १२ खेतीपाती १३ **सरकारी क्षेत्र** सरकारी अस्पताल २१ प्रास्वाके २२ हेपो २३ उस्वाचौ २४ अन्य सरकारी २६ __________ (खुलाउनुहोस) **गैसस क्षेत्र** युएमएन/रेडकस ३१ अन्य गैसस ३६ __________ (खुलाउनुहोस) **नीजी क्षेत्र** नीजी अस्पताल /क्लिनीक ४१ अन्य नीजी सेवा केन्द्र ४६ __________ (खुलाउनुहोस) अन्य कुनै ९६ __________ (खुलाउनुहोस)

NO.	QUESTION	LAST BIRTH	NEXT TO LAST BIRTH	2ND FROM LAST BIRTH	सि.न	प्रश्न	अघिल्लो जन्म	त्यो भन्दा पहिलेको	त्यो भन्दा पनि अघिल्लो
406	Who assisted the delivery? Anyone else? PROBE FOR THE TYPE(S) OF PERSON(S) AND RECORD ALL MENTIONED. IF RESPONDENT SAYS NO ONE ASSISTED, PROBE TO DETERMINE WHETHER ANY ADULTS WERE PRESENT AT THE DELIVERY.	HEALTH PERSONNEL DOCTOR A NURSE/ MIDWIFE B HEALTH ASST / HLTH WRK C OTHER PERSON TRADITIONAL BIRTH ATTENDANT D FCHV E RELATIVE/FRIEND F OTHER X _____ (SPECIFY) NO ONE Y	HEALTH PERSONNEL DOCTOR A NURSE/ MIDWIFE B HEALTH ASST / HLTH WRK C OTHER PERSON TRADITIONAL BIRTH ATTENDANT D FCHV E RELATIVE/FRIEND F OTHER X _____ (SPECIFY) NO ONE Y	HEALTH PERSONNEL DOCTOR A NURSE/ MIDWIFE B HEALTH ASST / HLTH WRK C OTHER PERSON TRADITIONAL BIRTH ATTENDANT D FCHV E RELATIVE/FRIEND F OTHER X _____ (SPECIFY) NO ONE Y	४०६	तँपाई सुत्केरी हुदां कसले सहयोग गरेको थियो? अन्य कसैले? सहयोग गर्ने बिभिन्न प्रकारको ब्यक्तिको लागि आवश्यक परेमा थप प्रश्न गर्नु होस र सबै उत्तरहरु टिप्नु होस यदि कसैले पनि सहयोग गरेनन भन्ने उत्तर दिएमा, सुत्केरी हुने बेलामा कुनै बयस्क ब्यक्ति साथमा भए नभएको यकिन गर्न थप प्रश्न गर्नु होस	स्वास्थ्य कर्मि डाक्टर A नर्स/मिडवाइफ B हे.अस्वा.का C अन्य ब्यक्तिहरु सुडेनी D स्वयंसेविका E नातेदार/साथी F अन्य X _____ (खुलाउनुहोस) कोहि पनि थिएन Y	स्वास्थ्य कर्मि डाक्टर A नर्स/मिडवाइफ B हे.अस्वा.का C अन्य ब्यक्तिहरु सुडेनी D स्वयंसेविका E नातेदार/साथी F अन्य X _____ (खुलाउनुहोस) कोहि पनि थिएन Y	स्वास्थ्य कर्मि डाक्टर A नर्स/मिडवाइफ B हे.अस्वा.का C अन्य ब्यक्तिहरु सुडेनी D स्वयंसेविका E नातेदार/साथी F अन्य X _____ (खुलाउनुहोस) कोहि पनि थिएन Y
407	Did you have any of the following serious problems during the pregnancy or during childbirth:	YES NO	YES NO	YES NO	४०७	तँपाई गर्भवती हुदां या सुत्केरी हुदा तलका मध्ये कुनै गम्भीर समस्या देखा परेको थियो	थियो थिएन	थियो थिएन	थियो थिएन
	Vaginal bleeding?	1 2	1 2	1 2		रक्तश्राव?	१ २	१ २	१ २
	Fits or convulsions?	1 2	1 2	1 2		कम्पन?	१ २	१ २	१ २
	Obstructed labour / baby was stuck?	1 2	1 2	1 2		अवरोध युक्त?	१ २	१ २	१ २
	Placenta was stuck?	1 2	1 2	1 2		साल अडकिएको?	१ २	१ २	१ २
	Fever and very sick?	1 2	1 2	1 2		ज्वरो?	१ २	१ २	१ २
	Swollen face?	1 2	1 2	1 2		मुख सुन्नीएको?	१ २	१ २	१ २
408	How was the baby delivered? PROBE FOR HOW THE BABY WAS DELIVERED.	NORMALLY 1 FORCEPS/VACUUM 2 OPERATIVELY 3 DON'T KNOW 8	NORMALLY 1 FORCEPS/VACUUM 2 OPERATIVELY 3 DON'T KNOW 8	NORMALLY 1 FORCEPS/VACUUM 2 OPERATIVELY 3 DON'T KNOW 8	४०८	बच्चा कसरी जन्माईएको थियो? बच्चा कसरी जँमीएको थियो भनी थप प्रश्न गर्नु होस.	साधारण (आँफै) १ औजारको प्रयोग/भ्याकुम २ अपरेसन ३ थहा छैन ८	साधारण (आँफै) १ औजारको प्रयोग/भ्याकुम २ अपरेसन ३ थहा छैन ८	साधारण (आँफै) १ औजारको प्रयोग/भ्याकुम २ अपरेसन ३ थहा छैन ८
409	CHECK WHETHER THE WOMAN IS AWARE OF THE MATERNITY INCENTIVE SCHEME. TICK APPROPRIATE BOX.	CHECK 301: AWARE OF MIS ☐→ Q410 NOT AWARE OF MIS ☐→ Q411	CHECK 301: AWARE OF MIS ☐→ Q410 NOT AWARE OF MIS ☐→ Q411	CHECK 301: AWARE OF MIS ☐→ Q410 NOT AWARE OF MIS ☐→ Q411	४०९	सुत्केरी भत्ताको बारेमा थहा भए नभएको यकिन गर्नुहोस । उपयुक्त कोष्ठमा चिन्ह लगाउनु होस ।	यकिन गरेको:३०१ सुत्केरी भत्ताको जानकारी छ ☐→ ४१० जानाकारी छैन ☐→ ४११	यकिन गरेको:३०१ सुत्केरी भत्ताको जानकारी छ ☐→ ४१० जानाकारी छैन ☐→ ४११	यकिन गरेको:३०१ सुत्केरी भत्ताको जानकारी छ ☐→ ४१० जानाकारी छैन ☐→ ४११

NO.	QUESTION	LAST BIRTH	NEXT TO LAST BIRTH	2ND FROM LAST BIRTH	सि.न	प्रश्न	अघिल्लो जन्म	त्यो भन्दा पहिलेको	त्यो भन्दा पनि अघिल्लो
410	If you think back to when you were pregnant with this baby, did you know about the Maternity Incentive Scheme at that time?	YES 1 NO 2 CAN'T REMEMBER 3	YES 1 NO 2 CAN'T REMEMBER 3	YES 1 NO 2 CAN'T REMEMBER 3	४१०	एकै छिन पुरानो कुरा संझनु होस र भन्नु होस कि तँपाई गर्भवती हुदां सुत्केरी भत्ताको बारेमा थहा थियो?	थियो १ थिएन २ संझना भएन ३	थियो १ थिएन २ संझना भएन ३	थियो १ थिएन २ संझना भएन ३
411	CHECK WETHER WOMAN DELIVERED IN A GOVERNMENT HEALTH INSTITUTION TICK APPROPRIATE BOX.	CHECK 405: DELIVERED IN GOVT FACILITY → Q412 DID NOT DELIVER IN GOVT FACILITY → Q425	CHECK 405: DELIVERED IN GOVT FACILITY → Q412 DID NOT DELIVER IN GOVT FACILITY → Q425	CHECK 405: DELIVERED IN GOVT FACILITY → Q412 DID NOT DELIVER IN GOVT FACILITY → Q425	४११	**सरकारी स्वास्थ्य संस्थामा सुत्केरी भए नभएको यकिन गर्नु होस** **उपयुक्त कोष्ठमा चिन्ह लगाउनु होस ।**	यकिन गरेको ४०५ सरकारी स्वास्थ्य संस्थामा सुत्केरी गराएको हो → ४१२ गराएको होइन → ४२५	यकिन गरेको ४०५ सरकारी स्वास्थ्य संस्थामा सुत्केरी गराएको हो → ४१२ गराएको होइन → ४२५	यकिन गरेको ४०५ सरकारी स्वास्थ्य संस्थामा सुत्केरी गराएको हो → ४१२ गराएको होइन → ४२५
412	Did you have to pay anything when you delivered in the health institution? PROBE: Did you pay for the consultation / user fee?	YES 1 NO 2 DON'T KNOW 8	YES 1 NO 2 DON'T KNOW 8	YES 1 NO 2 DON'T KNOW 8	४१२	तँपाईले स्वास्थ्य संस्थामा सुत्केरी गरांउदा कुनै रकम तीर्नु परेको थियो? **(सेवा शुल्क या परामर्ष शुल्क तिर्न परे नपरेको यकिन गर्न थप प्रश्न गर्नु होस)**	थियो १ थिएन २ थहा छैन ८	थियो १ थिएन २ थहा छैन ८	थियो १ थिएन २ थहा छैन ८
413	At any time after you gave birth did you receive any cash from the government as part of the maternity incentive scheme?	YES 1 NO, CLAIMED ONLY 2 → Q421 NO, NOT CLAIMED 3 → Q421	YES 1 NO, CLAIMED ONLY 2 → Q421 NO, NOT CLAIMED 3 → Q421	YES 1 NO, CLAIMED ONLY 2 → Q421 NO, NOT CLAIMED 3 → Q421	४१३	तँपाईले बच्चा जन्माइसके पछि कुनै पनि बेला सुत्केरी भत्ताको रुपमा सरकार बाट नगद भुक्तानी पाउनु भएको थियो?	पाएको १ पाएको छैन, माग गरेको छ २ → ४२१ पाएको छैन, माग गरेको छैन ३ → ४२१	पाएको १ पाएको छैन, माग गरेको छ २ → ४२१ पाएको छैन, माग गरेको छैन ३ → ४२१	पाएको १ पाएको छैन, माग गरेको छ २ → ४२१ पाएको छैन, माग गरेको छैन ३ → ४२१
414	Was the money deducted from your service fee? PROBE FOR WHETHER MONEY WAS FULLY OR PARTLY DEDUCTED	FULLY DEDUCTED 1 → Q421 PART DEDUCTED 2 NO 3 DON'T KNOW 8	FULLY DEDUCTED 1 → Q421 PART DEDUCTED 2 NO 3 DON'T KNOW 8	FULLY DEDUCTED 1 → Q421 PART DEDUCTED 2 NO 3 DON'T KNOW 8	४१४	तँपाई लाई सुत्केरी भत्ता दिंदा सेवा शुक वापतको रकम कटाएर दिएको थियो? **सत्केरी भत्ता बाट पुरै वा केही रकम कटाए नकटाए यकिन गर्न थप प्रश्न गर्नु होस ।**	पुरै कटाएको १ → ४२१ केहि अंश कटाएको २ कटाएको थिएन ३ थहा छैन ८	पुरै कटाएको १ → ४२१ केहि अंश कटाएको २ कटाएको थिएन ३ थहा छैन ८	पुरै कटाएको १ → ४२१ केहि अंश कटाएको २ कटाएको थिएन ३ थहा छैन ८
415	How much money did you receive?	___ ___ ___ ___ NRS	___ ___ ___ ___ NRS	___ ___ ___ ___ NRS	४१५	कति रुपैया पाउनु भएको थियो?	___ ___ ___ ___ रु	___ ___ ___ ___ रु	___ ___ ___ ___ रु

NO.	QUESTION	LAST BIRTH	NEXT TO LAST BIRTH	2ND FROM LAST BIRTH	सि.न	प्रश्न	अघिल्लो जन्म	त्यो भन्दा पहिलेको	त्यो भन्दा पनि अघिल्लो
416	Who was actually given the money?	WOMAN 1 HUSBAND 2 MOTHER-IN-LAW 3 OTHER RELATIVE 4 FRIEND 5 OTHER 6 (SPECIFY) DON'T KNOW 8	WOMAN 1 HUSBAND 2 MOTHER-IN-LAW 3 OTHER RELATIVE 4 FRIEND 5 OTHER 6 (SPECIFY) DON'T KNOW 8	WOMAN 1 HUSBAND 2 MOTHER-IN-LAW 3 OTHER RELATIVE 4 FRIEND 5 OTHER 6 (SPECIFY) DON'T KNOW 8	४१६	वास्तवमा सुत्केरी भत्ताको रकम कस्लाई दिइएको थियो?	महिला १ श्रीमान २ सासू ३ अन्य नातेदार ४ साथी ५ अन्य ६ (खुलाउनुहोस) थहा छैन ८	महिला १ श्रीमान २ सासू ३ अन्य नातेदार ४ साथी ५ अन्य ६ (खुलाउनुहोस) थहा छैन ८	महिला १ श्रीमान २ सासू ३ अन्य नातेदार ४ साथी ५ अन्य ६ (खुलाउनुहोस) थहा छैन ८
417	Did you receive the cash at the health facility or later?	AT FACILITY 1 → Q419 LATER DATE 2	AT FACILITY 1 → Q419 LATER DATE 2	AT FACILITY 1 → Q419 LATER DATE 2	४१७	तँपाईले नगद भुक्तानी स्वास्थ्य संस्था मा पाउनु भयो कि पछि मात्र?	स्वास्थ्य संस्थामा १ → ४१९ पछि २	स्वास्थ्य संस्थामा १ → ४१९ पछि २	स्वास्थ्य संस्थामा १ → ४१९ पछि २
418	How long did you have to wait after you delivered until you received the cash? ENTER DAYS / WEEKS / MONTHS IF UNKNOWN, ENTER '8 / 98 / 98'.	DAYS __ WEEKS __ __ MONTHS __ __	DAYS __ WEEKS __ __ MONTHS __ __	DAYS __ WEEKS __ __ MONTHS __ __	४१८	सुत्केरी भए पछि भत्ता पाउनकोलागि कति समय कुर्नु परको थियो? **(दिन/हप्ता/महिना नोट गनु होस। यदि थहा छैन भन्ने उत्तर आएमा ८/९८/९८ लेख्नु होस।)**	दिन __ हप्ता __ __ महिना __ __	दिन __ हप्ता __ __ महिना __ __	दिन __ हप्ता __ __ महिना __ __
419	Were there any problems in the administrative process to receive the cash?	YES 1 NO 2 DON'T KNOW 8	YES 1 NO 2 DON'T KNOW 8	YES 1 NO 2 DON'T KNOW 8	४१९	नगद भुत्तानी लिन कुनै प्रशासकिय फमेला परेको थियो कि? (फमेलाको ब्याख्या गरीदिनुहोस)	थियो १ थिएन २ थहा छैन ८	थियो १ थिएन २ थहा छैन ८	थियो १ थिएन २ थहा छैन ८
420	What did your household spend most of the money on?	FOOD 01 ALCOHOL 02 TOBACCO 03 FUEL 04 DURABLE GOOD 05 DELIVERY EXPENSES 06 TRANSPORT 07 REPAY DEBT 08 CLOTHING 09 OTHER 96 (SPECIFY) DON'T KNOW 98	FOOD 01 ALCOHOL 02 TOBACCO 03 FUEL 04 DURABLE GOOD 05 DELIVERY EXPENSES 06 TRANSPORT 07 REPAY DEBT 08 CLOTHING 09 OTHER 96 (SPECIFY) DON'T KNOW 98	FOOD 01 ALCOHOL 02 TOBACCO 03 FUEL 04 DURABLE GOOD 05 DELIVERY EXPENSES 06 TRANSPORT 07 REPAY DEBT 08 CLOTHING 09 OTHER 96 (SPECIFY) DON'T KNOW 98	४२०	तँपाईको परीवार ले भत्ताको धेरै जसो पैसा के गर्न खर्च गरे?	खना ०१ रक्सी ०२ चुरोट ०३ इनधन ०४ खप्ने सामान ०५ सुत्केरी खर्च ०६ यातायात ०७ ऋण तीर्न ०८ कपडा ०९ अन्य ९६ (खुलाउनुहोस) थहा छैन ९८	खना ०१ रक्सी ०२ चुरोट ०३ इनधन ०४ खप्ने सामान ०५ सुत्केरी खर्च ०६ यातायात ०७ ऋण तीर्न ०८ कपडा ०९ अन्य ९६ (खुलाउनुहोस) थहा छैन ९८	खाना ०१ रक्सी ०२ चुरोट ०३ इनधन ०४ खप्ने सामान ०५ सुत्केरी खर्च ०६ यातायात ०७ ऋण तीर्न ०८ कपडा ०९ अन्य ९६ (खुलाउनुहोस) थहा छैन ९८

NO.	QUESTION	LAST BIRTH	NEXT TO LAST BIRTH	2ND FROM LAST BIRTH	सि.न	प्रश्न	अघिल्लो जन्म	त्यो भन्दा पहिलेको	त्यो भन्दा पनि अघिल्लो
421	CHECK WHETHER THE WOMAN WAS AWARE OF THE MATERNITY INCENTIVE SCHEME DURING PREGNANCY TICK APPROPRIATE BOX.	CHECK 410: AWARE OF MIS ☐→ Q422 NOT AWARE OF MIS ☐→ Q423	CHECK 410: AWARE OF MIS ☐→ Q422 NOT AWARE OF MIS ☐→ Q423	CHECK 410: AWARE OF MIS ☐→ Q422 NOT AWARE OF MIS ☐→ Q423	४२१	गर्भवती भएदेखीनै महिलालाई सुत्केरी भत्ताको बारेमा जानकारी थियो उपयुक्त कोठामा चिन्ह लगाउनु	यकिन गर्नुहोस ४१० भत्ताको जानकारी छ ☐→ ४२२ जानकारी छैन ☐→ ४२३	यकिन गर्नुहोस ४१० भत्ताको जानकारी छ ☐→ ४२२ जानकारी छैन ☐→ ४२३	यकिन गर्नुहोस ४१० भत्ताको जानकारी छ ☐→ ४२२ जानकारी छैन ☐→ ४२३
422	Where would you have delivered your baby if the government had not offered the cash? PROBE TO SEE IF SHE WOULD HAVE DELIVERED IN THE SAME PLACE (THE GOVERNMENT FACILITY) OR IN A DIFFERENT PLACE.	HOME YOUR HOME 11 OTHER HOME 12 IN THE FIELD 13 GOVT SECTOR GOVT HOSPITAL 21 PHC CENTER 22 HEALTH POST 23 SUB-HEALTH POST 24 OTHER GOVT 26 ________ (SPECIFY) NON-GOVT SECTOR UMN/RED CROSS 31 OTHER GOVT 36 ________ (SPECIFY) PRIVATE MED SECTOR PVT HOSPITAL/ CLINIC 41 OTHER PRIVATE MED 46 ________ (SPECIFY) OTHER 96 ________ (SPECIFY)	HOME YOUR HOME 11 OTHER HOME 12 IN THE FIELD 13 GOVT SECTOR GOVT HOSPITAL 21 PHC CENTER 22 HEALTH POST 23 SUB-HEALTH POST 24 OTHER GOVT 26 ________ (SPECIFY) NON-GOVT SECTOR UMN/RED CROSS 31 OTHER GOVT 36 ________ (SPECIFY) PRIVATE MED SECTOR PVT HOSPITAL/ CLINIC 41 OTHER PRIVATE MED 46 ________ (SPECIFY) OTHER 96 ________ (SPECIFY)	HOME YOUR HOME 11 OTHER HOME 12 IN THE FIELD 13 GOVT SECTOR GOVT HOSPITAL 21 PHC CENTER 22 HEALTH POST 23 SUB-HEALTH POST 24 OTHER GOVT 26 ________ (SPECIFY) NON-GOVT SECTOR UMN/RED CROSS 31 OTHER GOVT 36 ________ (SPECIFY) PRIVATE MED SECTOR PVT HOSPITAL/ CLINIC 41 OTHER PRIVATE MED 46 ________ (SPECIFY) OTHER 96 ________ (SPECIFY)	४२२	यदि सरकारले नगद भत्ता नदिने भए तंपाईले आफ्नो बच्चा कहाँ जन्माउनु हुन्थ्यो? उनले सरकारी स्वास्थ्य संस्थामै सुत्केरी गरांउथिन या अन्यत्र भन्ने कुराको यकिन गर्न आवश्यक परेमा थप प्रश्न गर्नुहोस ।	घर आफ्नै ११ अरुकै १२ खेतीवारी १३ सरकारी क्षेत्र सरकारी अस्पताल २१ प्रास्वाके २२ हेपो २३ उस्वाचौ २४ अन्य सरकारी २६ ________ (खुलाउनुहोस) गैसस क्षेत्र युएमएन/रेडकस ३१ अन्य गैसस ३६ ________ (खुलाउनुहोस) नीजी क्षेत्र नीजी अस्पताल /क्लिनीक ४१ अन्य नीजी सेवा केन्द ४६ ________ (खुलाउनुहोस) अन्य कुनै ९६ ________ (खुलाउनुहोस)	घर आफ्नै ११ अरुकै १२ खेतीवारी १३ सरकारी क्षेत्र सरकारी अस्पताल २१ प्रास्वाके २२ हेपो २३ उस्वाचौ २४ अन्य सरकारी २६ ________ (खुलाउनुहोस) गैसस क्षेत्र युएमएन/रेडकस ३१ अन्य गैसस ३६ ________ (खुलाउनुहोस) नीजी क्षेत्र नीजी अस्पताल /क्लिनीक ४१ अन्य नीजी सेवा केन्द ४६ ________ (खुलाउनुहोस) अन्य कुनै ९६ ________ (खुलाउनुहोस)	घर आफ्नै ११ अरुकै १२ खेतीपाती १३ सरकारी क्षेत्र सरकारी अस्पताल २१ प्रास्वाके २२ हेपो २३ उस्वाचौ २४ अन्य सरकारी २६ ________ (खुलाउनुहोस) गैसस क्षेत्र युएमएन/रेडकस ३१ अन्य गैसस ३६ ________ (खुलाउनुहोस) नीजी क्षेत्र नीजी अस्पताल /क्लिनीक ४१ अन्य नीजी सेवा केन्द ४६ ________ (खुलाउनुहोस) अन्य कुनै ९६ ________ (खुलाउनुहोस)

NO.	QUESTION	LAST BIRTH	NEXT TO LAST BIRTH	2ND FROM LAST BIRTH	सि.न	प्रश्न	अघिल्लो जन्म	त्यो भन्दा पहिलेको	त्यो भन्दा पनि अघिल्लो
423	When you went to the facility, how did you get there? CIRCLE ALL THAT APPLY	WALKED 01 CARRIED 02 AMBULANCE 03 OTHER VEHICLE 04 RICKSHAW 05 STRETCHER 06 DOKO 07 OTHER 96 (SPECIFY)	WALKED 01 CARRIED 02 AMBULANCE 03 OTHER VEHICLE 04 RICKSHAW 05 STRETCHER 06 DOKO 07 OTHER 96 (SPECIFY)	WALKED 01 CARRIED 02 AMBULANCE 03 OTHER VEHICLE 04 RICKSHAW 05 STRETCHER 06 DOKO 07 OTHER 96 (SPECIFY)	४२३	स्वास्थ्य संस्थां सम्म कसरी पुग्नु भयो? **(उपयुक्त सबै साधनमा चिन्ह लगाउनु होस ।)**	हिडेंर ०१ बोकाएर ०२ एम्बुलेन्समा ०३ अन्य गाडी ०४ रीक्सा ०५ स्ट्रेचर ०६ डोको ०७ अन्य ९६ (खुलाउनुहोस)	हिडेंर ०१ बोकाएर ०२ एम्बुलेन्समा ०३ अन्य गाडी ०४ रीक्सा ०५ स्ट्रेचर ०६ डोको ०७ अन्य ९६ (खुलाउनुहोस)	हिडेंर ०१ बोकाएर ०२ एम्बुलेन्समा ०३ अन्य गाडी ०४ रीक्सा ०५ स्टभेचर ०६ डोको ०७ अन्य ९६ (खुलाउनुहोस)
424	How long did it take to get to the health facility where you delivered from your home?	LESS THAN 1 HOUR 1 BETWEEN 1 TO 4 HOURS 2 MORE THAN 4 HOURS 3 GO TO → END	LESS THAN 1 HOUR 1 BETWEEN 1 TO 4 HOURS 2 MORE THAN 4 HOURS 3 GO TO → END	LESS THAN 1 HOUR 1 BETWEEN 1 TO 4 HOURS 2 MORE THAN 4 HOURS 3 GO TO → END	४२४	सुत्केरी गराएको स्वास्थ्य संस्था सम्म पुग्न कति समय लागेको थियो?	१ घण्टा भन्दा कम १ १ देखि ४ घण्टा सम्म् २ ४ घण्टा बढी ३ **प्रश्नको अन्त्य गर्नु होस**	१ घण्टा भन्दा कम १ १ देखि ४ घण्टा सम्म् २ ४ घण्टा बढी ३ **प्रश्नको अन्त्य गर्नु होस**	१ घण्टा भन्दा कम १ १ देखि ४ घण्टा सम्म् २ ४ घण्टा बढी ३ **प्रश्नको अन्त्य गर्नु होस**
424	CHECK WHETHER THE WOMAN WAS AWARE OF THE MATERNITY INCENTIVE SCHEME DURING PREGNANCY TICK APPROPRIATE BOX.	CHECK 410: AWARE OF MIS → END NOT AWARE OF MIS → 425	CHECK 408: AWARE OF MIS → 419 NOT AWARE OF MIS → 420	CHECK 408: AWARE OF MIS → 419 NOT AWARE OF MIS → 420	४२४	**गर्भवती भएदेखीनै महिलालाई सुत्केरी भत्ताको बारेमा जानकारी थियो** **उपयुक्त कोठामा चिन्ह लगाउनु**	यकिन गर्नु होस ४०८ भत्ता बारे जानकारी छ → ४१९ जानकारी छैन → ४२१	यकिन गर्नु होस ४१० भत्ता बारे जानकारी छ → (अन्त्य) जानकारी छैन → ४२६	यकिन गर्नु होस ४१० भत्ता बारे जानकारी छ → (अन्त्य) जानकारी छैन → ४२६

NO.	QUESTION	LAST BIRTH	NEXT TO LAST BIRTH	2^{ND} FROM LAST BIRTH	सि.न	प्रश्न	अघिल्लो जन्म	त्यो भन्दा पहिलेको	त्यो भन्दा पनि अघिल्लो
426	Where would you have delivered your baby if you had known that you would receive money from the government health institution (500 NRS TERAI / 1000 NRS HILL / 1500 NRS MOUNTAIN)?	HOME YOUR HOME 11 OTHER HOME 12 IN THE FIELD 13 GOVT SECTOR GOVT HOSPITAL 21 PHC CENTER 22 HEALTH POST 23 SUB-HEALTH POST 24 OTHER GOVT 26 _______ (SPECIFY) NON-GOVT SECTOR UMN/RED CROSS 31 OTHER GOVT 36 _______ (SPECIFY) PRIVATE MED SECTOR PVT HOSPITAL/ CLINIC 41 OTHER PRIVATE MED 46 _______ (SPECIFY) OTHER 96 _______ (SPECIFY)	HOME YOUR HOME 11 OTHER HOME 12 IN THE FIELD 13 GOVT SECTOR GOVT HOSPITAL 21 PHC CENTER 22 HEALTH POST 23 SUB-HEALTH POST 24 OTHER GOVT 26 _______ (SPECIFY) NON-GOVT SECTOR UMN/RED CROSS 31 OTHER GOVT 36 _______ (SPECIFY) PRIVATE MED SECTOR PVT HOSPITAL/ CLINIC 41 OTHER PRIVATE MED 46 _______ (SPECIFY) OTHER 96 _______ (SPECIFY)	HOME YOUR HOME 11 OTHER HOME 12 IN THE FIELD 13 GOVT SECTOR GOVT HOSPITAL 21 PHC CENTER 22 HEALTH POST 23 SUB-HEALTH POST 24 OTHER GOVT 26 _______ (SPECIFY) NON-GOVT SECTOR UMN/RED CROSS 31 OTHER GOVT 36 _______ (SPECIFY) PRIVATE MED SECTOR PVT HOSPITAL/ CLINIC 41 OTHER PRIVATE MED 46 _______ (SPECIFY) OTHER 96 _______ (SPECIFY)	४२६	नगद (रु ५००, १००० या १५००) पाइन्छ भन्ने थहा भएको भए तँपाई कहां सुत्केरी गराउनु हुन्थ्यो?	घर आफ्नै ११ अरुकै १२ खेतीपाती १३ सरकारी क्षेत्र सरकारी अस्पताल २१ प्रास्वाके २२ हेपो २३ उस्वाचौ २४ अन्य सरकारी २६ _______ (खुलाउनुहोस) गैसस क्षेत्र युएमएन/रेडकस ३१ अन्य गैसस ३६ _______ (खुलाउनुहोस) नीजी क्षेत्र नीजी अस्पताल /क्लिनीक ४१ अन्य नीजी सेवा केन्द्र ४६ _______ (खुलाउनुहोस) अन्य कुनै ९६ _______ (खुलाउनुहोस)	घर आफ्नै ११ अरुकै १२ खेतीपाती १३ सरकारी क्षेत्र सरकारी अस्पताल २१ प्रास्वाके २२ हेपो २३ उस्वाचौ २४ अन्य सरकारी २६ _______ (खुलाउनुहोस) गैसस क्षेत्र युएमएन/रेडकस ३१ अन्य गैसस ३६ _______ (खुलाउनुहोस) नीजी क्षेत्र नीजी अस्पताल /क्लिनीक ४१ अन्य नीजी सेवा केन्द्र ४६ _______ (खुलाउनुहोस) अन्य कुनै ९६ _______ (खुलाउनुहोस)	घर आफ्नै ११ अरुकै १२ खेतीपाती १३ सरकारी क्षेत्र सरकारी अस्पताल २१ प्रास्वाके २२ हेपो २३ उस्वाचौ २४ अन्य सरकारी २६ _______ (खुलाउनुहोस) गैसस क्षेत्र युएमएन/रेडकस ३१ अन्य गैसस ३६ _______ (खुलाउनुहोस) नीजी क्षेत्र नीजी अस्पताल /क्लिनीक ४१ अन्य नीजी सेवा केन्द्र ४६ _______ (खुलाउनुहोस) अन्य कुनै ९६ _______ (खुलाउनुहोस)

END OF QUESTIONNAIRE
THANKYOU

प्रश्नको शिलशिला समाप्त भयो
धन्यवाद

CODING

ETHNICITY / CASTE

01 = BRAHMIN
02 = CHHETRI
03 = DANUWAAR
04 = GHARTI
05 = GURUNG
06 = KAAMI
07 = KIRATI
08 = MAGAR
09 = MAJHI
10 = MASALMAN
11 = NEWAR
12 = PARIYAR
13 = PRAJA
14 = RAJBANSI
15 = SANYASI
16 = SARKI
17 = SATAR
18 = TAMANG
19 = THAKURI
20 = THARU
21 = OTHER
98 = DON'T KNOW

संकेत

जातजाती

०१ ब्राम्हण
०२ क्षेत्री
०३ दनुवार
०४ घर्ती
०५ गुरुङ्ग
०६ कामी
०७ किरांती
०८ मगर
०९ माझी
१० मुसलमान
११ नेवार
१२ परीयार
१३ प्रजा
१४ रानबंसी
१५ सन्यासी
१६ सार्की
१७ सतार
१८ तामाङ
१९ ठकुरी
२० थारु
२१ अन्य
९८ थहा छैन

APPENDIX A5

TOPIC GUIDE AND STRUCTURED QUESTIONNAIRE

FOR KEY INFORMANT INTERVIEWS

IN MAKWANPUR DISTRICT

Topic guide for in-depth interview

Introduce yourself, the purpose of the interview, and the approximate amount of time it may take.

1. In the past 3 years, there has been an increase in utilisation of institutional deliveries (deliveries taking place in health institutions) in Makwanpur. How do you explain this increase? Which of the factors you mention were most important and why?

2. What changes have been made to the provision of delivery care services in the district and nearby districts over the past 3 years? *Probe for both improvements in services and deteriorations in services, changes in health infrastructure (eg. new health facilities), health personnel, and availability of emergency and c-section services.*

3. When did these changes happen? *Probe particularly around whether there were major changes at the beginning of year 2062 when the SDIP started.*

4. What NGOs have worked in maternal health in the district (including your own) in the past 3 years and how do think each of these organisations has affected utilisation of health facilities?

5. How do you think the conflict (Maoist insurgency) has affected health in general and maternal health more specifically in the district over the past 3 years? *Probe how the conflict situation has changed in recent years and whether this has influenced health in the district.*

6. Have you heard of the Safe Delivery Incentive Programme – a government programme that provides women cash if they deliver in health facility? What is your understanding of the programme in Makwanpur? To what extent do you think this programme has encouraged women to deliver in health institutions?

7. Do you know of any other person(s) in the district who might be particularly knowledgeable about these issues we have just discussed?

Many thanks for your time. I would now like to record some further information.

Record review questionnaire

1. Respondents working in government

1. **What new or re-furbished government health facilities have been completed in the past 3 years in this district (since May 2005)?** Record the type of facility (PHCC, HP etc), when it was functional, and whether it provides delivery care services (specify normal or emergency delivery care).	
2. **What new private, NGO or mission health facilities have been opened in the past 3 years in this district (since May 2005)?** Record the type of facility (hospital, clinic), when it was functional, and whether it provides delivery care services (specify normal or emergency delivery care).	
3. **Can the district hospital provide emergency obstetric care (ie. surgery, vacuum extraction)?** Record what types of emergency obstetric procedures the district hospital can provide and when they were first able to provide them, including gaps in service.	
4. **Can you list the number of health personnel by type actually working in the district hospital over the past 3 years.** Record the types of health worker (surgeon, doctor, nurse, midwife only) and number of health workers working on average each financial year.	

5. **How many maternity beds has the district hospital had each year over the past 3 years?** Record number of maternity beds in each financial year 2062/63, 2063/64, 2064/65.	
6. **Do government health facilities provide free delivery care for women in this district?** If yes, record when they started doing this for each type of health facility. Also record what items are given for free – ie. registration fee, medicines, diagnostic test.	
7. **What was the district health budget (including the district hospital budget but excluding the SDIP budget) each financial year over the past 4 years?** Record the budget for each financial year.	
8. **What NGOs have been working in maternal health in this district in the past 3 years?** Record the name of the NGOs and their main activities (if known)	

2. Respondents working in other organisations (eg. NGOs)

Eligibility criteria: organisation was working on health related issues in Makwanpur district at any point over the period May 2004 to May 2006.

1. **What is the name of your organisation?** Record phone number.	
2. **What general activities related to health does your organisation carry out in this district, including the work you fund in other partner NGOs?** Record only the broad area of work.	
3. **When did your organisation start (and complete) these activities?** Record the start date (month / year)	
4. **Are (were) these health activities carried out in the entire district or specific areas of the district, such as individual VDCs.** If organisation works in specific VDCs, name each VDC. Only record area of health activities.	

5. **What population approximately are / were covered by your health activities in this district?**	
6. **Can you list more specifically what health related activities you have done in this district, including assistance given to health facilities, the DHO, and communities.** Ask to see programme documents for specific activities. Record the name and types of health facilities that have been supported.	
7. **What was your annual budget and approximate expenditure on health activities only each financial year over the past 4 years?** Record the amount each year in whatever currency they provide the financial information.	

APPENDIX A6

BMC HEALTH SERVICES RESEARCH

JOURNAL ARTICLE

BMC Health Services Research

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Research article

Open Access

The experiences of districts in implementing a national incentive programme to promote safe delivery in Nepal

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Abstract

Background: Nepal's Safe Delivery Incentive Programme (SDIP) was introduced nationwide in 2005 with the intention of increasing utilisation of professional care at childbirth. It provided cash to women giving birth in a health facility and an incentive to the health provider for each delivery attended, either at home or in the facility. We explored early implementation of the programme at the district-level to understand the factors that have contributed to its low uptake.

Methods: We conducted in ten study districts a series of key informant interviews and focus group discussions with staff from health facilities and the district health office and other stakeholders involved in implementation. Manual content analysis was used to categorise data under emerging themes.

Results: Problems at the central level imposed severe constraints on the ability of district-level actors to implement the programme. These included bureaucratic delays in the disbursement of funds, difficulties in communicating the policy, both to implementers and the wider public and the complexity of the programme's design. However, some district implementers were able to cope with these problems, providing reasons for why uptake of the programme varied considerably between districts. Actions appeared to be influenced by the pressure to meet local needs, as well individual perceptions and acceptance of the programme. The experience also sheds light on some of the adverse effects of the programme on the wider health system.

Conclusion: The success of conditional cash transfer programmes in Latin America has led to a wave of enthusiasm for their adoption in other parts of the world. However, context matters and proponents of similar programmes in south Asia should give due attention to the challenges to implementation when capacity is weak and health services inadequate.

Background

Programmes that provide monetary incentives conditional on households engaging in certain health seeking behaviours have been popular for the past decade, particularly in Latin America. Such programmes have been implemented at scale, and typically target poor families and children [1,2]. Conditional cash transfers can be an effective means to increase utilisation of preventive health services and, in some cases, improve health outcomes [3,4]. However, the literature also points to problems, including: the inefficiencies of paying some people to do what they would have done anyway [5]; the high administrative cost of programmes [6]; the potential for unintended effects [7]; and ethical concerns, such as those related to the promotion of permanent contraceptive methods [4].

Interest in using cash incentives to influence behaviour and promote the health of families has spread to south Asia. Progress in raising the low coverage of skilled birth attendance (ie. delivery attended by either a doctor, nurse or midwife) in the region has been slow [8] and it is against this backdrop of relative stagnation that Nepal, India and Bangladesh have adopted policies to provide financial incentives to women in an effort to encourage greater use of maternity services [9-11]. While these policies are not intended to act as a social safety net – they are more orientated towards behavioural change – they still share many of the same characteristics as conditional cash transfer programmes.

This paper reports the findings of a qualitative study describing implementation of Nepal's scheme to understand the factors that have hindered uptake of the programme. Nepal's Safe Delivery Incentives Programme (SDIP) (formerly known as the Maternity Incentives Scheme) was launched in 2005, with the aim of raising the coverage of skilled birth attendance. It marked a departure from past government policy that had tended to focus predominantly on service delivery without serious regard for demand side barriers. The establishment of the SDIP was a response to mounting evidence of the high cost faced by households trying to access care at childbirth [12] and the low coverage of skilled birth attendance, most recently estimated at 19 percent [13].

National implementation of the programme meant that there were few opportunities to pilot different implementation approaches and develop mechanisms to verify the eligibility of women, pay beneficiaries, and monitor the programme, elements deemed essential for implementation [1]. In countries like Nepal, with weak governance and limited capacity [14], the need for such systems is perhaps all the more vital. Concerns were also raised about the complexity of the programme and how this might affect implementation.

We aim to shed light on these issues and, more broadly, contribute to the small body of literature on health policy implementation in developing countries [15,16]. Our approach is broadly descriptive, seeking to identify what is happening in terms of the design, implementation, administration, and operation of the programme; whether it is expected; and the reasons behind why it is happening as it is [16,17]. We focused on the experiences of actors involved in the programme at the district level in order to give a bottom-up perspective of the implementation process. A description of the design of the programme and its implementation at the central level establishes the context in which district level actors were operating. An important part of the story, namely the formulation of the policy, has been described elsewhere [18].

Safe Delivery Incentives Programme

The SDIP sought to change the behaviour of both families and health workers though a package of financial incentives (table 1) that included: i) a conditional cash transfer to women; ii) an incentive to the health provider for each delivery attended; and iii) free health care, in addition to the conditional cash transfer, for those women from the 25 least developed districts [11]. There have been a number of changes made to the design of the SDIP since our study. Here, we describe the benefits and eligibility criteria that were in place during the study period – ie. the first 18 months of the programme.

Table 1: Financial incentives offered by the SDIP and the eligibility criteria

Financial incentive	Eligibility criteria
1. Conditional cash transfer to women • 500 NRS ($7.8) in plains districts • 1,000 NRS ($15.6) in hill districts • 1,500 NRS ($23.4) in mountain districts	Woman delivered in a public health facility and had no more than two living children or an obstetric complication (as diagnosed by the health provider)
2. Provider incentive • 300 NRS ($4.7) for each delivery attended	Doctor, nurse, midwife, health assistant, auxiliary health worker or maternal and child health worker attended a delivery at the woman's home or in a public health facility
3. Free delivery care to women and facility reimbursed • 1,000 NRS ($15.6) reimbursed to health facility	Woman comes from one of the 25 least developed districts and meets the eligibility criteria required for the conditional cash transfer

The SDIP offered cash to women giving birth in a public health facility. Money was to be paid by the health provider or accountant on discharge and the amount was set to reflect differences in accessibility to health facilities across the three main geographical regions of Nepal (table 1). In contrast to many performance-based payment schemes, the government chose to provide a universal conditional cash transfer rather than one targeted towards the poorest. This decision was driven by the desire to gain political popularity, as well as concerns about equity [18].

The SDIP intended to alleviate some of the transport costs of accessing care. The conditional cash transfer represented 30–50 percent of the mean transport cost incurred by a family seeking delivery care at a health facility [12]. Two groups of women were eligible to receive the money: i) women with up to two living children; and ii) women with any number of specified obstetric complications, irrespective of parity. The rationale for the first of these eligibility criteria was to avoid a risk of the SDIP increasing fertility. Clearly, the use of cash rather than a voucher system meant that money had to be transferred from the district health office to the health facility and, once there, securely kept. In many health centres with no accountant or bank account, this implied the handling of large sums of cash by health workers.

The SDIP also provided 300 NRS ($4.7) to health workers for each delivery attended. Surprisingly, perhaps, the provider incentive was given for deliveries attended both at the health facility and at home. Policymakers were anxious that the SDIP should not neglect home deliveries altogether, as it was unrealistic to expect the majority of women, even over the medium term, to deliver in health facilities given the current low coverage rate. However, this decision gave rise to a possible tension with the conditional cash transfer, on the one hand, incentivising institutional deliveries and the provider incentive, on the other hand, encouraging health workers to attend home deliveries. The policy specified the cadres of health worker eligible to receive the incentive, but was intentionally vague on whether or how the incentive should be shared amongst health workers, leaving the decision to the health facility management committee. Initially, auxiliary health workers were not eligible for the provider incentive, but after one year of widespread protests, the policy was changed to include them.

Free maternity care was available to women from the 25 least developed districts as an additional benefit to the conditional cash transfer. The policy stipulated that health facilities were to be given 1,000 NRS ($15.7) for each delivery provided free of charge, as a reimbursement to recover costs.

Central level implementation

The central government issued guidelines to each district health office, zonal hospital and regional hospital on the how the SDIP should be designed and implemented [11]. In some respects (eg. sharing of the provider incentive), the guidelines gave actors at the district level discretion over implementation. On other matters (eg. the eligibility criteria), they represented a set of regulations that were intended to be strictly applied. In the absence of training, the guidelines were the primary means by which the policy was communicated to implementers at the district level.

There were lengthy delays in the transfer of funds from the central level (including the donor) to the districts. On average, districts received funds earmarked for the SDIP 283 days late in the first fiscal year, and 147 days late in the second fiscal year [19]. To initiate implementation of the SDIP as quickly as possible, the central level government encouraged districts to start paying beneficiaries using funds from other budget lines or borrow money from local partners. Wary of raising expectations amongst the public before ensuring funds were available to pay beneficiaries, the central level programme managers chose not to publicise the SDIP with a national media campaign. To be precise, the SDIP's launch was publicly announced; however, there was no national information campaign explaining the benefits of the programme and who could benefit

Uptake of the programme

Available data suggest uptake of the programme in its first two years was, broadly speaking, low. The most reliable data, from a household survey carried out in six districts, indicate that 29 percent of eligible women received the conditional cash transfer at the time of childbirth and only 27 percent of women had any knowledge of the programme while they were pregnant [19]. There were found to be wide variations between districts, suggesting implementation has been more successful in some places than others. The proportion of eligible women receiving the cash ranged from 16 percent to 52 percent, while awareness during pregnancy varied from 22 percent to 40 percent. Over the same period, annual expenditure of the programme was $1.2 million with approximately 50 percent going to women recipients of the conditional cash transfer [20].

Methods

Study setting

Nepal is a geographically and ethnically diverse country that has suffered from political conflict and internal upheaval as the country moved from democracy to monarchy and now to an interim phase of political uncertainty [21]. Himalayan mountains border Tibet to the north,

and India borders the flat plains to the south. Gross national income per capita is $340 [22] and while female literacy is improving, 45 percent of women remain illiterate [13]. Nepal has a maternal mortality rate of 281 per 100,000 live births and a neonatal mortality rate of 33 per 1,000 live births, and only 19 percent of women deliver with a skilled birth attendant [13].

Study participants and data collection

The study was conducted in 10 districts of Nepal. We purposively sampled two mountain districts, four hill districts, and four plains districts to ensure that the variation in the SDIP's package of benefits across the three topographical regions was represented. In each district, we sampled five health institutions that were providing delivery care (one hospital, two primary health centres and two health posts). Health facilities were purposively selected to include two that were near to the district health office and two that were further away. In addition, two regional hospitals were sampled from other districts since our study districts contained no hospitals providing this level of care.

We aimed to conduct one key informant interview with the most senior level of health personnel available in each health facility, a key informant interview with the district health office and a focus group discussion in each district. Participants of each focus group discussion were a mix of health personnel, accountants, non-governmental organisation workers, and management committee members. In total, 55 key informant interviews and nine focus group discussions were completed (table 2). Trained Nepali researchers conducted discussions and kept log-books. TPJ and ST worked from the offices of Family Health Division in the Ministry of Health and Population, and made notes of their observations during this time. Verbal data were tape-recorded and transcribed. The study was approved by the ethics committee of the London School of Hygiene and Tropical Medicine and written consent was obtained from each respondent.

Table 2: Number of key informant interviews completed and analysed (in parentheses) by place

	Plains	Hill	Mountain	Total
District health office	3 (2)	3 (2)	1 (1)	7 (5)
Regional hospital	0 (0)	2 (2)	0 (0)	2 (0)
Zonal/district hospital	6 (3)	4 (3)	1 (1)	11 (7)
Primary health centre	8 (6)	7 (6)	3 (2)	18 (14)
Health post	7 (6)	6 (5)	4 (3)	17 (14)
Total	24 (17)	22 (18)	9 (7)	55 (42)

Note: In addition, there were nine focus group discussions completed and analysed (four in plains, three in hill and two in mountain districts)

Analysis

Researchers who had collected and transcribed the data conducted manual content analysis [23] with two international researchers (TPJ, JM). Initially, 10 transcripts from different types of respondents and different topographical areas were categorised under headings from the topic guides. Categories were refined based on themes emerging from the data, and thereafter, transcripts were analysed according to those themes. We analysed all the focus group discussion data and a random sample of respondents in every district, ensuring coverage of stakeholders and methods (table 2). After analysis of 51 transcripts we felt there was saturation and a further 9 transcripts were read to check for recurring themes. Data were tabulated to compare responses across types of respondent and topography. Analysis was conducted in Nepali, and quotations were translated into English for publication. The extent to which observation data corroborated data from transcripts was discussed during analysis, and an observation report was written, describing the implementation of the programme.

Results

Variations in implementation

Information on examples of implementation were obtained from respondents in interviews and focus group discussions, allowing us to aggregate specific cases into categories of practices that could be mapped against the stated policy (table 3).

There were numerous practices in the implementation of the conditional cash transfer to the women. There were variations in the interpretation of the eligibility criteria and the administration of the cash. The former included cases where health facilities simply ignored the eligibility criteria altogether, making the cash available to all women delivering in a public health facility. More serious deviations from policy were apparent when an entire district, for example, gave cash to women delivering at home. Such practices might be expected to have the opposite effect to the SDIP's intended objective of increasing skilled birth attendance.

Administration of the cash varied in terms of: the amount of cash given; to whom the cash was given; and the time at which the cash was given. The practice of giving cash to husbands was a particular concern to some respondents who were worried that the money might be misspent. Most commonly, women were given no money at all or given it at a later date after being discharged from the health facility.

There were many instances of health facilities following their own rules in the payment of the health provider incentive. Practices varied according to who was entitled

Table 3: Variations in implementation

Policy	Practice
1. Conditional cash transfer to women	
Women who deliver in a public health facility – hospital, primary health centre or health post – are entitled to a cash payment if they have no more than two living children or an obstetric complication. The cash is given at the time of discharge. If referred, the woman is to receive the cash from the referring institution.	• Cash given to women delivering at home • Cash given to women delivering in sub-health posts • Cash given to all women, and not limited to those with no more than two living children or an obstetric complication • Reduced amount of cash given to women, because the health institution did not have sufficient funds and equally divided the money among the eligible women • Cash amount deducted from the patient's bill in the absence of any cash to hand over to the woman • Cash given on a first come first served basis or selectively due to insufficient funds • Cash not given at time of discharge but at a later time • Cash given to the relatives of women on proof of identity • Cash given to women with abortion complications (not in the policy) • Cash given to women by the referral hospital, rather than the referring institution • No cash given
2. Health provider incentive	
Government health professionals – medical doctor, nurse, midwife, health assistant, auxiliary health worker and maternal and child health worker – are entitled to an incentive for every delivery they attend either at home or at a government health facility	• Incentive to health workers given only for attendance at those deliveries in which the woman has no more than two living children or an obstetric complication • Incentive divided up among all staff involved in delivery care • Incentive given to a single health professional involved in the delivery • A share of the incentive taken by non health professionals – eg. the accountant • Incentive given to health professionals for attending institutional deliveries only, not home deliveries • Incentive claimed by health professionals for attending deliveries in private clinics • No incentive given to health professionals
3. Free delivery care to women	
Women eligible for the cash incentive and resident in a low human development district are also entitled to free delivery care. The health institution is reimbursed 1,000 NRS for each case of free delivery care given	• Free delivery provided to all women, and not limited to those with no more than two living children or an obstetric complication • Health institution not reimbursed for the free delivery

to receive the incentive, between whom the incentive was shared, and the place of delivery for which health workers could claim the incentive. Different practices regarding the sharing of the incentive between health staff were expected given that the policy guidelines allowed health facility management committees discretion on this issue. Some health facilities, however, took practices a step further, including non-health workers, such as the accountant, in the share of the incentives. The free delivery care element of the policy was usually implemented as intended. Sometimes, respondents reported that the health facility had not been reimbursed for the deliveries provided free of charge.

Factors affecting implementation

Delays in disbursement, inadequate funds and their consequences

Respondents at all levels of the health system expressed concern that women were not getting the incentive immediately after delivery. Often, money was not given to women in time because of delays in money reaching districts, inadequate funds or a combination of these factors. Delays occurred because of the late arrival of fund release letters from the central level, and the short-term absence of key district staff who were in the field or in training. In a few districts, health workers were also experiencing long delays before receiving their incentive, but more concern was expressed about the failure to pay women on time, particularly because the purpose of the cash was to meet immediate expenses of travel and subsistence.

> "As the incentive is given for transportation expenses it should be given on time." (District hospital, Hill, Key informant interview)

> "In my opinion, the incentive should be given to the woman immediately after she delivers...if she does not get the money in her hand she may not be able to borrow and then she will face problems." (District hospital, Hill, Key informant interview)

> "We sometimes feel that this scheme should be stopped. Either the money should arrive on time otherwise it does not have any meaning." (District hospital, Hill, Key informant interview)

A diverse group of respondents also reported that funds had been inadequate to pay beneficiaries. The amount budgeted did not match requirements, or the amount released was less than the amount stated in the budget. There was frustration that the central level did not consult with the district level in the development of plans, even when the district had taken the initiative to plan how to spend the budget.

When money was not available to give to eligible women at the time of delivery, a number of issues arose. First, it was difficult to find or contact women in order to give them the money, particularly those in remote areas or those whose whereabouts were unknown. Outstanding debts accumulated and many women, at the time of this study, were yet to be paid:

> "Since we have no money during the time of delivery we have to ask [women] to come later to collect the incentive. It will be difficult to find them later on, and many do not contact us. You see the problem?" (Health post, Hill, Key informant interview)

> "Women come from 60 kilometres away for delivery. If they do not receive the money immediately after delivery, how many times can they come from so far, just for 500 rupees, and how many times can they call?" (District stakeholders, Plains, Focus group discussion)

Second, a failure to give the incentive created a perception that health institutions were withholding money, leading to friction and mistrust of health personnel:

> "We started working with a tentative plan but as the number of deliveries increased, women who delivered in the beginning got the incentive and others were left out. About 40 to 50 women did not get the incentive. Those who did not get [the money] started fighting with us." (District stakeholders, Hill, Focus group discussion)

In one place, the programme was put on hold because there were inadequate funds, and staff were worried about the consequences of only giving cash to some women:

> "If we distribute the outstanding incentive of last year from February onwards we need about five hundred thousand rupees but we have received only one hundred thousand. If we distribute this amount we are sure to be beaten by women." (District stakeholders, Mountain, Focus group discussion)

A number of ways to deal with the unpredictability of funds were described. These included: making payment on a first come first served basis; providing money out of one's own pocket; giving a smaller amount of money to share the cash across a larger number of women; and borrowing from other sources. Some district health offices used funds from other health programmes, whilst some health institutions borrowed from their own account. Some district officials, who were reluctant to borrow, worried that donor funds may not materialise, or felt it was risky to borrow without approval.

> "If we spend money from the regular budget head funded by foreign donors we are questioned. If we spend even after receiving an authorisation letter we are questioned: 'why did we spend without receiving the letter of release?' Even those taking risks are trapped sometimes." (District health office, Plains, Key informant interview)

> "I am reluctant to use money from the hospital committee fund because donor funds are highly unpredictable and we do not know when they will come." (District health office, Mountain, Key informant interview)

Confusion about the policy

Many respondents were unclear about aspects of the policy. They reported that there had been inadequate dissemination of information to the districts. The confusion created variations in implementation and affected the ability of health workers to disseminate information in communities, potentially hampering the effectiveness of the programme.

District officials and health workers were often confused about how to implement the programme, finding the official guidelines issued by central government unhelpful, confusing and lacking in detail. There were reports of late distribution of guidelines and insufficient copies, which restricted their ability to implement the policy:

> "The centre was so miserly to send only one guideline. How do they think that this is sufficient to run [the programme] in such a big district?" (District stakeholders, Plains, Focus group discussion)

> "Most importantly, the staff should be properly oriented before launching the programme." (Health post, Mountain, Key informant interview)

There was particular confusion about the eligibility of health workers to receive the incentive, and the process of reimbursement to health institutions for free delivery care. Respondents did not know the cadres of health worker and the place of delivery that ensured eligibility to receive the money. Data suggest that the conditional cash

transfer to women was more clearly understood, but there were still some issues of confusion that led to deviations from the stated policy. Sometimes cash was distributed to women at ineligible health facilities and women were not paid when they were referred:

> "I am not sure about getting the incentive when referring the women to another facility after I attended her first. And I am also not sure from which facility the women will get the incentive..." (Primary health centre, Plains, Key informant interviews)

> "We were all confused about how to distribute the incentive and we were not sure whom to give, [and] how much to give" (District stakeholders, Mountain, Focus group discussion)

Districts disseminated information to the community using various means, such as FM radio or through female community health volunteers. However, district stakeholders felt communication was hampered by a lack of guidance on how to promote the policy, and the absence of any budget allocation. Moreover, some respondents felt it difficult to disseminate information about a programme that they themselves did not fully understand. Disseminating information about the programme was particularly challenging in sparsely populated areas where households were scattered. Respondents felt that poorer women who tended to live in more remote areas were disadvantaged because they were less likely to know about the programme. Women in more remote areas who had not received the cash at delivery were also disadvantaged as they were less likely to find out that the budget had been released:

> "Only advantaged women received the incentive as they are better informed and are able to visit the health facilities. The poor ones were not informed properly and did not receive the incentive." (District stakeholders, Plains, Focus group discussion)

> "I am sure people in town know about the scheme but I am not sure about in the villages" (District stakeholders, Plains, Focus group discussion)

Misuse and monitoring

Respondents in several districts were concerned about misuse of SDIP funds. Different types of misuse were described, including: false claims by health workers for deliveries that never took place; claims by health workers for assisting deliveries in private clinics; claims for money by women with more than two children; and skimming of money by staff at the district level. Occasionally reports of false claims were followed up, but the lack of a budget provision hindered verification of parity or if a birth actually took place.

> " [Health workers] are claiming incentives for deliveries that they have attended in the local market place, and registering them as institutional deliveries. And there is no mechanism to check." (District stakeholders, Plains, Focus group discussion)

> "You know, sometimes the district level people keep up to fifty percent of the incentive. I heard they make false claims too." (Health post, Hill, Key informant interview)

In some cases, it was not clear whether the lack of clarity in the guidelines caused the (unintentional) misuse of funds, or if they were wilfully misused. Either way, respondents felt that there were opportunities for misappropriation of funds by virtue of the programme's design:

> "When cash comes, there are possibilities for misuse, this is the only problem." (District health office, Hill, Key informant interview)

In almost all districts, respondents were unclear about what was expected of them in terms of monitoring the programme. There was a lack of guidance on how to monitor and there was no separate budget or time allocation to carry out these activities. Many felt that monitoring the distribution of financial incentives was important, but guidance had been insufficient.

> "So far we have not monitored the programme and no one has raised any question about this. However, this now stands as a big issue." (District hospital, Hill, Key informant interview)

> "A separate budget for supervision and monitoring of this scheme should be made available. The integrated budget for monitoring is just not enough." (District stakeholders, Hill, Focus group discussion)

No monitoring system had been established in any of the districts we sampled. Some respondents felt that they had not been given time to prepare recording and reporting tools, and hasty implementation had resulted in an inability to plan or set up a monitoring system. Reporting appeared to be on an ad hoc basis, provided 'on demand' to representatives of non-governmental organisations and central level officials, or in meetings where the programme was discussed. In some places respondents felt that health workers were not expected to monitor the scheme, and this was the responsibility of those at the central level or non-government organisations.

Acceptance of the policy

Most respondents welcomed the idea of giving cash to women delivering in a health facility and felt it was both legitimate and helpful. However, they had specific concerns with the eligibility criteria, questioning the logic of only giving the cash to women with two or fewer children. Respondents felt that this indirect discrimination, particularly against poorer women, opposed the overall aim of the programme – to increase institutional deliveries and reduce mortality:

> "The poorest of the poor are excluded from the incentive because the poor are the ones who have more than two children. So there should not be any parity condition" (District health office, Hill, Key informant interview)

> "Women having more babies are subject to higher risks and they are deprived of the incentive." (District stakeholders, Plains, Focus group discussion)

> "If safe motherhood is women's right, then what about the rights of women having more than two children?" (District stakeholders, Plains, Focus group discussion)

Health workers sometimes found themselves in difficult situations, either being unable to provide the cash to poorer women with greater need because they had more than two children, or purposively ignoring the parity restriction:

> "Women with 4 or 5 babies must also have been paid the incentive, because I have paid the incentive to women with 3 babies" (District stakeholders, Plains, Focus group discussion)

> "It is difficult if rich people get money and poor people do not get money...for example, a rich woman came to the health institution for delivery and got the incentive. A poor woman found out about the incentive from that person but we could not give her the incentive because she had more than two babies...(this) makes me feel uneasy." (Primary health centre, Hill, Key informant interview)

Other respondents were concerned about the practicalities of reliably verifying the parity (and therefore eligibility) of women and methods of verification were ineffective and sometimes restrictive:

> "How can a woman go to the Village Development Committee and get a certificate (of parity) before going to the health institution for delivery? Currently there is no local political representative, how can it be practical?" (District hospital, Hill, Key informant interview)

> "The main barrier is to find out the number of babies, even a mother with 3 or 4 babies claims that they have just 2 babies, and we are not trained to find out the parity (of the woman)." (District hospital, Hill, Key informant interview)

There was widespread discontent with the health provider incentive, even amongst those who benefit directly such midwives. It strained relations between health staff, particularly when some felt the distribution of money was unjust or higher qualified staff were ineligible to receive the incentive:

> "Distribution of incentives to health workers creates tensions especially in cases of home delivery. Often the home delivery is attended by one health worker but others who do not attend also the want the money to be equally distributed" (District stakeholders, Plains, Focus group discussion)

> "The guidelines are discriminatory by giving money to maternal and child health workers and not auxiliary health workers who are in charge. This issue is highly controversial in my district." (Health post, Plains, Key informant interview)

In one large hospital, managers wanted to avoid any conflict between staff and therefore no incentive was provided to health workers. Instead, the money was used to make up the deficit in payments to women.

Respondents felt that effective implementation of the programme required improvements in the availability and quality of services. This typically manifested itself in a call for greater investment in drugs, equipment and training of skilled birth attendants:

> "It does not help just to distribute money to women. The skills of all health workers should be improved by providing proper training." (District stakeholders, Plains, Focus group discussion)

Many respondents suggested that funds should be used to provide free delivery care, instead of allocation to the SIDP, and some felt that the programme should be needs based, targeting poorer women:

> "It is not necessary to provide incentives to all women. It should only be provided to poor women, otherwise it is not worthwhile and it is a loss of money. On the contrary, rich women should be charged...because

they can afford it." (Regional hospital, Hill, Key informant interivew)

"It would be even better if the amount of incentive could be given to the hospital to make the delivery service completely free." (District hospital, Hill, Key informant interview)

Discussion

The paper has described the experiences of district level actors in implementing the SDIP and illustrates a number of challenges they faced. In the discussion, we expand on the most important issues raised by respondents with reference to the wider literature on the implementation of health policy in developing countries.

The study had a number of limitations. First, while it was always our intention to follow a descriptive approach to studying implementation [16], methods grounded in health policy analysis theory may have been able to provide deeper insights by stating a set of hypotheses to test empirically [24]. There are analytical frameworks, for example, that integrate "politics, process and power into the study of health policies" [15]. Second, we focused on early implementation only, motivated by the need to provide timely findings in the evaluation of an ongoing programme. We recognise this provides an incomplete picture, a snapshot of implementation over what is, at a minimum, a five-year programme. Third, all data collection was completed before the analysis of data was undertaken. A more iterative process of data collection and analysis would have improved the topic guides and experience of the interviewers.

Despite these limitations, the study was able to provide a detailed account of the SDIP's early implementation. We should not perhaps be surprised that early implementation faced several difficulties. It was a national programme which was introduced rapidly without time set aside for piloting or detailed planning at district level. The large variation in practices suggests district managers and health workers were able to exercise considerable discretion in the implementation of the programme and it is largely their actions that have determined how the policy took shape on the ground. At the same time, a number of factors at the central level imposed considerable constraints on the ability of actors in each of the districts to implement the SDIP. Bureaucratic delays in the disbursement of funds, difficulties in communicating the policy, both to implementers and the wider public and the design of the programme were cited by respondents as important. It is these factors that provide the most convincing explanation of why uptake of the programme was low. Poor financial management, in particular, has been a common theme emerging from the recent literature on implementation of maternal health financing policies in low-income countries [9,25,26].

Political expediency to ensure the policy was adopted quickly [18] may have meant there was inadequate preparation in the planning of resources and development of certain mechanisms. Respondents frequently spoke about the inadequacy of funds and acknowledged that the means to verify the eligibility of women and monitor the programme were lacking. Moreover, efforts by the central level to retain substantial control of the implementation process – by using an earmarked budget, providing prescriptive (yet unclear) guidance on the policy, and offering few opportunities for feedback – may have exacerbated problems and contributed further to the programme's low uptake.

In this context, the actions of district level actors may be seen as coping strategies to overcome (or avoid) the problems imposed on them from above and, in turn, they may explain the reasons for the variation in uptake of the programme between districts. Those who attempted to deal with challenges were often driven by pressure to meet local needs. Inaction, however, was equally common and it is important to understand the motivations that influenced the two sets of actors.

The most important coping strategy, given the bureaucratic delays at the central level, may have been the decision by some district managers to direct funds from other budget lines for the purposes of the SDIP. This practice presumably allowed implementation earlier than would otherwise have been possible, but its impact on the financing of other district health programmes is, from the data, unclear. Prior perceptions about the unpredictability of donor funding influenced the decision of some managers to refrain from using other budget lines and delay implementation. It is also possible that this strict adherence to government regulations may have represented a reaction – particularly among those who had taken the time to develop careful plans for how to allocate the SDIP budget between health facilities – against the continued pressure from the central government to use funds from other budget headings.

The fear of having to deal with angry families demanding their money appeared to be a motivating factor behind a number of practices to manage the problem of unpredictable funding to health facilities. Health workers tried to appease mothers by providing money out of their own pocket, deducting an amount equivalent to the conditional cash transfer from the hospital bill or sharing what money they had among all those waiting. Another motivating factor may have been the wide support for paying mothers – also found elsewhere [1,9] – which resonated

with the view that mothers tend to put funds to better use than men. Some simply sidestepped the problem altogether, putting the programme on hold so that no women could claim the cash.

With respect to raising awareness, some districts undertook local initiatives to communicate information about the programme using, for example, FM radio. It suggests that other districts could have done more to promote the programme, but with widespread confusion among implementers they themselves may have lacked the confidence to take the initiative themselves.

It appears that the complexity of the programme – with the different eligibility criteria for different incentives – was itself a major barrier to implementation, exacerbated further by the confusing guidelines. There is no denying that such programmes are inherently complex; one only needs to looks at Brazil's conditional cash transfer programme, *Bolsa Familia* [27]. However, an alternative approach to implementation may have promoted more innovation and creativity at the district level with the emphasis on reaching policy objectives, rather than specifying the policy in such detail, which probably made people uncertain whether or not they could adapt the rules when faced with problems.

Central to this question of why some district implementers took actions to deal with problems and others did not may be the widespread knowledge that the SDIP was donor-funded. Interestingly, one of the reasons donors provide funds directly to the recipient government's treasury is to promote national ownership of policy. In practice, however, there appeared to be little ownership of the policy at the district level. The SDIP was perceived by many as a 'programme', whose activities were regarded as additional to the routine of government. Respondents maintained that monitoring, supervision and communication of the programme could not be carried out using available resources and the fact that there was no budget provision or explicit time allocation for these tasks reinforced the idea that they should be done by external monitors from the central level or NGOs. Other studies have found that such perceptions can be lead to inaction and a general reluctance to carry out tasks demanded of the central level [28-30].

Several issues arose that may have had serious implications for the wider public health system, highlighting the potential of the SDIP to have (unforeseen) adverse effects. The perception that health providers may have held money rather than paying women can only have eroded further the community's trust in the public health system, thereby reducing demand for all health services, not just delivery care. Equally serious, but from the perspective of service provision, was the tension between staff caused by the provider incentive. Any conflict between staff is likely to have consequences for all health services provided by the health facility. In this regard, the central level could have devoted more time to explaining the rationale for the provider incentive (ie. why only some cadres were eligible for the incentive) in order to build legitimacy of this element of the SDIP.

Conclusion

Changes made to the SDIP since the study suggest development and implementation of the policy has been a dynamic process. In late 2007, the Government of Nepal made a number of changes, reflecting some of the most important concerns of respondents in this study. The eligibility criteria to receive the conditional cash transfer to women were removed, allowing all women to benefit and simplifying the programme enormously. The programme was expanded to include not-for-profit hospitals in order to address concerns about the availability of obstetric services. A national information campaign and district level training of staff were carried out to improve awareness and understanding of the programme. The orientation, in particular, provided a forum for district level staff to voice concerns and have greater exposure to information about the programme. Finally, procedures to manage and disburse funds at the central level were streamlined to reduce delays. These changes are welcome and they were most likely responsible for substantial increases in the uptake of the programme in its third year [19]. More recently, the government announced further changes, abolishing user fees for delivery care at all public health facilities while continuing to provide the SDIP's conditional cash transfer to women. Given the problems with early implementation and the adjustments made by policymakers, it will be important to evaluate the impact and implementation of the SDIP over the first five years.

The success of conditional cash transfer programmes in Latin America has led to a wave of enthusiasm for their adoption in other parts of the world. However, context matters and proponents of similar programmes in south Asia should give due attention to the challenges to implementation when capacity is weak and health services inadequate. There is a need for both careful planning in their roll out and closer engagement with district level actors, who exercise considerable influence in the implementation of policy.

Declaration of competing interests

The authors declare that they have no competing interests.

Authors' contributions

All authors contributed to the overall design of the study. TPJ, BDN and ST managed the data collection process.

Data analysis was done by JM, BDN, ST and TPJ, in addition to a team of researchers involved in the data collection and trained by JM in qualitative data analysis methods. All authors drafted and approved the final manuscript.

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References

1. Fiszbein A, Schady N: *Conditional cash transfers: Reducing present and future poverty* Washington DC: World Bank; 2009.
2. Handa S, Davis B: **The Experience of Conditional Cash Transfers in Latin America and the Caribbean.** *Development Policy Review* 2006, **24(5)**:513-536.
3. Glassman A, Todd J, Gaarder M: **Performance-Based Incentives for Health: Conditional Cash Transfer Programs in Latin America and the Caribbean.** Washington DC: Center for Global Development; 2007.
4. Lagarde M, Haines A, Palmer N: **Conditional cash transfers for improving uptake of health interventions in low- and middle-income countries: a systematic review.** *Jama* 2007, **298(16)**:1900-1910.
5. de Janvry A, Sadoulet E: **Making conditional cash transfer programs more efficient: designing for maximum effect of the conditionality.** *World Bank Econ Rev* 2006, **20(1)**:1-29.
6. Grosh M: *Administering targeted social programs in Latin America: From platitudes to practice* Washington DC: World Bank; 1994.
7. Morris S, Flores R, Olinto P, Medina JM: **Monetary incentives in primary health care and effects on use and coverage of preventive health care interventions in rural Honduras: cluster randomised trial.** *Lancet* 2004, **364**:2030-2037.
8. Koblinsky M, Matthews Z, Hussein J, Mavalankar D, Mridha MK, Anwar I, Achadi E, Adjei S, Padmanabhan P, Marchal B, *et al.*: **Going to scale with professional skilled care.** *Lancet* 2006, **368(9544)**:1377-1386.
9. Devadasan N, Elias M, John D, Grahachary S, Ralte L: **A conditional cash assistance programme for promoting institutional deliveries among the poor in India: Process evaluation results.** In *Reducing financial barriers to obstetric care in low-income countries* Edited by: Richard F, Witter S, De Brouwere V. Antwerp: ITG Press; 2008.
10. Government of the People's Republic of Bangladesh: **Demand side financing pilot maternal health voucher scheme proposal.** Dhaka: Ministry of Health and Family Welfare, Government of the People's Republic of Bangladesh; 2007.
11. Government of Nepal: **Operational guidelines on incentives for safe delivery services.** Kathmandu: Government of Nepal, Ministry of Health and Population; 2005.
12. Borghi J, Ensor T, Neupane BD, Tiwari S: **Financial implications of skilled attendance at delivery in Nepal.** *Trop Med Int Health* 2006, **11(2)**:228-237.
13. Government of Nepal: **Nepal Demographic and Health Survey.** Kathmandu, Nepal: ORC Macro, MD, USA; 2007.
14. Kaufmann D, Kraay A, Mastruzzi M: **Governance matters VII: Aggregate and individual governance indicators, 1996–2007.** In *World Bank Policy Research Working Paper No 4654* Washington DC: World Bank; 2008.
15. Gilson L, Raphaely N: **The terrain of health policy analysis in low and middle income countries: a review of published literature 1994–2007.** *Health Policy Plan* 2008, **23(5)**:294-307.
16. Sanders D, Haines A: **Implementation research is needed to achieve international health goals.** *PLoS Med* 2006, **3(6)**:e186.
17. Werner A: *A guide to implementation research* Washington DC: Urban Institute Press; 2005.
18. Ensor T, Clapham S, Prasai DP: **What drives health policy formulation: Insights from the Nepal maternity incentive scheme?** *Health Policy* 2008, **90**:247-253.
19. Powell-Jackson T, Neupane BD, Tiwari S, Morrison J, Costello A: **Evaluation of the Safe Delivery Incentive Programme: Final Report of the Evaluation.** Kathmandu: Support to Safe Motherhood Programme, Nepal; 2008.
20. SSMP: **Safe Delivery Incentives Programme: Six monthly monitoring report for period April 2008 to September 2008.** Kathmandu: Support to Safe Motherhood Programme; 2008.
21. International Crisis Group: **Nepal's new political landscape.** In *Asia Report N° 156* Brussels: International Crisis Group; 2008.
22. World Bank: *World development indicators* Washington DC: World Bank; 2008.
23. Krueger R, Casey MA: *Focus groups: a practical guide for applied research* London: Sage Publications; 2000.
24. Walt G, Shiffman J, Schneider H, Murray SF, Brugha R, Gilson L: **'Doing' health policy analysis: methodological and conceptual reflections and challenges.** *Health Policy Plan* 2008, **23(5)**:308-317.
25. Witter S, Adjei S: **Start-stop funding, its causes and consequences: a case study of the delivery exemptions policy in Ghana.** *Int J Health Plann Manage* 2007, **22(2)**:133-143.
26. Witter S, Armar-Klemesu M, Dieng T: **National fee exemption schemes for deliveries: comparing the recent experiences of Ghana and Senegal.** In *Reducing financial barriers to obstetric care in low-income countries* Edited by: Richard F, Witter S, De Brouwere V. Antwerp: ITG Press; 2008.
27. Lindert K, Linder A, Hobbs J, Briere B: *The nuts and bolts of Brazil's Bolsa Familia Program: Implementing conditional cash transfers in a decentralised context* Washington DC: World Bank; 2007.
28. Kamuzora P, Gilson L: **Factors influencing implementation of the Community Health Fund in Tanzania.** *Health Policy Plan* 2007, **22(2)**:95-102.
29. Gilson L, Kalyalya D, Kuchler F, Lake S, Oranga H, Ouendo M: **Strategies for promoting equity: experience with community financing in three African countries.** *Health Policy* 2001, **58(1)**:37-67.
30. Mwangu M: **Enhancing district health planning and management in Tanzania: a social political analysis of the role of the health management information system (HMIS).** In *PhD. Disseration* Dar es Salaam: University of Dar es Salaam; 2001.

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APPENDIX A7

ADVANCES IN HEALTH ECONOMICS

AND HEALTH SERVICES RESEARCH

JOURNAL ARTICLE

THE IMPACT OF NEPAL'S NATIONAL INCENTIVE PROGRAMME TO PROMOTE SAFE DELIVERY IN THE DISTRICT OF MAKWANPUR

T. Powell-Jackson, B. D. Neupane, S. Tiwari, K. Tumbahangphe, D. Manandhar and A. M. Costello

ABSTRACT

Objective – *Nepal's Safe Delivery Incentive Programme (SDIP) was introduced nationwide in 2005 with the aim of encouraging greater use of professional care at childbirth. It provided cash to women giving birth in a public health facility and an incentive to the health provider for each delivery attended, either at home or in the facility. We aimed to assess the impact of the programme on neonatal mortality and health care seeking behaviour at childbirth in one district of Nepal.*

Methods – *Impacts were identified using an interrupted time series approach, applied to household data. We estimated a model linking the level of each outcome at a point in time to the start of the programme,*

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demographic controls, a vector of time variables and community-level fixed effects.

Findings – *The recipients of the cash transfer in the programme's first two years were disproportionately wealthier households, reflecting existing inequality in the use of government maternity services. In places with women's groups – where information about the policy was widely disseminated – the SDIP substantially increased skilled birth attendance, but failed to impact on either neonatal mortality or the caesarean section rate. In places with no women's groups, the SDIP had no impact on utilisation outcomes or neonatal mortality.*

Implications for policy – *The lack of any impact on neonatal mortality suggests that greater increases in utilisation or better quality of care are needed to improve health outcomes. The SDIP changed health care seeking behaviour only in those areas with women's groups highlighting the importance of effective communication of the policy to the wider public.*

INTRODUCTION

Under-utilisation of health care services is a familiar problem in developing countries. A combination of both supply- and demand-side barriers restrict access to services, particularly for poorer households who are in greatest need of health care (Ensor & Cooper, 2004; Travis et al., 2004). Overcoming these obstacles is especially challenging in maternal health, in part because the provision of and the reluctance to use maternity services are inextricably linked to deep-rooted issues such as the state of the health system and the place of women in society. This may explain, perhaps, why professional care at childbirth in sub-Saharan Africa and south Asia has stagnated over the past decade (Koblinsky et al., 2006).

A big part of the challenge, and one that is being increasingly recognised, is persuading the relevant agents to undertake changes in behaviour that promote the health of individuals and families. Many countries, particularly in Latin America, have sought to raise demand for health services by providing monetary incentives to households on the condition that they engage in certain health care seeking practices (Fiszbein & Schady, 2009). The most influential of these was the Mexican *Progresa* programme, introduced in 1997 to target poor households with cash transfers provided the children regularly attended school and made preventive health care visits

(Gertler, 2004). Other nationwide conditional cash transfer (CCT) programmes – *Red de Proteccion Socia* in Nicaragua, *Familias en Accion* in Colombia, *Bolsa Alimentacao* in Brazil, *Programa de Asignacion* in Honduras and *Bono de Desarrollo Humano* in Ecuador – were similar in design to the Mexican programme, also targeting poor household with a focus on human capital formation (Attanasio, Carlos Gomez, Heredia, & Vera-Hernandez, 2005; Maluccio & Flores, 2004; Morris, Flores, Olinto, & Medina, 2004a; Morris, Olinto, Flores, Nilson, & Figueno, 2004b; Paxon & Schady, 2007). Many of these programmes were evaluated using randomised methods, providing a strong body of evidence that they can be an effective means to increase utilisation and, in some cases, improve health (Lagarde, Haines, & Palmer, 2007; Glassman, Todd, & Gaarder, 2007).

Also popular are schemes that incentivise health staff to work harder by linking payments to some measure of effort. Performance-based payment schemes have been implemented in Cambodia (Soeters & Griffiths, 2003), Rwanda (Meessen, Kashala, & Musango, 2007) and Haiti (Eichler, Auxila, & Pollock, 2001), modelled around the basic idea of paying or 'contracting' health providers to meet performance targets related to health outputs, punctuality or management capacity. The evidence regarding the success of provider-payment schemes is not only mixed but also, in the case of positive findings, questionable due to weaknesses in study design (Eldridge & Palmer, 2009).

In 2005, Nepal introduced the Safe Delivery Incentive Programme (SDIP) that combines the two types of incentive. It provides a CCT to households with an incentive to health staff for each delivery they attend. The SDIP grew out of concerns about the slow progress in raising coverage of skilled birth attendance and the prohibitively high cost faced by households trying to access professional care at childbirth (Borghi, Ensor, Neupane, & Tiwari, 2006). Latest figures show that over 80 percent of women in Nepal continue to deliver at home and only 19 percent deliver with a doctor or nurse in attendance (Government of Nepal, 2007). The SDIP marked a departure from past government policy that tended to focus on service provision only. Since the launch of the SDIP, India and Bangladesh have followed suit with similar programmes of their own reflecting growing interest in south Asia (Devadasan, Elias, John, Grahachary, & Ralte, 2008; Government of the People's Republic of Bangladesh, 2007). While these programmes fit the CCT label less well than the Latin American programmes – they are not intended as a social safety net – they still seek to change health seeking behaviour with cash transfers.

This chapter reports on a study that assessed the performance of the SDIP in Makwanpur, a district of Nepal where suitable data were available.

Specifically, it explored three related issues: the financial burden of health care at childbirth, the benefit incidence of the CCT and the impact of the SDIP. The study was by no means comprehensive; it was limited to a quantitative evaluation of the SDIP in one part of the country. The larger evaluation, of which this study was a part, was broader in its scope capturing, for example, the experiences of a wide range of stakeholders with a view to identifying the main factors that have impeded and facilitated implementation of the programme (Powell-Jackson, Neupane, Tiwari, Morrison, & Costello, 2008). Nevertheless, the study reported here seeks to assess programme impact, the key component of any evaluation. Moreover, the findings are likely to be applicable, in some measure, to the rest of the country. There is little hard empirical evidence on the health impact of CCT programmes in south Asia, where implementation is constrained by weak governance (Kaufmann, Kraay, & Mastruzzi, 2008). The existing body of evidence is limited largely to schemes in Latin American countries, where government systems to verify eligibility, pay beneficiaries and monitor activities are more developed.

The model used to estimate the impact of the SDIP looks for a discontinuity at the specific point in time the programme began in the district (Cook & Campbell, 1979). At this point in time, we would expect observations after the programme to be different from those before it if the programme is to have had any impact. Our dataset from a community surveillance system lends itself well to such an approach. It covers almost seven years of continuous data collection and contains household data, which is not able to be manipulated as easily as service data to make performance of a programme appear better. The absence of any non-programme areas to construct a comparison group, however, is a major limitation. With pre- and post-intervention data on both programme and non-programme sites, it would have been possible to use difference-in-difference (e.g. Wagstaff, 2009b) or even triple difference methods to estimate impacts (Moffitt, 1991; Wagstaff, 2009a). Instead, the approach is limited to identifying instantaneous impacts and must assume no change in the secular trend of the outcome in the no-treatment state. It is capable of providing *plausible* evidence of an impact (Habicht, Victora, & Vaughan, 1999; Victora, Habicht, & Bryce, 2004).

We were also interested in the disruptive effects of out-of-pocket (OOP) spending for institutional delivery care on household consumption. Our intention was not to look at changes over time, but instead provide estimates at one point in time, after the SDIP started. We might expect payments for delivery care to be more disruptive than other types of health care, since they

are known to be particularly high in Nepal (Borghi et al., 2006). On the other hand, childbirth differs from your typical health shock in that the event is largely predictable, giving families time to prepare financially.[1]

In the next section, we describe the SDIP in Nepal and give a brief overview of implementation of the programme to-date. The subsequent sections outline the methods used to assess the performance of the programme and report the results of the study. Finally, implications of the findings are discussed.

SAFE DELIVERY INCENTIVE PROGRAMME

The Nepalese health care system is dominated by the public sector, although the number of private and charitable hospitals is growing. Maternity services in Makwanpur, as in the rest of the country, are delivered through a network of health facilities based around a district health system model, supported by regional and national hospitals providing specialised care.

Delivery care services are not free at the point of use; in fact, household OOP expenditures can be substantial, particularly in the case of emergency surgery. In Makwanpur, the mean cost to a household of a normal delivery was found to be 4,042 NRS ($63.2), compared with 22,780 NRS ($356.2) incurred by those with a caesarean section (Table 1). For both types of delivery, facility-based charges and the additional costs of goods and services purchased outside of the health facility together account for around two-thirds of the overall cost. Payments made to the health provider are retained at facility level and placed under the control of the health management

Table 1. Household Costs of Institutional Delivery Care by Cost Category in Makwanpur (Rupees).

Cost Category	Vaginal ($n = 271$)	95% CI	%	Caesarean Section ($n = 29$)	95% CI	%
Facility-based charges	1,492	(1,191–1,793)	36.9	7,913	(5,675–10,150)	34.7
Additional charges	1,185	(1,040–1,330)	29.3	7,071	(4777–9,405)	31.1
Transport costs	669	(565–773)	16.5	1,415	(845–1,985)	6.2
Debt to service provider	697	(474–920)	17.2	6,362	(2,995–9,730)	27.9
Total	4042	(3,522–4,562)	100	22,780	(17,045–28,516)	100

Source: Cost of delivery and living standards survey.

committee (if in place). Clearly, delivery care can be an important source of revenue for health facilities. Outstanding debts to service providers remain a sizable share of the total cost suggesting households, particularly those with women requiring a caesarean section, struggle to find any means to pay their bills at the time the service is received.[2] The transport cost associated with a caesarean section is almost double that of a normal delivery, presumably because families need to travel further and more urgently to hospitals sufficiently specialised to carry out surgery.

With a view to alleviating some of financial cost of delivery care, the Government of Nepal launched the SDIP nationwide in 2005.[3] The SDIP's package of financial benefits included (i) a CCT to women who delivered their baby in a health facility and (ii) an incentive to health workers for each delivery attended either at home or in a health facility (see Table 2); (Government of Nepal, 2005).[4] In this way, the programme sought to increase utilisation of professional care at delivery by influencing the behaviour of both households and health workers. The amount of cash offered to the woman varied across geographical regions to account for differences in the transport cost faced by households (Borghi et al., 2006).

The CCT, worth 1,000 NRS, is clearly not enough to cover the full cost of delivery care incurred by a household representing one quarter of the cost of a normal delivery or one twentieth of the cost of a caesarean section. The intention of the SDIP was to share the cost, leaving the household still to pay for a substantial proportion of the costs of health care.

The provider incentive for attending a delivery at home was born out of a desire to improve care for those women wising to deliver at home. Despite being well-intentioned, this decision gave rise to a possible tension between the various incentives, with the CCT, on the one hand, incentivising women

Table 2. The Benefits Offered by the SDIP and the Eligibility Criteria Applied in Makwanpur.

Financial Benefit	Eligibility Criteria
1. Conditional cash transfer to women	
• 1000 NRS ($15.6)	• Woman delivered in a public health facility *and* had no more than two living children *or* an obstetric complication
2. Provider incentive	
• 300 NRS ($4.7) per delivery	• Doctor, nurse, midwife, health assistant, auxiliary health worker or maternal and child health worker attended a delivery at home or in a public health facility

to the health facility, and the provider incentive, on the other hand, encouraging health providers to attend deliveries at home[5]. The extent to which health workers can attend both deliveries at home and deliveries at the health facility depends on whether there is slack in the labour supply. If there is indeed a trade-off, how the incentive influences behaviour of the health worker will then depend in part on the income that would be forgone (both the provider incentive and the user fee from the patient) by not being present to attend a delivery in the health facility. Another interesting element to the design of the programme is the condition that the CCT is available only to those with two or fewer children (unless the woman has an obstetric complication). The restriction was put in place to reflect concerns that the programme might inadvertently increase fertility. In practice, however, health workers found it difficult to verify a woman's parity and the condition was later scrapped.

The programme was limited to public sector health facilities in the first two years (our study period) but has subsequently expanded to include both non-profit and private health facilities. Unlike many other demand-side programmes, the SDIP does not explicitly target the poor, despite the rhetoric of national policymakers sometimes suggesting otherwise.[6] Nor does the programme use vouchers, distributing the CCT as cash. Numerous types of health worker can claim the provider incentive, including those with no formal training in delivery care, reflecting the compromise that was required to make the programme workable in a country where human resources in health are scarce.

There has been substantial involvement of the central level in the implementation of the programme; the Ministry of Health is in charge of overall management of the programme and provides funds in instalments to each district and regional hospital. Implementation has been governed by a set of guidelines, developed at the central level then issued to districts, to explain the management of funds and the monitoring of activities, as well as the eligibility criteria for beneficiaries. Despite these guidelines, implementation was found to vary substantially between districts owing, in part, to widespread confusion amongst district officials and health workers. There were variations in the eligibility criteria applied to the CCT, the sharing of the provider payment among staff, the payment mechanisms used, the means of monitoring and so on.

The programme has faced a number of challenges related to lengthy delays in the disbursement of funds and hesitation on the part of the central government to promote the programme. As a result, the level of coverage achieved by the programme in its first three years was low. A household

survey found that only 27 percent of households had ever heard of the programme and 29 percent of women who delivered in an eligible facility received the CCT at the time of delivery (Powell-Jackson et al., 2008). With this level of awareness, a substantial proportion of the population were not reached by the SDIP. In Makwanpur, there were no data on community awareness, but this is likely to have been substantially higher where women's groups were operating since efforts were made to publicise the programme widely through this existing channel.

METHODS

Estimation of Financial Burden

The purpose of this analysis is to show the financial burden of paying for delivery care at a health facility, once the SDIP had begun.[7] If the woman received the CCT, spending on delivery care is adjusted accordingly to include what is effectively a subsidy. The unit of analysis is the household, and financial burden is measured as the share of health spending for delivery care in household consumption.[8] A common extension of this approach uses measures of catastrophic spending to estimate the effect of health care payments on household material living standards (Wagstaff & van Doorslaer, 2003; Xu et al., 2003). Health spending is regarded as catastrophic if it exceeds a certain fraction of total household expenditure in any given time period. It is based on the premise that health spending is likely to displace consumption of other goods and services if it makes up a large proportion of total household resources.

Catastrophic payments have been defined in two ways. The first measures catastrophic payments as the share of health spending in total household consumption, while the other estimates health spending relative to household consumption net of spending on basic essentials (i.e. non-food consumption). The second measure reflects the view that non-discretionary expenditure may be a better indicator of a household's living standard or capacity to pay for health care (Wagstaff & van Doorslaer, 2003; Xu et al., 2003). The threshold above which health spending is classified as catastrophic is essentially arbitrary (O'Donnell, van Doorslaer, Wagstaff, & Lindelow, 2008). We use the most common thresholds of 10 percent in the case of the first measure of catastrophic payments and 40 percent in the second case. Results are stratified by type of delivery since spending on normal deliveries and caesarean sections is expected to diverge widely.

Identification of Impacts

Time is commonly used in the evaluation literature to establish a comparison group with which to assess a programme's impact. The most basic approach estimates impact by measuring the mean change in outcome before and after the programme commences. It is rarely able to permit reasonable causal inferences, as there is no a priori reason why the key assumption of no change in the absence of the programme should hold in practice. Unless the influence of non-programme factors can be ruled out with confidence, the conclusions from such a design can be weak. With more time periods, it is possible to test for an interruption at a specific point in time around the start of the programme, thereby providing more plausible causal inferences.

In the first instance, we plot outcomes against time to see if there is any evidence of a discontinuity in the time series around the month the SDIP began. From interviews with district programme managers, we know that Makwanpur district was able to start implementation of the SDIP in September 2005, two months after the official launch. The graphs also plot the three-month moving average to show with more clarity the underlying pattern by smoothing the data. While crude, the graphs provide a visual means of assessing the impact of the programme on the set of outcomes.

The second step involves estimation of a model that links the level of the outcome at a point in time to the start of the programme, contemporaneous values of a series of demographic controls, time and community-level fixed effects. The specification takes the form:

$$y_{it} = \gamma D_t + \beta X_{it} + \lambda T + \alpha_j + \varepsilon_{it},$$

where y_{it} is the outcome variable for individual i measured at time t, D_t is the treatment dummy at time t, X_{it} is a vector of individual and household characteristics measured at time t, T is time measured in months, α_j are community-level fixed effects and ε_{it} is a random error. The impact of the programme is given by the size of the coefficient γ. A value of γ equal to 0 indicates that the SDIP has had no impact on the outcome of interest. We include a full set of community dummies to control for influences at the village level such as the activities of non-governmental organisations (NGOs). We also include a vector of individual and household characteristics to capture other secular trends in the outcome: the woman's age, religion, ethnicity, educational attainment, the occupation of the household

head, the size of the household, the materials used to make the house and the number of months the household had sufficient food in the previous year. The time variable(s) captures the secular trend in the outcome over time. How we specify this relationship between the outcome and time may affect the results. We, therefore, show results for two different specifications to assess the robustness of the results: a restricted model where time is a quadratic function and a more flexible model in which time is specified as a polynomial function of degree four.

The impact of the SDIP is assessed in relation to a set of outcomes that include a measure of health and various indicators of utilisation of delivery care services (Table 3). These outcome indicators are defined as probabilities. Our preference would have been to use maternal mortality as one of our main health outcomes, to be consistent with the main goal of the programme. However, given the rarity of a maternal death and the huge sample size required to detect even a large effect, we assess the impact of the SDIP on neonatal mortality only. About 25–45 percent of neonatal deaths occur around the first day of life and can, therefore, be prevented through direct medical intervention at the time of childbirth (Lawn, Cousens, & Zupan, 2005). Neonatal mortality is both of interest in itself and a reasonable proxy for maternal mortality. A prerequisite for there to be an effect of the SDIP on mortality is an increase in utilisation of maternity services and adequate quality of care. Put another way, a finding that showed an impact on neonatal mortality without any impact on utilisation of maternity services would, given our behavioural model, be difficult to rationalise.

Utilisation outcomes refer to the place of delivery (home, government facility or private facility) and the type of birth attendant (a skilled birth attendant or any health worker). We expect a positive impact of the programme on utilisation of government maternity services and skilled birth attendance. The CCT to the woman functions as a price subsidy reducing the cost of care and thereby raising demand, the extent to which depends on the household's price elasticity. The provider payment, however, should increase the availability of health workers to attend deliveries by providing additional motivation to work. We also include the probability of a caesarean section, although our expectation of an impact on this outcome is perhaps lower given that the SDIP does not address many of the supply-side constraints that explain the low rate of caesarean sections in Nepal. The final outcome is the number of antenatal care visits, whose inclusion is explained later. With the exception of this outcome, all outcomes are binary. Thus, an appropriate model is a probit. In presenting the results, we report

Table 3. Summary Statistics of the Community Surveillance System Dataset.

Variable	Pre-SDIP		Post-SDIP	
	Mean	Standard Error	Mean	Standard Error
Outcomes				
Neonatal mortality	0.029	0.002	0.023	0.002
Delivery at home	0.946	0.003	0.870	0.004
Delivery at government facility	0.042	0.002	0.108	0.004
Delivery at private facility	0.002	0.001	0.010	0.001
Delivery with skilled birth attendant	0.044	0.002	0.109	0.004
Delivery with any health worker	0.061	0.003	0.170	0.004
Delivery by caesarean section	0.003	0.001	0.010	0.001
Number of ANC visits	1.235	0.020	2.116	0.024
Characteristics of woman and household				
Age of woman during birth of child	27.918	0.075	25.619	0.075
Education grade	1.028	0.027	1.998	0.037
HH size	6.899	0.035	7.192	0.038
Months of sufficient food in previous year	9.222	0.031	9.637	0.033
Hindu	0.336	0.005	0.321	0.006
Buddhist	0.653	0.005	0.656	0.006
Muslim	0.000	0.000	0.001	0.000
Christian	0.010	0.001	0.014	0.001
Other religion	0.001	0.000	0.008	0.001
Brahmin/Chhetri	0.156	0.004	0.156	0.004
Newar	0.023	0.002	0.018	0.002
Janajati	0.777	0.005	0.778	0.005
Other caste	0.003	0.001	0.007	0.001
Cement house	0.022	0.002	0.044	0.002
Brick/mud house	0.020	0.002	0.031	0.002
Stone/mud house	0.630	0.006	0.589	0.006
Planks house	0.312	0.005	0.254	0.005
Brushwood house	0.009	0.001	0.009	0.001
Thatch house	0.004	0.001	0.006	0.001
Other type of house	0.003	0.001	0.046	0.002
Agricultural work	0.910	0.003	0.927	0.003
Salaried/government work	0.019	0.002	0.015	0.001
Small business	0.014	0.001	0.017	0.002
Wage labourer	0.058	0.003	0.040	0.002
Other work	0.000	0.000	0.002	0.001
HH in women's group intervention area	0.499	0.006	0.461	0.006
N	7,613		7,186	

the change in probability associated with a given change in the treatment variable rather than the estimated coefficient.

The identification strategy relies on there being no other change at the time of the programme's introduction that could account for a discontinuity or shift in the relationship between the outcome and time. Changes in non-programme factors such as health infrastructure, staffing levels, government policy and the activities of NGOs working in maternal health are a particular concern. One way of testing the plausibility of this assumption is to estimate the impact of the SDIP on the use of antenatal care, an outcome unrelated to the SDIP but closely linked to maternal health more broadly. If the explanation for a discontinuity in the use of delivery care is a factor other than the SDIP, it is likely this same factor would also affect antenatal care seeking.

A further limitation is that the regression model is only able to identify impacts that surface instantaneously. Thus, the question is whether the SDIP would be expected to have an immediate effect on the set outcomes. The CCT and the provider payment in principle *should* have an instantaneous impact on utilisation and neonatal mortality, but if implementation has been slow, the effects may be incremental or simply delayed. On the demand side, the critical factor is awareness of the CCT in households. In those villages where women's groups were running (i.e. approximately half of the sample), we are confident that awareness was high from the outset due to the widespread promotion of the SDIP through this channel, as stated earlier. For this reason, when presenting the results, we stratify according to those villages that did and those that did not have women's groups at the time the SDIP was implemented.

Data

This chapter draws on data from a community surveillance system that has been running in rural areas of Makwanpur district, as part of a randomised control trial to assess the effectiveness of a participatory intervention with women's groups (Manandhar et al., 2004). In the surveillance area, every woman was interviewed one month postpartum about her health seeking behaviour at childbirth, the survival status of the newborn, her household's socioeconomic status and receipt of the CCT. The questionnaire recorded ownership of assets, with which an asset wealth index was constructed using principal components analysis (Filmer & Pritchett, 1998). Over the period 2001–2007, complete data were collected on 14,799 deliveries in the 24 local

administrative areas or Village Development Committees (VDC) covered by the surveillance system.[9] This period includes five years before the SDIP started and almost two years of programme implementation.

After the SDIP had begun, women who delivered in a health facility were asked additional questions on general household consumption and the cost of delivery care. The recall period remained one month, except for expenditures on durable items. Over a six-month period, every household (300 in total) in the surveillance area with a woman who delivered in a health facility was interviewed. The additional module captured general household expenditure, following closely the Nepal Living Standards Measurement Survey (Government of Nepal, 2004), as well as household expenditures on delivery care and outstanding debt. The approach to measuring household living standards was comprehensive, capturing information on not just household expenditures but also the value of home production and those goods or services received in kind. This allows computation of household consumption, a proxy for permanent income (Deaton & Grosh, 2000). The cost of delivery covered facility-based charges (registration; delivery fee; operating theatre; bed charge; drugs; medical supplies; diagnostic tests; food, gifts to health staff and spending on traditional practitioner if sought during labour), additional charges (lodging and food of accompanying family and drugs, medical supplies and food bought outside) and transport charges (Borghi et al., 2006).[10] Outstanding payments to health providers were also included. A summary of these data was presented in the previous section.

Table 3 reports descriptive statistics of the outcome and socioeconomic variables for the five-year period before and the two-year period after the start of the SDIP. Neonatal mortality fell from 29 deaths per 1,000 live births in the first period to 23 deaths per 1,000 in the second period. Utilisation of maternity services and skilled birth attendance were both low in the first period but have risen markedly over time. The proportion of women delivering at a government health facility, for example, increased from 4.2 percent to 10.8 percent between the two periods, and skilled birth attendance rose from 4.4 percent to 10.9 percent. Also, women in the second period were far more likely to deliver in the presence of a health worker. There was an increase in the caesarean section rate from 0.3 percent to 1 percent and an increase in the mean number of antenatal care visits from 1.2 to 2.1.

In the X_{it}, we include a number of characteristics of the woman and her household. There have been notable changes in some of these characteristics over time. While women are more likely to give birth at a younger age and household size has increased, there has been little change in the religion or

caste of families. The education level of women is low, although it has increased over time. Similarly, food sufficiency and the type of house have both improved. Almost 50 percent of the sample was resident in areas that received the women's group intervention.

RESULTS

Financial Burden of Delivery Care

We estimate the OOP health care budget share as an indicator of the financial burden associated with giving birth in a health facility. Table 4 indicates that OOP payments for normal delivery care accounted for 3.6 percent of total annual household consumption, while those for a caesarean section accounted for a much higher 19.3 percent, even with the SDIP in place. Clearly, spending on a caesarean section places an enormous strain on the household budget. The concentration indices of OOP budget shares for both types of delivery are negative indicating that better-off families spend a smaller fraction of total household resources on delivery care. The quintile

Table 4. Out-of-Pocket Spending on Institutional Delivery Care as a Percentage of Household Consumption.

	Vaginal Delivery	Caesarean Section
OOP delivery care spending as % of total household consumption		
Mean (%)	3.6	19.3
Quintile mean		
Poorest (20%)	5.1	22.9
Poorer (20%)	5.6	18.9
Middle (20%)	2.7	22.1
Richer (20%)	2.5	16.3
Richest (20%)	1.9	16.2
Concentration index	−0.23	−0.058
Incidence of catastrophic spending (>10%)	7.4	72.4
OOP delivery care spending as % of household non-food consumption		
Mean (%)	9.9	35.9
Concentration index	−0.21	−0.075
Incidence of catastrophic spending (>40%)	2.6	41.4

Source: Cost of delivery and living standards survey.
Notes: Vaginal deliveries ($N = 271$); caesarean section ($N = 29$).

means also show a similar pattern, although the gradient is less steep in the case of caesarean sections. Given that our sample covered only households seeking delivery care, it is perhaps to be expected that the OOP budget share decreased with household resources. If we had included those who did not seek any care – that is, women who delivered at home – it is likely we would have found that wealthier households spend proportionately more on health care, consistent with other studies (van Doorslaer et al., 2007). The proportion of households that incur catastrophic spending is considerable. Using a 10 percent threshold, the incidence of catastrophic spending was 7.4 percent for normal delivery care and 72.4 percent for caesarean sections.

The mean OOP budget share of non-food expenditure offers an alternative measure of the disruptive effect of OOP payments on living standards. The mean share rises considerably to 9.9 percent for normal deliveries and 35.9 percent for caesarean sections reflecting the large fraction of household resources devoted to food (basic necessities) in our sample. Again, the concentration indices are negative suggesting that richer households spent a smaller fraction of their discretionary resources on delivery care. The incidence of catastrophic spending, as defined by a 40 percent threshold, was 2.6 percent in the case of normal delivery care and 41.4 percent for caesarean sections.

While we are unable to comment on how the SDIP has affected the financial burden of delivery care, health spending, and particularly that on surgery, appears to be highly disruptive to the living standards of households, despite the financial assistance offered by the SDIP.

Uptake and Benefit Incidence of the Conditional Cash Transfer

Women who meet the conditions of the SDIP should receive the CCT on the day of discharge from the health facility. During our study period, only two-fifths of eligible women received the CCT after childbirth. There are likely to be factors other than the official conditions laid down in the policy that influence the chances of a woman receiving the CCT. We explored this possibility using a probit model, the results of which are reported in Table 5.

In accordance with the official eligibility criteria, if a woman had two or fewer children or delivered in a public health facility, she was more likely to receive the CCT. In addition, a number of other factors were statistically significant. The chances of receiving the CCT varied by type of public health facility, suggesting differences in uptake were related to where the woman delivered. Women who delivered in a primary health care centre were most

Table 5. Results of Probit of Determinants of Receiving the Conditional Cash Transfer.

Variable	Coefficient	Z score
Two or fewer living children	0.833	6.75
Home delivery	*Reference category*	
District hospital delivery	2.362	19.88
Other public hospital delivery	2.035	16.00
Primary health centre delivery	2.575	20.42
Health post delivery	1.679	4.00
Private health facility delivery	0.885	3.12
Asset wealth	0.013	0.67
Ethnically marginalised	0.132	1.56
No education	*Reference category*	
Primary education	0.397	3.54
Some secondary	0.471	3.98
Secondary or higher education	0.561	4.06
Woman attended women's group	0.124	1.07
Agricultural work	*Reference category*	
Salaried work	−0.248	−1.49
Small business	−0.004	−0.03
Waged labour	0.288	1.69
Other occupation	0.381	0.72
constant	−3.982	−23.35
N observations	9,801	
Pseudo R^2	0.524	

Source: Community surveillance system 2005–2007.
Notes: Data include additional villages that were included in the surveillance system from 2005 onwards. Table 3 does not report summary statistics for these villages.

likely to receive the cash, while those using a health post were least likely. Those who delivered in a private health facility rather than at home were more likely to receive the CCT. This could be explained by women receiving the cash after childbirth during a visit to a public health facility to manage postpartum complications. Women with at least some education had a higher chance of receiving the CCT. Given the administrative procedures, women with no education (i.e. illiterate women) may have found it difficult – and health staff unwilling to assist – to complete the required form to apply for the CCT. The explanatory variables in the model do not fully capture administrative problems in the management of funds and undoubtedly, as reported elsewhere, delays in the disbursement of funds higher up the system prevented women getting access to the CCT (Powell-Jackson et al., 2008).

With no explicit targeting built into the SDIP, we would expect the same factors that influence use of public health facilities at delivery also to affect the chances of a woman receiving the CCT. Indeed, if we omit the variables relating to place of delivery in the probit model mentioned earlier (results not shown), wealth becomes significant – that is, richer households are much more likely to receive the CCT because they have a higher chance of delivering in a public health facility.[11] Another way of showing this is with concentration curves. In Fig. 1, we see that receipt of the CCT is heavily concentrated among richer households, reflecting the fact that users of government maternity services are also disproportionately wealthier.[12] Inequality in the benefit incidence of the CCT is simply illustrative of an existing inequality in the use of delivery care services. The main purpose of the CCT is to raise demand for health services, but it is also a transfer of resources to households. In this

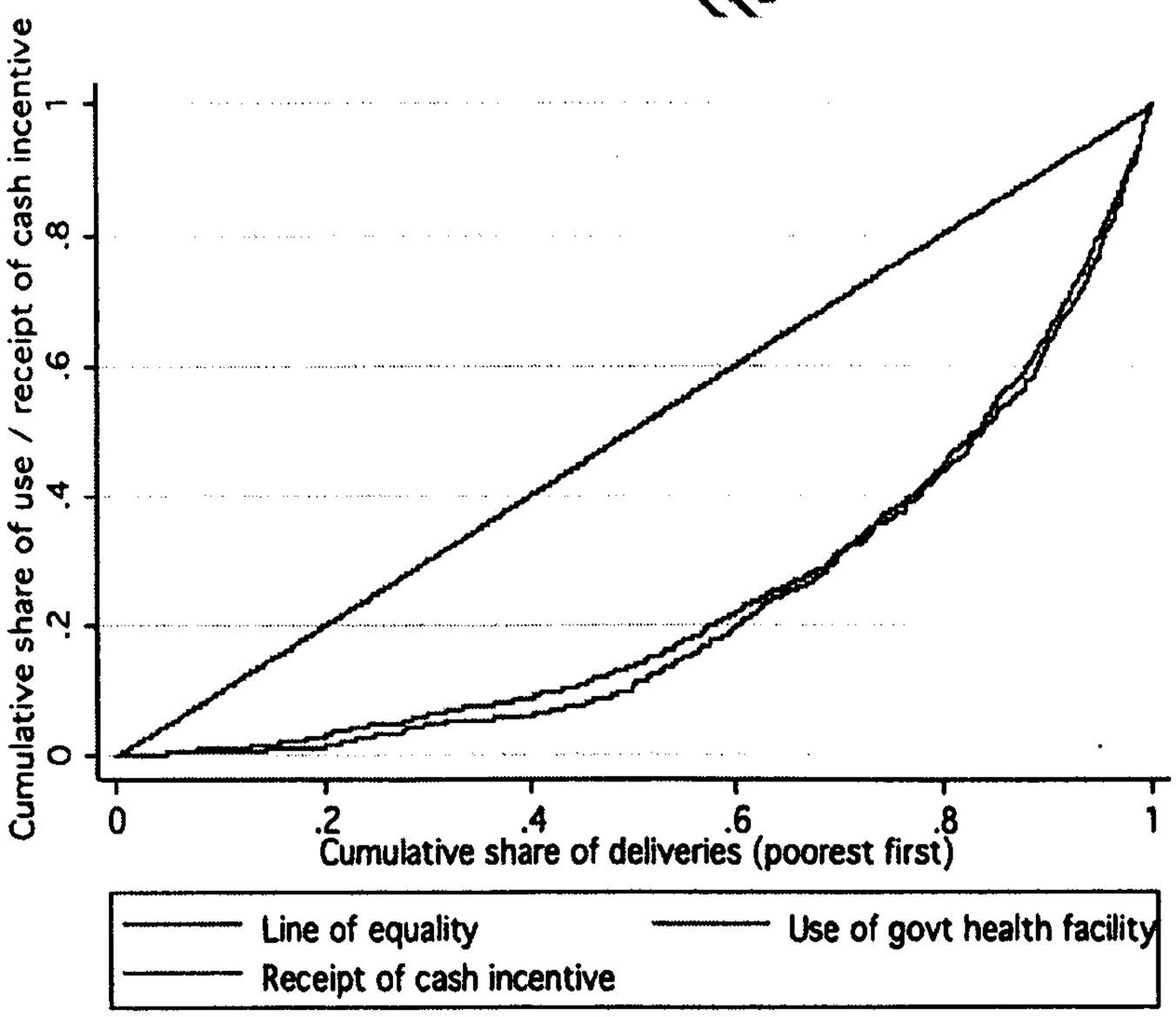

Fig. 1. Concentration Curves for Use of Institutional Delivery and Receipt of Conditional Cash Transfer in the Entire Population of Delivering Women. *Source:* Community Surveillance System 2005–2007.

second regard, it may be considered inequitable, benefiting relatively wealthier groups within our sample of rural women.

Impacts

Figs. 2–5 plot selected outcomes over time, showing the three-month moving average and a vertical line to indicate the point at which implementation of the SDIP began. Visual inspection of the time series data provides a useful starting point to identify impacts.

An interruption in the time series at the month of the programme's introduction can be seen in the case of a delivery at home and a delivery with a skilled birth attendant. The shifts are in the expected direction: a reduction in the probability of a home delivery and an increase in the chances of a delivery with a skilled birth attendant. In contrast, there is no obvious shift in the probability of a neonatal death or the number of antenatal care visits at around the time of the programme's introduction, but rather a consistent trend over the entire period.

Next, we turn to the regression analysis, starting with the most flexible specification of the relationship between the outcomes and time. The

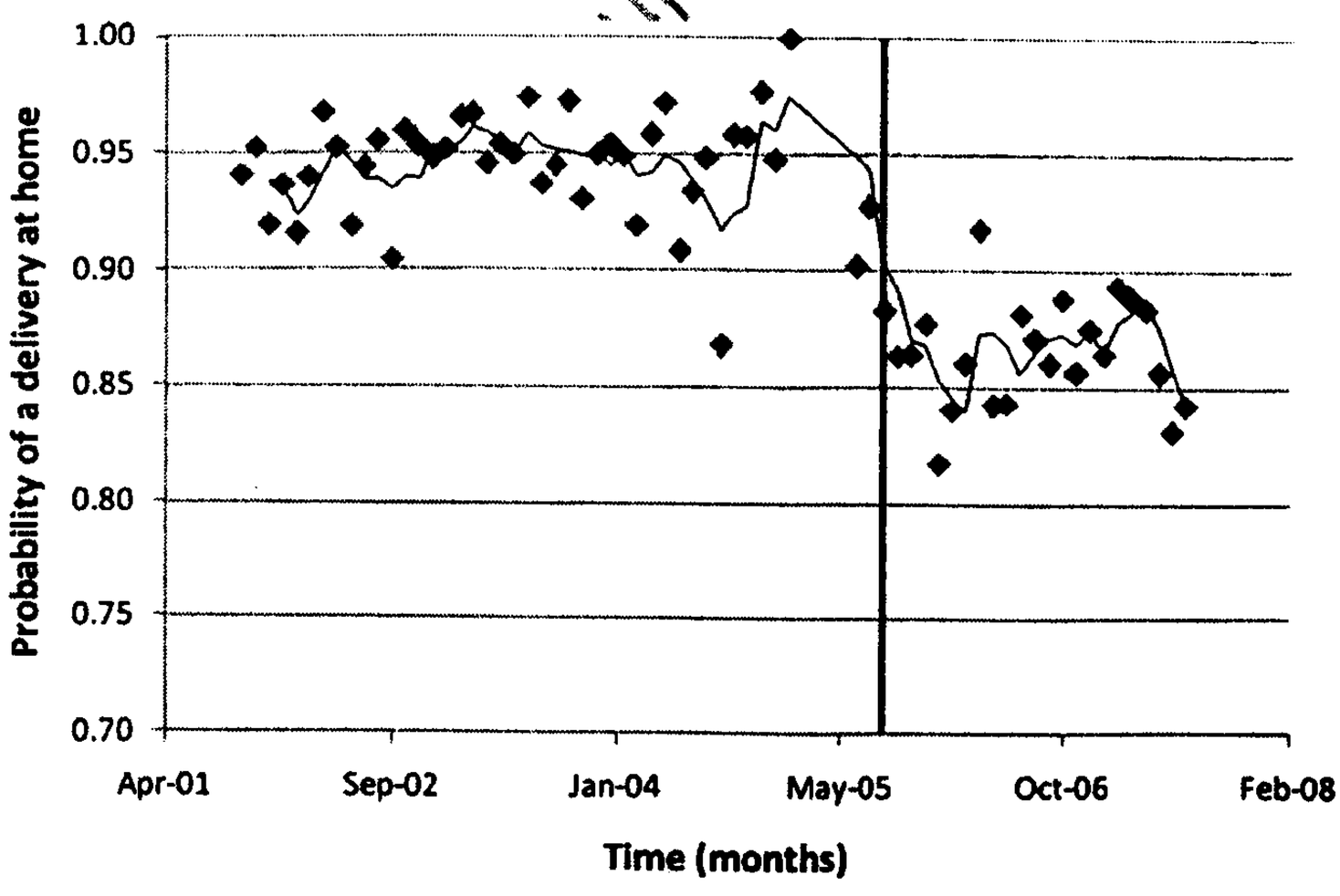

Fig. 2. Probability of a Delivery at Home Over Time: The Three-Month Moving Average and Start of the SDIP.

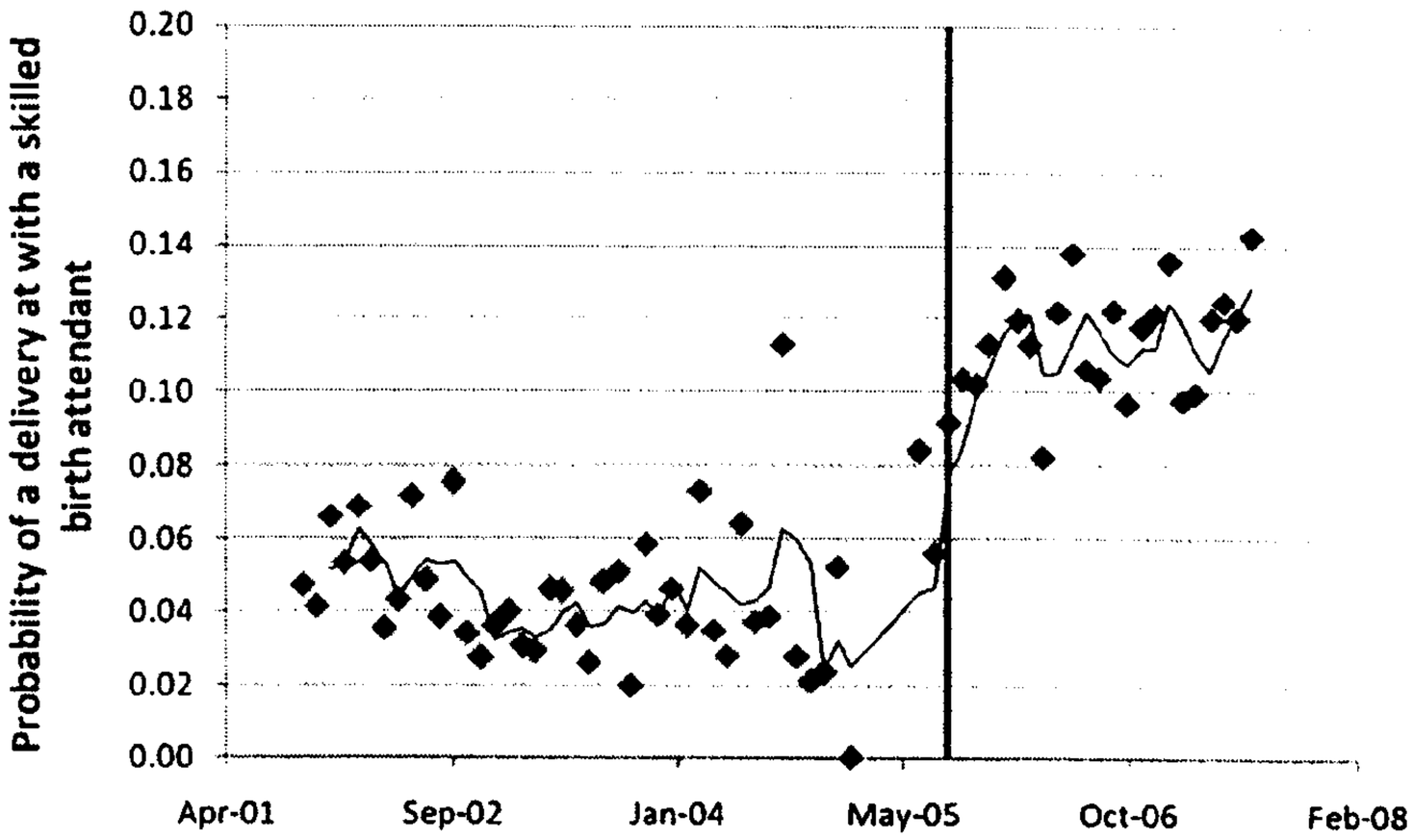

Fig. 3. Probability of a Delivery with a Skilled Birth Attendant Over Time: The Three-Month Moving Average and Start of the SDIP.

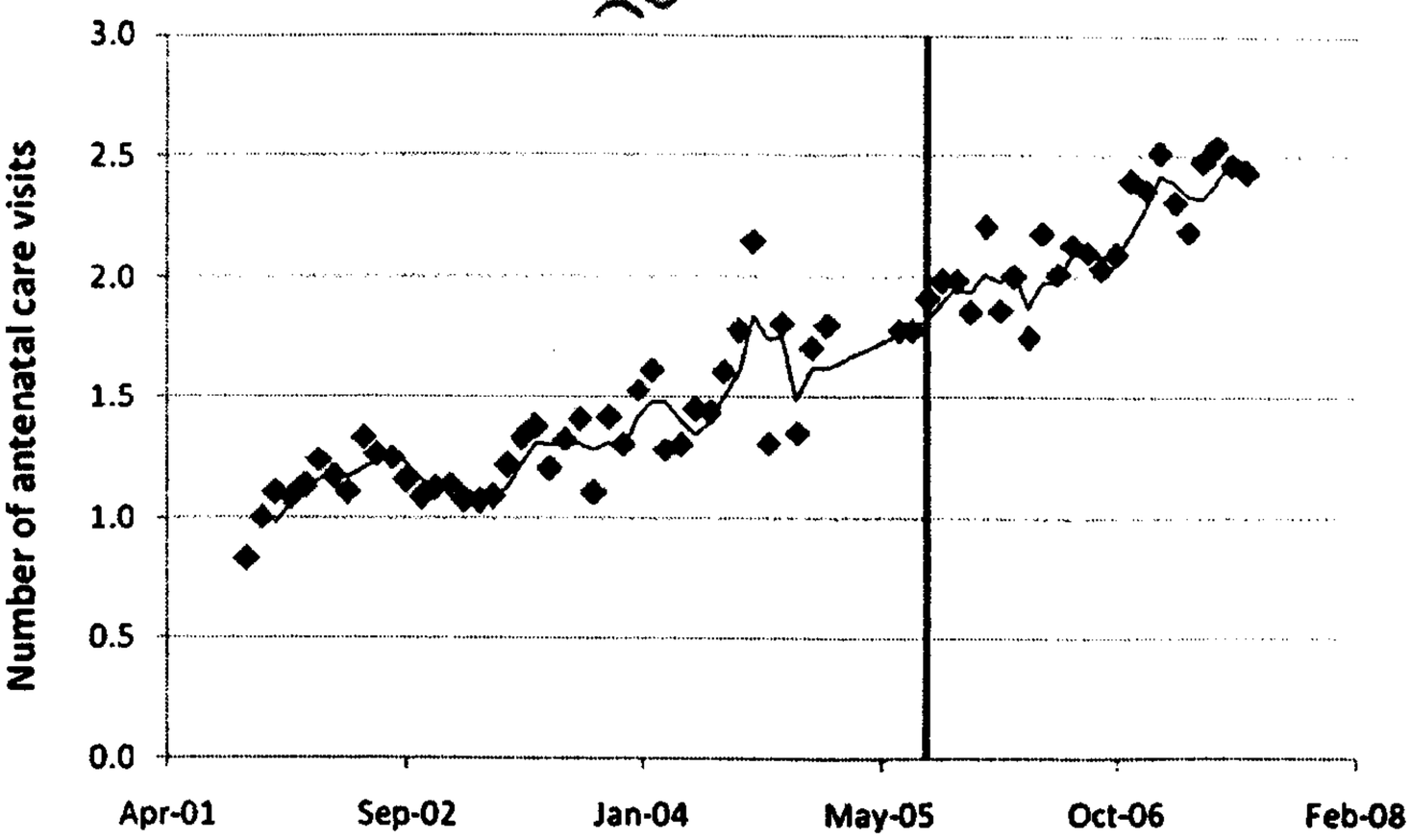

Fig. 4. Number of Antenatal Care Visits Over Time: The Three-Month Moving Average and Start of the SDIP.

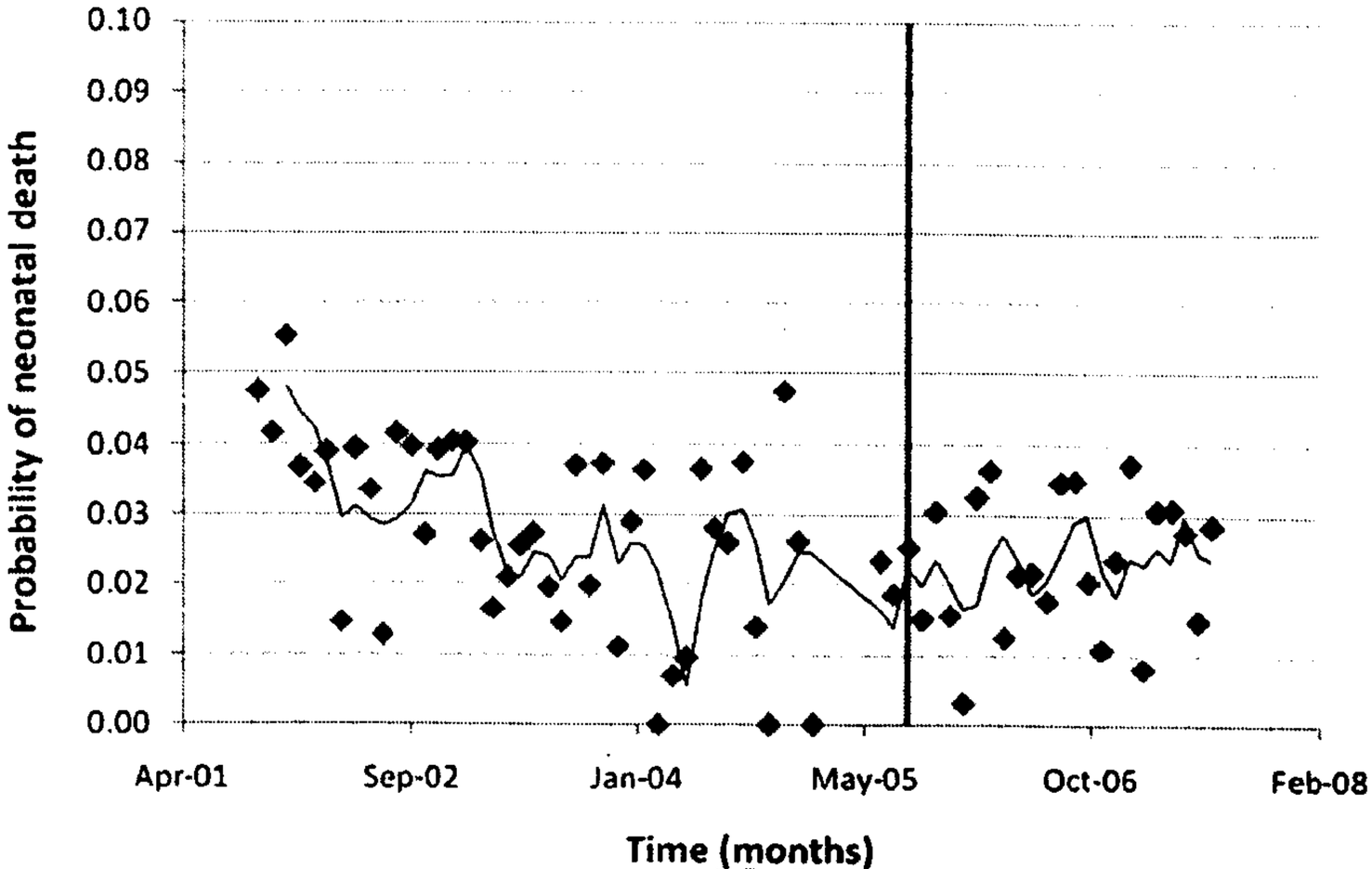

Fig. 5. Probability of a Neonatal Death Over Time: The Three-Month Moving Average and Start of the SDIP.

regressions based on the full sample (i.e. including all villages) confirm the results of the visual inspection. Table 6 illustrates that the SDIP had a significant impact on a number of outcomes. The SDIP reduced the probability of a home delivery by 4.2 percentage points and increased the chances of a delivery in a government health facility by 2.6 percentage points. Estimates also suggest a positive impact on skilled birth attendance (2.3 percentage points) and attendance by any health worker (4.4 percentage points). There is no evidence that the SDIP had any impact on neonatal mortality, utilisation of private health facilities and the caesarean section rate.

When we stratify the results between the villages that were receiving the women's group intervention at the time the SDIP began and those that were not, substantial differences in the impacts are revealed (Table 6). In the villages without women's groups, the SDIP had no impact on any of the outcomes. In the villages with women's groups, however, the SDIP increased skilled birth attendance by 5.3 percentage points and raised the chances of a delivery in a government health facility by 6.3 percentage points. The results from the full sample are driven by the villages with women's groups. The possibility remains that some factor other than the SDIP was responsible for these impacts. In Table 7, estimates show that

Table 6. Effect of the SDIP on the Probability of a Neonatal Death and the Use of Health Care Services at Childbirth (Quartic Time Function).

Outcome	All Villages			Villages with Women's Groups			Villages without Women's Groups		
	Effect		Pseudo R^2	Effect		Pseudo R^2	Effect		Pseudo R^2
	dy/dx	z		dy/dx	z		dy/dx	z	
Neonatal mortality	−0.0004	−0.05	0.019	−0.002	−0.20	0.020	0.001	0.11	0.025
Delivery at home	−0.042	−3.49	0.212	−0.091	−3.82	0.201	−0.009	−0.82	0.189
Delivery at government facility	0.026	2.78	0.244	0.063	3.25	0.225	0.004	0.45	0.235
Delivery at private facility	0.002	1.17	0.337	0.000	0.41	0.409	0.000	0.57	0.197
Delivery with skilled birth attendance	0.023	2.34	0.245	0.053	2.72	0.223	0.005	0.52	0.253
Delivery with a health worker	0.044	3.46	0.247	0.088	3.5	0.219	0.016	1.29	0.240
Delivery by caesarean section	−0.001	−0.69	0.186	−0.003	−1.00	0.182	0.000	0.43	0.225

Notes: Regressions include 24 community-level fixed effects, dummies capturing ethnicity, religion, occupation of household head, and materials used to make house, as well variables for age of the woman at childbirth, educational attainment and number of months in the previous year for which household had enough food. The time function is a polynomial of degree four.

Table 7. Effect of the SDIP on the Number of Antenatal Care Visits (Quartic Time Function).

Outcome	All Villages			Villages with Women's Groups			Villages without Women's Groups		
	Effect		R^2	Effect		R^2	Effect		R^2
	Coeff.	t-Stat.		Coeff.	t-Stat.		Coeff.	t-Stat.	
Number of antenatal care visits	0.031	0.38	0.380	0.128	1.01	0.357	−0.054	−0.53	0.332

Notes: Regressions include 24 community-level fixed effects, dummies capturing ethnicity, religion, occupation of household head, and materials used to make house, as well variables for age of the woman at childbirth, educational attainment and number of months in the previous year for which household had enough food. The time function is a polynomial of degree four.

there was no discontinuity in the number of antenatal care visits at the time of the SDIP's introduction, strengthening the plausibility of the overall findings. It seems unlikely that non-programme factors would have affected utilisation of maternity services without having an impact on antenatal care.

Tables 8 and 9 provide impact estimates using the more restricted specification where time is modelled as a quadratic function. Some important differences in impact estimates between the two sets of regressions emerge. The regressions based on the full sample indicate that the SDIP had a positive impact on the probability of a delivery at a private health facility. In practice, such a finding is difficult to explain, unless there was a misunderstanding in the community that the SDIP was also covering the private sector. The other major difference is the finding of a positive impact of the SDIP on utilisation of government maternity services in villages that did not receive the women's group intervention. The two specifications remain consistent in their finding of no impact on either neonatal mortality or the caesarean section rate.

Table 8. Effect of the SDIP on the Probability of a Neonatal Death and the Use of Health Care Services at Childbirth (Quadratic Time Function).

Outcome	All Villages			Villages with Women's Groups			Villages without Women's Groups		
	Effect		Pseudo R^2	Effect		Pseudo R^2	Effect		Pseudo R^2
	dy/dx			dy/dx	z		dy/dx	z	
Neonatal mortality	0.0001	0.01	0.019	0.002	0.27	0.020	0.000	0.00	0.025
Delivery at home	−0.049	−5.25	0.212	−0.073	−4.33	0.201	−0.033	−3.17	0.186
Delivery at government facility	0.029	4.18	0.244	0.045	3.33	0.225	0.020	2.68	0.232
Delivery at private facility	0.004	2.25	0.330	0.002	1.86	0.402	0.000	0.77	0.188
Delivery with skilled birth attendance	0.031	4.16	0.245	0.046	3.32	0.222	0.021	2.74	0.251
Delivery with a health worker	0.069	6.60	0.245	0.110	5.58	0.218	0.042	3.74	0.236
Delivery by caesarean section	−0.0004	−0.30	0.185	−0.002	−0.79	0.181	0.001	0.93	0.224

Notes: Regressions include 24 community-level fixed effects, dummies capturing ethnicity, religion, occupation of household head, and materials used to make house, as well variables for age of the woman at childbirth, educational attainment and number of months in the previous year for which household had enough food. The time function is a polynomial of degree two.

Table 9. Effect of the SDIP on the Number of Antenatal Care Visits (Quadratic Time Function).

Outcome	All Villages			Villages with Women's Groups			Villages without Women's Groups		
	Effect		R^2	Effect		R^2	Effect		R^2
	Coeff.	*t*-Stat.		Coeff.	*t*-Stat.		Coeff.	*t*-Stat.	
Number of antenatal care visits	−0.046	−0.75	0.379	−0.013	−0.14	0.356	−0.072	−0.91	0.332

Notes: Regressions include 24 community-level fixed effects, dummies capturing ethnicity, religion, occupation of household head, and materials used to make house, as well variables for age of the woman at childbirth, educational attainment and number of months in the previous year for which household had enough food. The time function is a polynomial of degree two.

DISCUSSION

While CCT programmes in Latin America have been well-documented, there is little empirical evidence on whether large-scale cash incentive programmes in south Asia can improve health care seeking behaviour and health outcomes. This chapter provides evidence of the SDIP's impact in one district of Nepal.

The results suggest that the SDIP had a significant impact on utilisation of maternity services, despite known problems in the administration and uptake of the CCT. The programme raised skilled birth attendance and reduced the chance of a woman delivering at home. Even though the CCT represented a small proportion of the cost of delivery care to a household, it acted as a powerful enough signal for behavioural change. The programme, however, failed to have any impact on the caesarean rate, suggesting supply-side barriers constrain utilisation of emergency obstetric services rather than a lack of demand. The results also showed no impact on neonatal mortality. The SDIP changed health care seeking behaviour at childbirth but not the health outcomes of the newborn. It may be the case that the impact on utilisation was too modest to produce a detectable effect on mortality, or inadequate quality of care was the constraining factor in translating increases in utilisation into improved health.

A closer examination of the results from the most flexible model shows that the impact estimates from the entire sample are driven by the villages with women's groups. In these villages, the impact of the SDIP on utilisation of maternity services and skilled birth attendance was substantial. There

remained, however, no impact of the programme on the caesarean section rate or neonatal mortality. These findings point towards the women's groups in Makwanpur as a useful means to communicate the SDIP to the public and highlight the importance of having a communication strategy as an integral part of implementation. There are implications for the impact of the programme in the rest of country, where indications are that awareness has been low. If the public are unaware of the programme's benefits, they cannot be expected to change behaviour as a consequence. It is conceivable that public awareness of the programme in the villages without women's groups spread slowly, causing a change in health care seeking behaviour over time that could not be identified using our approach.

There are reasons to believe that the impact estimates in our study area were greater than the country as a whole. Geographical access to health facilities in the district is relatively good, whereas in many other districts in Nepal, poor access represents more than simply a high transport cost – it is a physical barrier to getting to the health facility. Moreover, our sample included only rural households who are typically poorer than urban households. Economic theory would predict that poorer households are likely to be more incentivised by the CCT.

Of concern is the high incidence of catastrophic expenditure associated with OOP spending on institutional delivery care, despite the inclusion of the CCT in the estimates.[13] It implies that the SDIP, by incentivising greater use of institutional delivery, risks exposing more households to catastrophic payments. Moreover, there is no reason to assume that the health benefits of professional care necessarily outweigh the economic costs. CCT programmes in other countries have rarely encountered this tension because they have focused on low-cost preventive interventions (typically given free of charge) such as immunisation or growth monitoring. But evidence from China suggests that health insurance can increase the risk of catastrophic expenditure by raising utilisation of care (Wagstaff & Lindelow, 2008).

Further to this issue of cost, there was anecdotal evidence showing that providers may have price discriminated between patients, charging more to women who were given the CCT.[14] With such behaviour, the CCT provides no subsidy to the cost of care or protection against catastrophic payments. Greater transparency in the charging of user fees in Nepal would limit the extent to which health providers can price discriminate. More importantly, though, the SDIP should be linked to policies that offer better financial protection to households, focusing in particular on obstetric complications and poorer households – which are both associated with a higher incidence of catastrophic payments. The Government of Nepal recently abolished user

fees for delivery care in the public sector. If implemented well, the change in policy should offer considerable financial protection to households. Any further evaluation of the SDIP will need to be wary of this policy change as a possible confounder in any analysis of utilisation.

The analysis of the determinants of uptake of the CCT suggest more households would be able to access the cash if the administration process were simplified so that it did not work against those with no education. Problems in the disbursement of funds at the central level are widely acknowledged, but the results suggest administration at the facility level also matters. It may be the case that certain types of health facility, such as health posts, need additional administrative support from the district health office to improve management of the SDIP.

The study raises the issue of targeting. One of the major differences between the SDIP and Latin American CCT programmes is its universal nature. In Mexico, de Janvry and Sadoulet (2006) has highlighted the inefficiencies associated with paying people to do what they would have done anyway. Since the CCT is given to those who meet the condition, irrespective of whether they would have met the condition in the absence of the programme, the cost per marginal visit can be very high. These inefficiencies are likely to be greater in the SDIP, as utilisation of delivery care services is higher amongst the better-off who remain eligible for the CCT. Also, we demonstrated another, if unsurprising, consequence of choosing not to target. The distribution of the CCT was skewed heavily in favour of relatively better-off families since they are most likely to attend health facilities. An obvious implication for the fine-tuning of the programme would be to target poor households. However, the evidence regarding the feasibility of targeting in low-income countries is not encouraging, and the cost of administration can be substantial. Given existing difficulties in the administration of the CCT, it is reasonable then that the SDIP does not target specific households; policymakers must accept the drawbacks and costs that this entails. Whether the SDIP represents value for money is a pressing question for further research, particularly given the additional inefficiencies that come hand in hand with not being able to target.

NOTES

1. An obstetric complication represents more of a health shock since it is, to some extent, unforeseen.
2. While we include debt to the service provider in the total cost, it is not known whether households paid the amount still owed after the time of survey.

3. A small number of large tertiary hospitals in Kathmandu were not part of the programme in its first two years.

4. In the least developed districts, women were also offered free care in addition to the CCT. Our study district was not one of the districts in which women from that district could benefit from the free delivery care component of the SDIP.

5. A related concern is that health workers attending a home delivery, worried that they could forgo the provider incentive, might be reluctant to refer women to a health facility in the case of an emergency.

6. An information pamphlet, for example, explains that 'more benefits reach to [the] poor, disadvantaged and marginalised women' and 'the [SDIP] contributes to mitigate the barrier in seeking care, provides relief to the poor families ...' (Government of Nepal. 2006).

7. In the absence of pre-implementation data, this chapter is not able to shed light on the question of whether the SDIP has affected delivery care spending and the financial burden it places on households.

8. Otherwise referred to as the OOP health care budget share.

9. Mean number of deliveries per month captured by the surveillance system was 221.

10. Unlike (Borghi et al., 2006), we did not include the opportunity cost of time.

11. Note that there was no independent effect of wealth in Table 5, once we controlled for the place of delivery.

12. As measured by a wealth index derived using principal components analysis from information about the ownership of assets.

13. We acknowledge that the estimates of catastrophic expenditure may exaggerate the short-term disruptive effects of paying for delivery care since childbirth typically is not a health shock and households can plan financially for the event. However, there are likely to be important longer term effects that are not captured in measures of catastrophic expenditure.

14. Among women who received the CCT, the mean OOP payment to the health provider for a normal delivery was 1,774 NRS (95% CI: 1304–2245), compared with 968 NRS 95% CI: 791–1145) among those who did not receive any cash.

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REFERENCES

Attanasio, O., Carlos Gomez, L., Heredia, P., & Vera-Hernandez, M. (2005). *The short term impact of a conditional cash subsidy on child health and nutrition in Columbia*. London: The Institute for Fiscal Studies.

Borghi, J., Ensor, T., Neupane, B. D., & Tiwari, S. (2006). Financial implications of skilled attendance at delivery in Nepal. *Tropical Medicine & International Health, 11*, 228–237.

Cook, T., & Campbell, D. (1979). *Quasi-experimentation. Design and analysis issues for field settings*. Boston: Houghton Mifflin Co.

de Janvry, A., & Sadoulet, E. (2006). Making conditional cash transfer programs more efficient: Designing for maximum effect of the conditionality. *The World Bank Economic Review, 20*(1), 1–29.

Deaton, A., & Grosh, M. (2000). *Consumption*. Washington DC: World Bank.

Devadasan, N., Elias, M., John, D., Grahachary, S., & Ralte, L. (2008). A conditional cash assistance programme for promoting institutional deliveries among the poor in India: Process evaluation results. In: F. Richard, S. Witter & V. Brouwere (Eds), *Reducing financial barriers to obstetric care in low-income countries*. Antwerp: ITG Press.

Eichler, R., Auxila, P., & Pollock, J. (2001). Promoting preventive health care: Paying for performance in Haiti. In: P. Brook & S. Smith (Eds), *Contracting for public services: Output-based aid and its applications* (pp. 65–72). Washington DC: World Bank.

Eldridge, C., & Palmer, N. (2009). Performance-based payment: Some reflections on the discourse, evidence and unanswered questions. *Health Policy Plan, 24*(3), 160–166.

Ensor, T., & Cooper, S. (2004). Overcoming barriers to health service access: Influencing the demand side. *Health Policy Plan, 19*, 69–79.

Filmer, D., & Pritchett, L. (1998). *Estimating wealth effects with no expenditure data-or tears: An application to educational enrollment in states of India*. Washington DC: World Bank.

Fiszbein, A., & Schady, N. (2009). *Conditional cash transfers: Reducing present and future poverty*. Washington DC: World Bank.

Gertler, P. (2004). Do conditional cash transfers improve child health? Evidence from PROGRESA's control randomised experiment. *American Economic Review, 94*, 336–341.

Glassman, A., Todd, J., & Gaarder, M. (2007). *Performance-based incentives for health: conditional cash transfer programs in Latin America and the Caribbean*. Washington DC: Center for Global Development.

Government of Nepal. (2004). *Nepal living standards survey 2003/04*. Central Bureau of Statistics, Government of Nepal, Kathmandu.

Government of Nepal. (2005). *Operational guidelines on incentives for safe delivery services*. Kathmandu: Government of Nepal, Ministry of Health and Population.

Government of Nepal. (2006). Information kit on cost sharing scheme for the promotion of safe delivery service. Government of Nepal and Support to Safe Motherhood Programme, Ministry of Health and Population, Kathmandu.

Government of Nepal. (2007). *Nepal Demographic and Health Survey*. Kathmandu, Nepal: Government of Nepal and ORC Macro.

Government of the People's Republic of Bangladesh. (2007). *Demand side financing pilot maternal health voucher scheme proposal*. Dhaka: Ministry of Health and Family Welfare, Government of the People's Republic of Bangladesh.

Habicht, J. P., Victora, C. G., & Vaughan, J. P. (1999). Evaluation designs for adequacy, plausibility and probability of public health programme performance and impact. *International Journal of Epidemiology, 28*, 10–18.

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2008). *Governance matters VII: Aggregate and individual governance indicators, 1996–2007*. World Bank Policy Research Working Paper no. 4654. World Bank, Washington DC.

Koblinsky, M., Matthews, Z., Hussein, J., Mavalankar, D., Mridha, M. K., Anwar, I., Achadi, E., et al. (2006). Going to scale with professional skilled care. *Lancet, 368*, 1377–1386.

Lagarde, M., Haines, A., & Palmer, N. (2007). Conditional cash transfers for improving uptake of health interventions in low- and middle-income countries: A systematic review. *JAMA, 298*, 1900–1910.

Lawn, J. E., Cousens, S., & Zupan, J. (2005). 4 Million neonatal deaths: When? Where? Why? *Lancet, 365*, 891–900.

Maluccio, J., & Flores, R. (2004). *Impact evaluation of a conditional cash transfer program: The Nicaraguan red de proteccion social*. Discussion Paper, 184. International Food Policy Research Institute, Washington DC.

Manandhar, D. S., Osrin, D., Shrestha, B. P., Mesko, N., Morrison, J., Tumbahangphe, K. M., Tamang, S., et al. (2004). Effect of a participatory intervention with women's groups on birth outcomes in Nepal: Cluster-randomised controlled trial. *Lancet, 364*, 970–979.

Meessen, B., Kashala, J. P., & Musango, L. (2007). Output-based payment to boost staff productivity in public health centres: Contracting in Kabutare district, Rwanda. *Bulletin of the World Health Organization, 85*, 108–115.

Moffitt, R. (1991). Program evaluation with nonexperimental data. *Evaluation Review, 15*, 291–314.

Morris, S., Flores, R., Olinto, P., & Medina, J. M. (2004a). Monetary incentives in primary health care and effects on use and coverage of preventive health care interventions in rural Honduras: Cluster randomised trial. *Lancet, 364*, 2030–2037.

Morris, S. S., Olinto, P., Flores, R., Nilson, E. A., & Figueiro, A. C. (2004b). Conditional cash transfers are associated with a small reduction in the rate of weight gain of preschool children in northeast Brazil. *Journal of Nutrition, 134*, 2336–2341.

O'Donnell, O., Doorslaer, E., Wagstaff, A., & Lindelow, M. (2008). *Analysing health equity using household survey data: A guide to techniques and their implementation*. Washington DC: World Bank.

Paxon, C., & Schady, N. (2007). *Does money matter? The effects of cash transfers on child health and development in rural Ecuador*. Washington, DC: World Bank.

Powell-Jackson, T., Neupane, B. D., Tiwari, S., Morrison, J., & Costello, A. (2008). *Evaluation of the safe delivery incentive programme: Final report of the evaluation*. Kathmandu, Nepal: Support to Safe Motherhood Programme.

Soeters, R., & Griffiths, F. (2003). Improving government health services through contract management: A case from Cambodia. *Health Policy Plan, 18*, 74–83.

Travis, P., Bennett, S., Haines, A., Pang, T., Bhutta, Z., Hyder, A. A., Pielemeier, N. R., Mills, A., & Evans, T. (2004). Overcoming health-systems constraints to achieve the Millennium Development Goals. *Lancet, 364*, 900–906.

van Doorslaer, E., O'Donnell, O., Rannan-Eliya, R. P., Somanathan, A., Adhikari, S. R., Garg, C. C., Harbianto, D., et al. (2007). Catastrophic payments for health care in Asia. *Health Economics, 16*, 1159–1184.

Victora, C. G., Habicht, J. P., & Bryce, J. (2004). Evidence-based public health: Moving beyond randomized trials. *American Journal of Public Health, 94*, 400–405.

Wagstaff, A. (2009a). Estimating health insurance impacts under unobserved heterogeneity: The case of Vietnam's Health Care Fund for the Poor Health Economics. *Health Economics*, in press.

Wagstaff, A. (2009b). Extending health insurance to the rural population: An impact evaluation of China's new cooperative medical scheme. *Journal of Health Economics, 28*, 1–19.
Wagstaff, A., & Doorslaer, E. (2003). Catastrophe and impoverishment in paying for health care: With applications to Vietnam 1993–1998. *Health Economics, 12*, 921–934.
Wagstaff, A., & Lindelow, M. (2008). Can insurance increase financial risk? The curious case of health insurance in China. *Journal of Health Economics, 27*, 990–1005.
Xu, K., Evans, D. B., Kawabata, K., Zeramdini, R., Klavus, J., & Murray, C. J. (2003). Household catastrophic health expenditure: A multicountry analysis. *Lancet, 362*, 111–117.