Pragmatic pluralism for health: Understanding the role of public financing and public-private engagement on use, quality, and equity in access to maternal health services in Kenya

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I, Mardieh Louise Dennis, confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

_____	1 September, 2019
Mardieh Louise Dennis	Date

THESIS ABSTRACT

This thesis assesses the effects of having pluralistic systems of health financing and service provision on universal healthcare coverage with a case study on maternal health in Kenya. Through five research papers using a mix of systematic literature review, qualitative, and quasi-experimental quantitative methods, this thesis answers three primary research questions. First, how do researchers measure the contribution of the private sector to maternal health and family planning service provision and how much care does the private sector provide in sub-Saharan Africa (SSA)? Second, how did Kenya's pluralistic financing policies and public-private engagement strategies for health arise and evolve over time? Finally, what are the impacts of user fee removals and subsidized vouchers on use, sector, quality, continuity, and equity of maternal care in Kenya?

The findings from the systematic review suggest that there is substantial heterogeneity in the way that the private health sector is defined in scientific literature, making it difficult to compare estimates of private sector health provision. The qualitative study reveals that Kenya's pluralistic health system results from the confluence of many historical, social, political, and economic factors and effective lobbying by the private for-profit sector. Finally, the three quasi-experimental studies highlight a complex set of outcomes resulting from user fee removal policies and the safe motherhood voucher program in Kenya. The 10/20 policy was associated with positive effects on the timing and number of ANC visits; however, these improvements were unrelated to use of the public primary care facilities that the policy targeted. The voucher program increased use of facility-based delivery care among poor women; however, it had no impact on use of four or more ANC visits or postnatal care. After the free maternity services policy was introduced, the voucher program no longer improved use of facility-based delivery among the poor; however, use of the private sector remained much higher in voucher counties. Both the voucher program and insurance coverage had positive impacts on continuity of maternal care for poor women, while introduction of the free maternity services policy did not.

Many factors affect women's use of maternal health services beyond the cost of care. Making services free in the public sector is not sufficient to eliminate disparities in access to health services; policymakers must therefore simultaneously address both financial and non-financial barriers to service use. Health financing strategies involving private providers have

the potential to equitably increase service use and continuity, provided that the cost of care is subsidized for users with the lowest ability to pay.

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ACRONYMS AND ABBREVIATIONS

ANC	Antenatal care
aOR	Adjusted odds ratio
CHWs	Community health workers
CI	Confidence interval
DHS	Demographic and Health Survey
GDP	Gross domestic product
HMIS	Health management information system
KfW	German Development Bank
KSh	Kenyan Shillings
KSPA	Kenya Service Provision Assessment
LMIC	Low- and middle-income country
LSHTM	London School of Hygiene and Tropical Medicine
MAR	Missing at random
MCAR	Missing completely at random
MDG	Millennium Development Goal
MMR	Maternal mortality ratio
MNAR	Missing not at random
NGO	Non-governmental organization
NHIF	National Hospital Insurance Fund
NSHIF	National Social Health Insurance Fund
ODA	Official development assistance
OR	Odds ratio
PNC	Postnatal care

PPP	Purchasing power parity
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
SBA	Skilled birth attendant
SDG	Sustainable Development Goal
SSA	Sub-Saharan Africa
UHC	Universal healthcare coverage
VAT	Value-added tax
WHO	World Health Organization

1 INTRODUCTION

1.1 THESIS OVERVIEW

The concept of 'health for all' has been fundamental to health policies and programming since as early as 1948, when the Universal Declaration of Human Rights declared that everyone should have the right to a standard of living that ensures adequate health and wellbeing [1]. In 1978, the Declaration of Alma Ata established health as a basic right that should be guaranteed in all countries [2,3]. Decades later, in 2005, the World Health Organization (WHO) member states passed a resolution to ensure that all people could access health services without experiencing financial hardship, an idea that they termed 'universal coverage' [3,4]. Universal healthcare coverage (UHC) is now nearly ubiquitous in the global development agenda, particularly since the release of the Sustainable Development Goals (SDGs) in 2015, which emphasize the importance of ensuring universal access to affordable, high-quality health services [5]. Consensus on how to achieve UHC, however, is more elusive, particularly for low- and middle-income country (LMIC) settings, where coverage of healthcare services and public spending on health tend to be lowest [6,7]. Furthermore, in practice, even if most LMIC governments increased the proportion of their annual budgets allocated to health, few to none would have the financial capacity to cover the full cost of health care for all, nor would public health facilities be prepared to fully meet the demand for care [4,7]. Thus, as countries strive to achieve UHC, they must implement a range of policies and interventions to equitably address these two critical heath sector gaps: financing and service provision [8,9].

For LMICs, progress towards UHC has frequently been measured by tracking coverage of key services associated with the Millennium Development Goal (MDG) and SDG targets pertaining to improving maternal and child health [7,9–13]. Given that the Universal Declaration of Human Rights states that the periods of motherhood and childhood should be treated with particular care and assistance, maternal health serves as a good proxy indicator for how well countries are making progress towards achieving UHC and guaranteeing human rights related to health more broadly [1]. As sub-Saharan Africa bears a disproportionally large share of the global maternal mortality burden, many African governments have initiated a number of strategies to increase access and reduce financial barriers to care [14]. In terms of financial protection, some countries have removed or reduced user fees for essential health services such as maternity care in government facilities and taken steps to establish national health insurance schemes with the ultimate goal of

providing insurance coverage for all [11,15]. A number of African countries, and the financial and technical agencies that support them, have also sought to leverage private sector resources by strategically engaging with private health providers to increase access to essential care through approaches such as purchasing, incentivizing, and regulation [16–19].

To comprehensively address the many challenges with ensuring universal financial protection and service provision, some countries, such as Kenya, have implemented all of these strategies at the same time. Given Kenya's multiple and concurrent approaches to achieving UHC, particularly for maternal health services, it provides an interesting and complex environment in which to study the impact of such strategies. The aim of this thesis is therefore to assess the effects of having pluralistic systems of health financing and service provision on achieving UHC for maternal health care in Kenya.

1.2 Background

1.2.1 Developing government policies to close the health financing gap

Closing the health financing gap requires governments to provide sufficient financial protection for its citizens to eliminate or reduce the number of households that endure financial hardship as a result of seeking healthcare services [6,7]. To make progress towards closing this gap, LMICs have typically turned to two key strategies over the past two decades: (a) establishing a national health insurance scheme to pool risk and pre-pay for health services and (b) reducing or eliminating user fees for services in government health facilities [3]. Developing equitable and sustainable approaches to financing these strategies, however, has proven particularly challenging in LMIC settings where both the government and the population face significant economic constraints [15]. Taxes form an important funding source for UHC strategies in high-income countries [15]. In many LMICs, on the other hand, weak tax systems and large informal working sectors severely limit the amount of revenue that governments are able to collect from taxes [11,15]. While some LMICs have successfully used indirect taxes—such as the value-added tax (VAT)—to help fund their UHC programs, there are limited examples of this working progressively in sub-Saharan Africa [8,20]. Government funds are often also complemented by revenue generated from the health service users themselves, either through insurance contributions or user fees at the point of service. Where the formal employment sector is large, countries can deduct mandatory insurance contributions from workers' salaries. However, it is far less feasible and equitable to collect contributions from the informally employed and unemployed populations, many

of whom are not able to afford the premiums [15]. Similarly, while user charges can help to co-finance the health system and relieve some of the pressure on governments to finance health services, they can also be counterproductive to the goal of equitable financial protection, as the fees are more likely to either deter poor households from seeking care, or push them into poverty [21–23]. Further, effectively targeting exemptions to the poorest is both expensive and difficult to implement in practice. For many LMICs, donor aid also constitutes a substantial proportion of financing for health, leading to important questions about the sustainability of health financing systems and their vulnerability to changing priorities in the donor landscape [24,25]. For example, as donor funds are often earmarked, this donor dependence has resulted in some national priorities, such as maternal health, receiving comparatively smaller increases in financing over time than others, such as child health and reproductive and sexual health, which may impact progress towards achieving key indicators of UHC [26].

Given these resource constraints, many LMICs have opted to take incremental steps towards closing the financing gap for UHC, targeting select populations or a subset of essential health services [9,11,15,27]. Many countries, including Kenya and Tanzania, began their national health insurance reform process by first establishing a compulsory contributory scheme for individuals working in the civil service or formal employment sector [11,15,25,28]. These schemes however, do not provide financial protection for the informally employed or unemployed. Some countries, such as Ghana, Rwanda, and Mali have attempted to transition from separate community-based health insurance schemes to national schemes with premium exemptions and subsidies for the poor and other vulnerable groups [11,15,28,29]. While this approach attempts to achieve greater equity in coverage, it has proven both challenging and expensive to identify, enroll, and collect voluntary premiums from the target populations [15,30–32].

Most LMICs have also sought to close the health financing gap by eliminating or reducing user fees in government facilities. These charges were introduced in many low-income countries during the late 1980s and early 1990s to reduce government spending, in accordance with the conditions of the structural adjustment loans from the World Bank and International Monetary Fund [11,33,34]. Since the early 2000s, there has been a major shift in the global ideology surrounding user fees, with many countries eliminating user fees due to the belief that the limited funds generated by these charges do not justify the risk of excluding those with low ability to pay from accessing care [11,34–36]. However, as complete elimination of user fees in public facilities requires substantial financial commitment, many

LMICs have instead prioritized fee removal for select levels of care, types of essential services, vulnerable groups, or geographic regions [11,34,37]. The extent of user fee reforms therefore tends to be closely related to a country's income level. For example, a study of 46 African governments that underwent user fee reforms found that 75% of low-income countries charged user fees at all levels of public sector care compared to only 67% of lower-middle-income countries and 29% of higher-middle-income countries [11]. Additionally, with the MDGs prompting countries to improve their maternal health outcomes in particular, many LMICs have also focused their user fee reforms on maternal health care [22,37].

To more comprehensively address these challenges to universal financial protection, some countries have implemented both of these approaches–reforming health insurance and removing user fees—at the same time, or in conjunction with other financial interventions such as vouchers, conditional cash transfers, and transportation reimbursements [3,15]. Despite the multitude of approaches that have been adopted, out-of-pocket spending per person on health does not appear to have declined in LMICs between 2000 and 2016, suggesting the need for countries to both strengthen these approaches and consider new strategies for increasing financial protection on the journey to achieving UHC [6].

1.2.2 Engaging private providers to close the service provision gap

Beyond the challenges that governments face to ensure financial protection, a number of supply-side barriers limit government health service provision and inhibit progress towards UHC. Thus, even where national financial protection strategies have been implemented, several governments have struggled with issues such as inequitable distribution of public-sector infrastructure and human resources for health; limited or expensive transportation options; stock-outs of drugs and supplies; and overcrowded facilities effectively creating barriers to equitable provision of services in government health facilities [8,11,27,38]. To expand coverage using all available resources, many countries have turned to private sector health providers to help narrow the service provision gap. The definition of what constitutes the private sector and which types of private providers are engaged for public-private partnerships varies across settings. Thus, although there is a growing body of research on the private sector for health in LMICs, it is unclear whether the sector is being defined consistently across studies. In this thesis, the *'private sector'* serves as an umbrella term for all non-government providers, including for-profit, not-for-profit, and faith-based.

The degree to which LMIC governments should engage with private providers, and particularly for-profit private providers, to achieve UHC has long been debated. On one end of the spectrum, some argue that given limited financial resources, many LMIC governments cannot provide health services for the whole population. The private sector is already an important provider of health services in LMICs, including among the poor [17,39–43]. This group therefore views strategic partnerships between the public and private sectors as both logical and necessary for improving access to essential health services [42,44–47]. Many supporters of increased public-private engagement contend that leveraging these private providers can improve the efficiency of the public spending on health by making use of existing health infrastructure and providers; attracting private sector investment into the healthcare system; and encouraging the development of innovative and cost-efficient strategies for delivering care [42,45,46]. Additionally, some supporters of engaging private providers to achieve UHC argue that by shifting the demand for healthcare among the non-poor towards private providers, governments can focus their resources on ensuring that the poor have access to high quality and affordable care in the public sector; this concept is often referred to as market segmentation, or the 'total market approach' [48,49].

On the other end of the spectrum, some argue that UHC can only be achieved through increased investment in government facilities and making services financially accessible in the public sector [45]. While proponents of the total market approach believe that effectively segmenting the market for health services will result in more equitable distribution of government resources for health, skeptics counter that increasing the market share of private health providers in LMICs would only serve to further marginalize the poor [45,48–50]. In settings with human resource shortages, for example, the growth of the private health sector may result in the loss of government health workers to private facilities, thus weakening the public sector [18]. Additionally, some argue that the profit motives of the commercial private sector in particular, are inherently inequitable and at odds with the principles of UHC, as they tend to prioritize those with greater ability to pay for health services [45,50]. Further, many worry that even where for-profit private services are financially accessible to the poor, they are often of reduced quality or promote unnecessary medical interventions [15,18,45].

While both sides of this ideological debate raise important points, the global conversation around these issues seems to be shifting away from *if* the private sector should be engaged and towards *how best* to work with private health providers to achieve UHC in LMICs [16,18,19,51,52]. Where countries have leveraged the private sector to increase the provision of, and demand for, health services, the implemented approaches can generally be grouped

into three broad categories: (1) purchasing, (2) incentivization, (3) and regulation [16–19]. Montagu and Goodman (2016) used slightly different terminology (with incentivization corresponding to 'encourage' and regulation corresponding to 'constrain' and 'prohibit'), to outline the relationships between these approaches and the tools used to implement them (Figure 1.1) [16]. In some cases this engagement is led solely by the government, and in other instances, it is supported or implemented by donors and non-governmental organizations (NGOs) working in collaboration with the government [16–18,42].

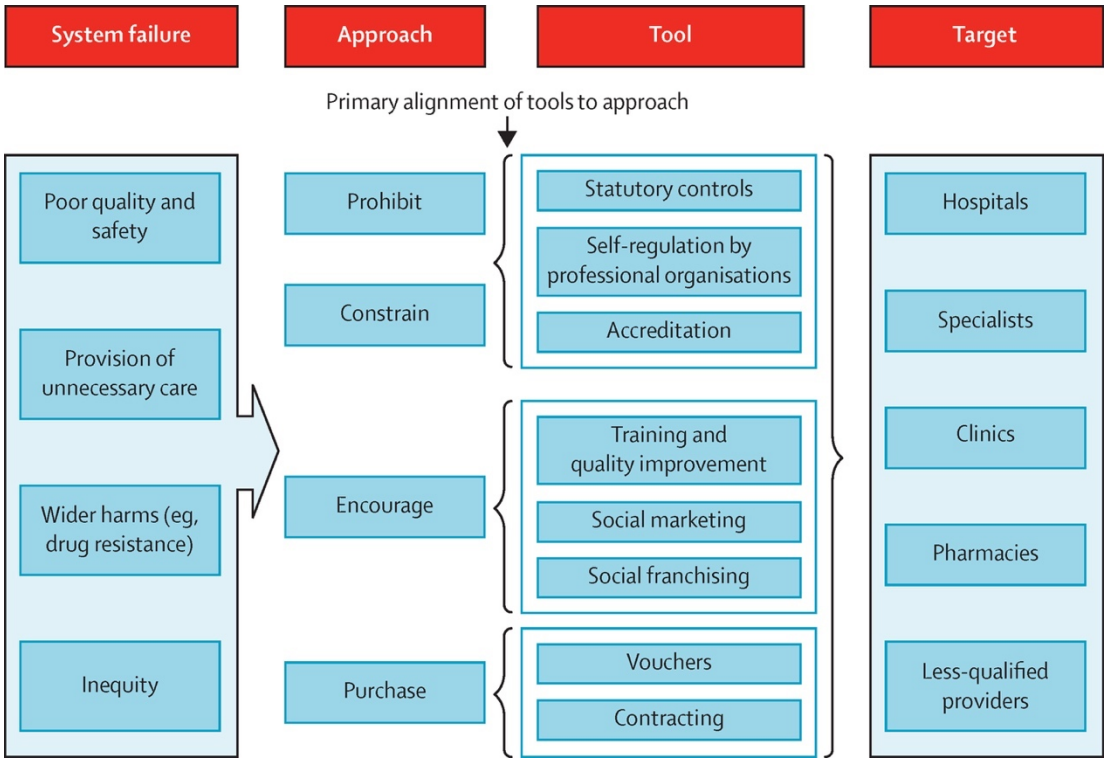

Figure 1.1 Types of Public-Private Partnership Mechanisms [16]

1.2.2.1 *Purchasing*

There are multiple mechanisms through which governments can purchase private sector health services. For instance, private facilities are often contracted to provide services on behalf of the government. By leveraging existing private sector resources, the contracting approach allows for governments to quickly increase coverage of services without having to wait for longer-term investments in new infrastructure and expanding the health workforce to materialize [16,17,42]. Since the early 1990s, the Tanzanian government, for example, has formally contracted faith-based health facilities to provide primary healthcare services in areas without government facilities [53]. Similarly, in cases where the government has more infrastructure than it has the capacity to manage, private entities are sometimes contracted to operate and maintain those health facilities on behalf of the government [54]. Additionally,

where national health insurance schemes exist, governments sometimes enroll private providers into the insurance network to increase the number of facilities through which beneficiaries can access care [15]. For example, the national health insurance schemes in Ghana, Kenya, and Nigeria accredit and purchase services from private health facilities [15]. Similarly, private health services are sometimes purchased through healthcare voucher schemes [16–18,42]. With this type of arrangement, members of a target population are given subsidized vouchers to obtain health services in private facilities; private providers are then compensated for each voucher client served. The Kenyan government, for instance, sought to expand access to family planning, maternal health, and gender-based violence services to poor women through its Reproductive Health Voucher program [55]. Under this program, participating public and private facilities were reimbursed at standardized rates for each voucher client served.

1.2.2.2 *Incentivization*

Under the category of incentivization, private providers are sometimes given financial or in-kind support to improve their quality of care and/or to facilitate them offering services at lower price points. These incentives can come in many forms. Some governments offer private health providers with grants or tax incentives, such as reduced tariffs for importing certain medical supplies and equipment [16,19]. Additionally, to ensure that the private health sector offers high quality care in line with national standards and guidelines, some governments provide free or subsidized continuous education and on-the-job training opportunities to private providers [16,18,19,42,51]. For example, since 1997, the Ugandan government has provided private non-profit primary care providers with grants and in-kind contributions, such as training and medical equipment, to expand access to the country's minimum healthcare package [56]. Health commodity social marketing and social franchising of health facilities also often involve mutually-beneficial partnerships between governments or NGOs and for-profit providers to achieve public health goals [16,18,19,42]. In the case of social marketing, private drug outlets are frequently provided with commodities at subsidized prices, which they then distribute using marketing techniques to generate increased demand [16,17]. In the case of social franchising, private providers join a network of facilities that are certified and regulated under a common brand name and regulated by a franchisor. In exchange for delivering priority public health services, the franchisor often provides participating private facilities with training to ensure a certain standard of care and marketing services to generate increased demand for care [16,17,42]. Although social franchises for health in LMICs are typically managed by donor-financed NGOs to operate

for the public good, in some countries, the Ministry of Health manages or monitors the performance of a franchise network [42,57]. The Ghanaian government, for example, partners with the operator of the Social Franchise Initiative to conduct clinical audits of franchised health facilities [57]. Additionally, in Rwanda, the Ministry of Health co-manages the One Family Health franchise with a private entity [57].

1.2.2.3 *Regulation*

A third important way in which governments engage with private health providers is through various forms of regulation to ensure that services meet the ethical and quality standards necessary for achieving UHC. Some countries enact legislation and policies to ensure that private providers' activities are aligned with public health goals. This can take many forms, such as restricting the types of services that providers can offer; mandating providers to offer care for life-threatening emergencies; and enacting price controls for essential drugs and services [16,18,42]. In Zimbabwe, for instance, private for-profit hospitals are required to provide justification and obtain special permission from the Minister of Health to charge fees higher than the pre-approved rates set by the government [58]. Private health providers are also regulated with licensing and accreditation [16,17,19,42,51]. Through licensing requirements, governments can help improve quality of care in the private sector by ensuring that private providers have achieved a certain level of training or education. Additionally, through accreditation, governments can reduce use of poor-quality private providers by certifying that certain facilities are appropriately staffed and equipped to provide essential care. While many countries have minimum clinical requirements for accreditation of new private health facilities, some countries also grant permission for facilities to operate based on whether or not the facilities are likely to adequately and equitably fill a gap in the health system. For example, in Namibia and Zimbabwe, facilities can be denied a license to operate if they are not determined to be serving the public good [58]. By preventing the registration of new for-profit facilities in areas that are adequately served, this type of government regulation could help stimulate a more equitable distribution of health facilities.

1.2.3 Measuring progress towards UHC: maternal health as a key indicator

While the previous sections outlined strategies for achieving UHC, this section describes how the success of these strategies have been measured. In 2000, world leaders agreed on a set of eight MDGs for reducing poverty around the world [10]. The specific targets for MDG 5, to improve maternal health, were to reduce maternal mortality by 75% between 1990 and 2015 and achieve universal access to reproductive health services [10]. Since this time,

increasing access to maternal health care in LMICs has been at the forefront of priority issues for achieving broader global developmental goals. LMICs made important progress in reducing maternal mortality over the MDG era; however, inequality between world regions, countries, and individuals within countries remains high. For example, between 1990 and 2015, the maternal mortality ratio (MMR) in sub-Saharan Africa declined by 45% from 987 to 546 maternal deaths per 100,000 live births [59]. While this decline was comparable to the global decrease in MMR over the same period, sub-Saharan Africa accounted for nearly two-thirds of global maternal deaths in 2015 (while only having 13% of the population) and had an MMR 2.5 times higher than the global average [59,60]. Introduced in 2016, the Sustainable Development Goals (SDGs) build upon the mission of the MDGs and outline the global development priorities and targets to be achieved by 2030 [61]. In line with MDG 5, SDG 3 challenges countries to eliminate maternal deaths from preventable causes; ensure universal health care affordability, access, and coverage; and protect women's sexual and reproductive health and rights [61].

Reducing global disparities in maternal mortality and achieving SDG 3 will require LMICs to, among other things, increase coverage of affordable, high quality services across the continuum from pregnancy to the postpartum period. During pregnancy, the World Health Organization (WHO) previously recommended that women make a minimum of four visits with antenatal care (ANC); in 2016, this recommendation was updated to a minimum of eight ANC contacts [62]. Additionally, it is recommended that a woman's first ANC contact occurs within the first twelve weeks, or first trimester, of pregnancy [62]. The frequency and timing of ANC contacts are frequently used as indicators of ANC coverage, as it is believed that women who make the recommended minimum number of contacts are more likely to receive an essential package of interventions aimed at preventing, detecting, and treating issues that contribute to perinatal morbidity and mortality [62]. During childbirth, the WHO recommends that women receive care under the supervision of a skilled birth attendant (SBA) with the appropriate skills to monitor women's progression through the stages of labor; provide critical interventions to prevent adverse outcomes; identify warning signs; and provide timely referral for higher-level care as needed [63]. Typically, births attended by SBAs occur in health facilities; thus coverage of births in health facilities is often used as a proxy measure for coverage of appropriate delivery care [64]. Previous WHO recommendations stated that women and newborns should receive a postnatal check within 24 to 48 hours of delivery [65]. As a result, many studies on coverage and timing of PNC examine the proportion of mothers and/or babies that received a postnatal check within 48 hours of

birth. However, more recent guidelines state that women who delivered in health facilities should remain in the facility for observation for at least 24 hours and that women who delivered at home should receive a postnatal care (PNC) contact within 24 hours of childbirth [63,66]. Furthermore, current recommendations now state that all women, regardless of childbirth location, should receive an additional three PNC contacts: on the third day after birth (48-72 hours); between the first and second week after birth (7-14 days); and six weeks after birth [66].

The leading causes of maternal death are well documented and it is estimated that 98% of these deaths could be prevented by providing key interventions throughout the previously outlined continuum from ANC to PNC [67–69]. Furthermore, effectively linking antenatal, childbirth, and postnatal care can also help to reduce the risk of perinatal and neonatal mortality [69]. Despite the many available guidelines on when and how to provide maternal health services, coverage of care across the continuum continues to be low in LMICs [40,68]. Even when critical maternal services are available, many women in LMICs fail to benefit from them due to barriers, including social and cultural factors, perceived need for services, and financial and physical accessibility [64]. Further, when women in LMICs do access maternal health services, they are often of insufficient quality [58]. Thus, as countries strive to achieve SDG 3, it is critical to develop systems to finance and provide care in ways that equitably increase coverage of high-quality maternal care across the continuum.

1.2.4 What do we know about the role of health financing strategies and public-private engagement in increasing coverage of maternal health services in sub-Saharan Africa?

Health financing reforms and public-private engagement for health are commonplace across Africa. Details about how these approaches are implemented are rarely well documented and the body of evidence on their impact on maternal health in Africa is somewhat inconclusive due to the way in which policy changes are typically implemented and the resulting quality of study designs that can be used to study their impact. While it is clear that many of these approaches *can* work, success is highly dependent on having adequate financing; the contexts in which they are implemented; the details of the programs; fidelity of implementation; and the presence and absence of complementary programming and health infrastructure that facilitate improved coverage of essential services. Another key challenge in evaluating health policies and health systems interventions is that in many cases, multiple strategies and policies are adopted concurrently, and sometimes their relative contributions are difficult to

disentangle. Studies that have examined the impact of health financing reforms and public-private engagement on use or coverage of maternal health services in sub-Saharan Africa have focused primarily on user fees, insurance schemes, and voucher programs. Although social franchising for maternal health is a common approach to private sector engagement in sub-Saharan Africa, its impact on service use has received little rigorous evaluation.

1.2.4.1 *User fee removals & reductions*

Over the past two decades, several countries throughout sub-Saharan Africa have implemented user fee reforms for maternal health services, including Benin, Burkina Faso, Burundi, Ghana, Kenya, Lesotho, Liberia, Madagascar, Mali, Niger, Senegal, Sierra Leone, South Africa, Sudan, Uganda, and Zambia [22]. Despite this widespread implementation, two systematic reviews on the impact of user fee reforms on use of maternal health services have determined the evidence base to be weak, with most studies relying on observational and quasi-experimental study designs that must be interpreted carefully [22,23]. Additionally, with regard to evidence of the relationship between user fee removals and use of services across the maternal health continuum, the majority of studies from the region have focused on the effects of user fee reforms on use of facility delivery, with little to no study of their impact on use of ANC, PNC, or of women's continuity of care from pregnancy to the postpartum period [22,23].

The available evidence from sub-Saharan Africa generally suggests that removing or reducing user fees increases the use of facility-based delivery care [22,23,70–74] As many countries have documented serious operational challenges in implementing user fee removals and reductions, it is important to understand both the short- and longer-term effects of these policies on use of maternal health services [75]. However, most of the research on this topic has focused on the effects that have occurred within three to five years after a policy rather than the longer-term effects [23,76]. Additionally, although there is a gap in evidence on the impact of user fee reforms on use of ANC and PNC, a couple of studies have reported unexpected effects of user fee reforms on use of ANC. In South Africa, the removal of user fees for curative services seemed to be associated with decreased use of ANC [77]. In contrast, a study from Uganda found that removing user fees for other outpatient services resulted in an increase in use of ANC [78].

Despite the generally positive effects of user fee removals and reductions on service use, comparatively fewer studies have examined their impact on equity in use of maternal care. The available evidence suggests that the impact of user fee removals and reductions on equity

in maternal health service coverage is mixed [22,23,73]. A study of user fee removals in Ghana, Senegal, and Sierra Leone, for instance, found that removing fees increased use of facility-based delivery care equally across all wealth groups, suggesting no impact on equity [74]. Recent quasi-experimental studies of data from Benin, Burkina Faso, Ghana, and Mali, however, found that user fee removals were associated with greater increases of facility-based delivery care among the poor, presumably leading to more equitable use of delivery care at the population level [73,79,80]. In contrast, a study of user fee removals between 2003 to 2004 in Kenya found that removing user fees was associated with greater increases in facility-based delivery care among wealthier women, highlighting the possibility for such policy changes to exacerbate existing inequities in use of care [81].

1.2.4.2 *Health insurance*

The evidence base on the impact of health insurance on use of maternal health care in Africa is limited both in terms of number of studies and rigor [82,83]. Studies from Ghana, Kenya, Mali, Mauritania, Rwanda, Senegal, Tanzania, and Togo reported that insurance coverage was associated with increased levels of a number of maternal health service use outcomes, including: initiating ANC during the first trimester of pregnancy, having one or more ANC visits (1+ ANC), having four or more ANC visits (4+ ANC), facility-based delivery, skilled attendance at birth, cesarean section, and PNC [82–90]. However, the estimated impact of insurance coverage on maternal health service use differs between countries and within countries by factors such as study design, service type, and income group. For instance, while a multi-country study found no relationship between health insurance coverage and use of 4+ ANC in Rwanda, insurance was associated with increased use of four or more ANC visits in Ghana [82]. Additionally, despite the lack of relationship between insurance coverage and 4+ ANC in Rwanda, the study found that among the same population, women who were enrolled in health insurance were more likely to have given birth in a health facility [82]. In contrast to the studies that found positive associations between insurance and maternal health service coverage, a recent evaluation of a free health insurance scheme for pregnant women in Tanzania found that the scheme had no effect on timing or use of ANC, facility delivery, or PNC, partially due to poor understanding of the benefits and late ANC initiation leading to late enrollment in the scheme [91]. Finally, although many studies of the impact of health insurance on maternal health service use have examined use at different points along the maternal health continuum, there seems to be a gap with regard to the influence of health insurance enrollment on women's continuity of care from ANC to childbirth to PNC.

A potentially negative outcome of financing healthcare through insurance programs is that it has strong potential to contribute to inequitable use of maternal health services because women who are better-off are more likely to have health insurance coverage than those who are poor [15,82,84,86]. However, there is limited evidence on the impact of health insurance coverage on equity in use of maternal health services at the population level or whether the effect of health insurance enrollment differs between the poor and non-poor. A study from Ghana reported that the introduction of its National Health Insurance Scheme had a similar impact on use of maternal care among the total population and among the poor specifically, indicating that the reform was not pro-poor [84]. In Kenya, on the other hand, researchers found that the positive effect of having health insurance on use of SBAs and/or facility-based delivery care was considerably greater among those with lower socioeconomic status compared to those with higher socioeconomic status [89]. Despite this seemingly pro-poor finding, more vulnerable women were less likely to have health insurance, suggesting that the net effect of health insurance at the population level may have still favored women who were better-off [89].

1.2.4.3 *Vouchers*

Voucher programs have been implemented in a number of countries and for a range of health services in the public and private sectors. While in some programs vouchers are distributed for free, in others, members of the target population purchase the vouchers at highly subsidized rates [92]. Despite the vast global experience in implementing these programs and promotion of the approach, there is very little rigorous evidence on the relationship between voucher programs and coverage of maternal health services [92–95]. Most studies on vouchers in LMICs generally, and sub-Saharan Africa specifically, have examined the short-term impact of the programs on service use and relied on analytic approaches that limit the ability to make any causal inferences [96]. Despite these limitations, studies from Kenya and Uganda suggest that selling subsidized vouchers to poor women increases use of facility delivery and/or skilled attendance at birth [96–100]. In contrast, studies in Kenya and Uganda of 4+ ANC reported no evidence of a positive impact of vouchers on use of ANC or PNC [98,100,101]. Although safe motherhood vouchers typically allow women to obtain ANC, delivery, and PNC services, none of the identified studies on vouchers explored their impact on continuity of care from pregnancy to the postpartum period.

Limited research exists on the impact of voucher programs and equity in access to maternal care in sub-Saharan Africa, but findings from south Asia suggest that effectively targeting vouchers to the poorest can result in higher increases in use of maternal health services among poor women [94,96]. Evidence from Kenya and Uganda, however, shows that even where vouchers were targeted to the poor and increased use of maternal health services, poorer women continued to be less likely to have received maternal care [98–101]. These findings suggest the need for better targeting of vouchers to ensure they effectively close the coverage gap between the better-off and the vulnerable.

1.2.4.4 *Social franchising*

A 2015 survey of social franchising programs around the world found that 22 African countries had at least one social franchise network [57]. Additionally, the survey found that 61% of social franchises globally offered safe motherhood services, including ANC, delivery care, and/or PNC [57]. Although social franchising programs for maternal health are fairly common globally and in Africa, rigorous evidence on the impact of social franchising on maternal health service coverage is sparse [102,103]. Furthermore, the few rigorous studies that do exist, primarily from countries in Asia, have not found evidence of a relationship between social franchising programs and use or equity in coverage of maternal health services [103–105].

1.3 THESIS RATIONALE, AIMS, & OBJECTIVES

The previous section illustrates that various health financing and public-private engagement strategies have been implemented and studied in sub-Saharan Africa with great interest over the past two decades. The body of literature suggests that while many of these approaches *can* have a positive effect on coverage, each approach alone is unlikely to sufficiently address the many barriers to UHC, particularly for the poor. Despite the great interest in the private sector, it is challenging to ascertain private-sector performance without a clear understanding of the ways in which differences in its definition affect the research findings. Further, the evidence does not provide any clarity regarding whether these approaches facilitate improved continuity of care across the maternal health pathway, nor on their impact when implemented concurrently. The structure and focus of my research evolved over the first two years of my PhD, but these critical information gaps ultimately led me to my final thesis topic examining the impact of multiple health financing and service provision approaches on achieving UHC for maternal health in Kenya.

In the first year of my PhD, I intended to explore a range of contextual factors that influence usage patterns for private sector family planning and childbirth services at the country and individual levels and how private sector market share relates to coverage and equity in different African contexts using Demographic and Health Survey (DHS) data. I planned to compare family planning and childbirth services, as I felt I could gain important insights into how different mechanisms might vary for a predominantly outpatient service, such as family planning, compared to an inpatient service, such as childbirth care. I began my research with a systematic review of how researchers conceptualized the private sector and measured its use for family planning and childbirth care in sub-Saharan Africa. However, as I delved more into the topic I came to better understand that individuals' interaction with public and private health services is inextricably linked to their health financing options. I thus became interested in understanding more about the intersections between health financing and public-private partnerships, and their impact on reproductive and maternal health care. As I began to search for datasets beyond the DHS that would allow me to investigate further into this topic, I met a researcher from the Population Council in Kenya who mentioned that they had data from multiple surveys conducted for an evaluation of a reproductive health voucher program. The principal investigator of the study subsequently agreed to collaborate and share the datasets with me to analyze for my thesis. This provided me with an opportunity to explore the role of multiple health financing schemes and a major public-private engagement strategy on UHC for maternal health within a country with a strong private health sector presence, including during my two-month stay in Kenya hosted by the Population Council.

This thesis therefore aims to assess the effects of having pluralistic systems of health financing and service provision on service use, quality of care, and equity with a case study on maternal health care in Kenya. This will be achieved through five specific research objectives that answer three broader research questions:

Q1: How do researchers measure the contribution of the private sector to maternal health and family planning service provision and how much care does the private sector provide in sub-Saharan Africa (SSA)?

Objective 1: Summarize methods used to measure private providers' contribution to childbirth and family planning service provision in Africa.

Q2: How did Kenya's pluralistic financing policies and public-private engagement strategies for health arise and evolve over time?

Objective 2: Explore the factors that have contributed to changes in health financing and health sector composition in Kenya.

Q3: What are the impacts of user fee removals and subsidized vouchers on use, sector, quality, continuity, and equity of maternal care in Kenya?

Objective 3: Examine the impact of Kenya's 2004 10/20 public sector user fee reduction policy on equity in use, sector, and content of ANC.

Objective 4: Evaluate the impact of the Kenya safe motherhood voucher program on use of ANC, facility delivery, and PNC before and after user fees for maternity services were removed from all public facilities in 2013.

Objective 5: Examine the health financing and non-financial determinants of ANC initiation and subsequent continuity of maternal care in Kenya.

1.4 THESIS STRUCTURE

This is a 'research paper' style thesis with the results presented in five research papers with additional linking material. Because the methods and data sources differ between chapters, there is no overall methods chapter; instead the methods are presented within each research paper. This chapter (Chapter 1) provides a general background. The proceeding seven chapters are organized as follows:

Chapter 2 addresses question 1 and objective 1 of this thesis. In a systematic review published in *BMC Health Services Research* (research paper 1), this chapter critically examines the methods used to measure private sector health providers' contribution to childbirth and family planning service provision and synthesizes existing evidence on the role of the private sector in reproductive and maternal health service provision in sub-Saharan Africa.

Chapter 3 serves as a background for the research papers in chapters 4-7 by providing a brief overview of the geographic, social, economic, and health context in Kenya. This chapter describes the structure of the health system in Kenya, including the private sector, and provides a summary of key reproductive and maternal health indicators over time.

Chapter 4 explores thesis question 2 and objective 2 through an un-published paper (research paper 2) outlining the findings from a policy document review and thematic

analysis of key informant interview data. In this chapter, I examine the role of various factors, including the political economy, pressure from external actors, and effective domestic lobbying, on key changes in health financing policies and the Kenyan government's interactions with private sector health providers.

To address thesis question 3 and objective 3, **Chapter 5** (un-published research paper 3) presents results from an interrupted time series analysis of Demographic and Health Survey data from 1995 to 2014. This study examines the role of the 10/20 user fee reduction policy on the timing of women's ANC initiation, number of visits, source of care, and content of care. Additionally, this study investigates whether the introduction of the policy had any impact on equity in any of the aforementioned outcomes.

In **Chapters 6 & 7,** I examine thesis question 3 and objectives 4 and 5 by analyzing data from three household surveys to examine the impact of (a) the Kenya Reproductive Health Voucher Program, a program that provided poor women with subsidized access to public and private sector health services from 2006 to 2016 and (b) the 2013 Kenya free maternity services policy, which called for free maternity services to be provided in all public facilities.

Chapter 6 contains a paper published in *BMJ Global Health* (objective 4, research paper 4), in which I conduct a difference-in-difference analysis to examine the impact of the voucher program on use and source of ANC, facility delivery, postnatal care, and two aggregate indicators of care across the maternal health continuum. Additionally, I explore whether the voucher program continued to have any impact after the removal of user fees under the free maternity services policy.

Building upon the findings of the previous chapter, **Chapter 7** presents a paper published in *Health Policy and Planning* (objective 5, research paper 5) that examines in more detail the role of the voucher program, free maternity services policy, health insurance coverage, and other non-financial factors on women's practices regarding initiation and continuity of care throughout the maternal health pathway.

Finally, **Chapter 8** synthesizes the main findings from the five research papers; reflects on their contributions and limitations; identifies priority areas for future research; and provides recommendations for policymakers in Kenya and other low and middle-income countries on how to effectively design and implement health financing policies and public-private partnerships to achieve universal coverage of care across the maternal health continuum.

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RESEARCH PAPER COVER SHEET

PLEASE NOTE THAT A COVER SHEET MUST BE COMPLETED FOR EACH RESEARCH PAPER INCLUDED IN A THESIS.

SECTION A – Student Details

Student	Mardieh Dennis
Principal Supervisor	Oona Campbell
Thesis Title	Pragmatic pluralism for health: Understanding the role of public financing and public-private engagement on use, quality, and equity in access to maternal health services in Kenya

If the Research Paper has previously been published please complete Section B, if not please move to Section C

SECTION B – Paper already published

Where was the work published?	BMC Health Services Research		
When was the work published?	10 September, 2018		
If the work was published prior to registration for your research degree, give a brief rationale for its inclusion	n/a		
Have you retained the copyright for the work?*	**Yes**	Was the work subject to academic peer review?	**Yes**

**If yes, please attach evidence of retention. If no, or if the work is being included in its published format, please attach evidence of permission from the copyright holder (publisher or other author) to include this work.*

SECTION C – Prepared for publication, but not yet published

Where is the work intended to be published?	
Please list the paper's authors in the intended authorship order:	
Stage of publication	Choose an item.

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	With input from my co-authors, I designed the study, conducted the literature search, screened all articles, analyzed the findings, and wrote the manuscript.

Student Signature: _____ **Date:** 1 September, 2019

Supervisor Signature: _____ **Date:** 1 September, 2019

Dennis ML, Benova L, Owolabi OO, Campbell OMR. Meeting need vs. sharing the market: a systematic review of methods to measure the use of private sector family planning and childbirth services in sub-Saharan Africa. BMC Heal Serv Res. 2018;1–13.

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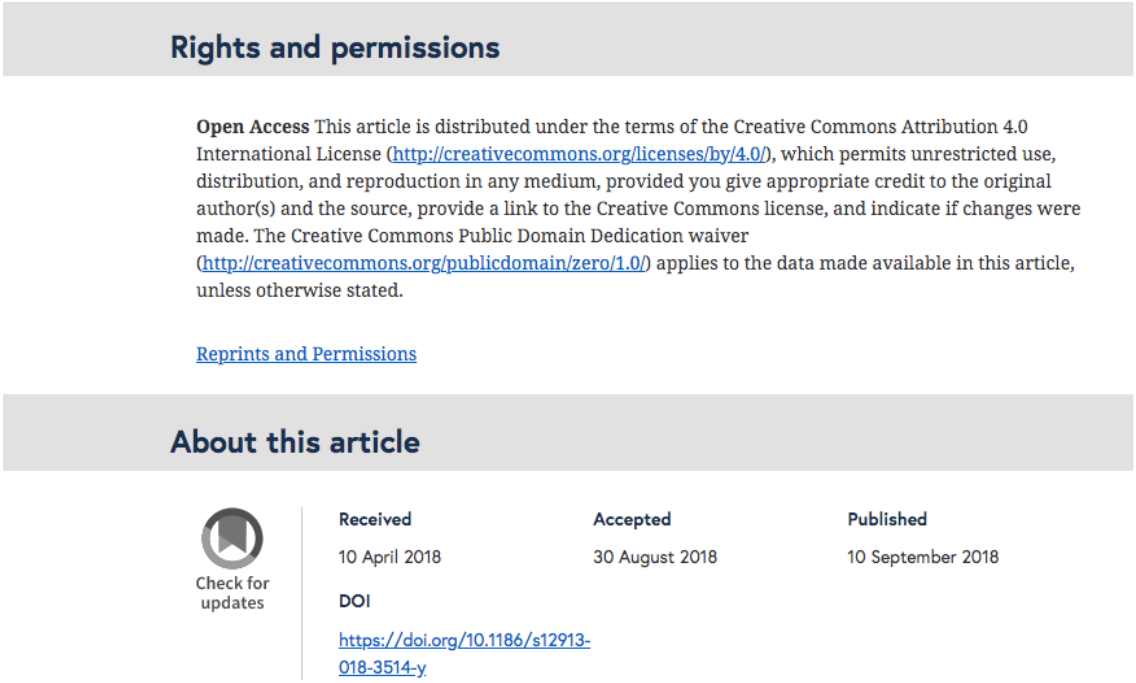

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2 MEETING NEED VS. SHARING THE MARKET: A SYSTEMATIC REVIEW OF METHODS TO MEASURE THE USE OF PRIVATE SECTOR FAMILY PLANNING & CHILDBIRTH SERVICES IN SUB-SAHARAN AFRICA

This chapter presents research paper 1 using a systematic review to answer the first research question of this thesis, namely examining how researchers measure the contribution of the private sector to maternal health and family planning service provision, and how much care the private sector provides in sub-Saharan Africa.

2.1 ABSTRACT

Background

Ensuring universal access to maternal and reproductive health services is critical to the success of global efforts to reduce poverty and inequality. Engaging private providers has been proposed as a strategy for increasing access to healthcare in low- and middle-income countries; however, little consensus exists on how to estimate the extent of private sector use. Using research from sub-Saharan Africa, this study systematically compares and critiques quantitative measures of private sector family planning and childbirth service use and synthesizes evidence on the role of the private sector in the region.

Methods

We conducted a systematic review of the Medline, Global Health, and Popline databases. All studies that estimated use of private sector family planning or childbirth services in one or more sub-Saharan African countries were included in this review. For each study, we extracted data on the key study outcomes and information on the methods used to estimate private sector use.

Results

Fifty-three papers met our inclusion criteria; 31 provided outcomes on family planning, and 26 provided childbirth service outcomes. We found substantial methodological variation between studies; for instance, while some reported on service use from any private sector source, others distinguished private sector providers either by their profit orientation or position within or outside the formal medical sector. Additionally, studies measured the use of private sector services differently, with some estimating the proportion of need met by

the private sector and others examining the sector's share among the market of service users. Overall, the estimates suggest that the private sector makes up a considerable portion (>20%) of the market for family planning and childbirth care, but its role in meeting women's need for these services is fairly low (<10%).

Conclusions

Many studies have examined the extent of private sector family planning and childbirth service provision; however, inconsistent methodologies make it difficult to compare results across studies and contexts. Policymakers should consider the implications of both private market share and coverage estimates and be cautious in interpreting data on the scale of private sector health service provision without a clear understanding of the methodology.

2.2 BACKGROUND

As the international development community shifts its focus from the Millennium Development Goals to the Sustainable Development Goals, universal access to maternal and reproductive health services remains critical to the global strategy for poverty and inequality reduction [5,106]. Many low- and middle-income country governments have rolled out strategies to increase supply of and demand for public sector family planning and childbirth services [22,37,107–110]. However, some argue that reliance on the public sector alone to expand access to health services is impractical and that harnessing the contribution of private, non-government actors is the key to achieving universal healthcare coverage in low- and middle-income settings [33,44,111]. Proponents of publicly-financed health services, on the other hand, argue that encouraging growth of the private health sector is likely to exacerbate inequalities in access to care by making services financially unattainable for the poor [44,112,113].

Understanding non-government actors' current contribution to health service provision is critical for determining if, how, and in which contexts to engage the private sector. While many studies have attempted to quantify the contribution of the private sector in low- and middle-income country (LMIC) contexts, there has been relatively little discussion of the philosophical and methodological considerations of doing so. One major challenge is defining what constitutes the "public" and "private" sectors. While sector is often defined in terms of the ownership or management of a health facility and dichotomized as public versus private, past research on health systems in LMICs has acknowledged that formalized partnerships between government-owned and non-government entities, government financing of private providers, and the practice of providers offering services in both government and privately-operated facilities have resulted in challenges in distinguishing the two sectors [114,115]. Additionally, researchers of organizational theory argue that this public-private dichotomy does not adequately capture the range of factors that determine the degree to which a health facility or organization is publicly-oriented, and that health organizations should, instead, be conceptualized along a multi-dimensional continuum including ownership, financing, and mission. [116,117]. These more nuanced definitions of sector, however, require details about health providers that are often not available or infeasible to collect in population-level assessments of the use of providers in different sectors. For this reason, in this thesis, I define the private sector based on ownership, with all health facilities owned by non-government actors, including non-profit and faith-based, classified as the private sector.

Using this ownership-based definition of sector, private providers are believed to provide a substantial portion of maternal and reproductive health services in low- and middle-income countries; however, estimates of their role seem to vary considerably between studies and contexts [19,118]. For instance, one recent study using Demographic and Health Survey (DHS) data reported that 38% of modern family planning users in sub-Saharan Africa sought care in the private sector, while another recent study, also using DHS data, estimated this figure at 28% [119,120]. Though some of the variation between the two estimates is due to different countries being included in the analyses, inconsistencies in how these percentages were calculated also had an effect.

Differences in measurement approaches increase the likelihood of researchers over- or underestimating the role of the private sector in provision of family planning and childbirth services. Using research from sub-Saharan Africa, this review has two main objectives: (1) to systematically compare and critique quantitative measures of private sector family planning and childbirth service use and (2) to descriptively synthesize evidence of the contribution of the private sector family planning and childbirth service use in the region. Further, by examining both an outpatient service largely requiring low- to mid-level clinical skills (family planning) and an inpatient service requiring mid- to high-level clinical skills (childbirth care), this study will highlight how the identified methodological approaches affect private sector use estimates for services delivered through different channels of the health system.

2.3 METHODS

2.3.1 Scope of review

For the purposes of this review, we considered the private sector to encompass all providers owned by non-government actors. Given the descriptive nature of our outcomes of interest, peer-reviewed and grey literature papers of any study design were eligible for inclusion. We did not apply any restrictions on language or date of publication. For each study, we summarized the methods used to measure private sector service provision and the estimates reported. We discussed the strengths and weaknesses of the methods used in each study and how they might have biased the findings.

2.3.2 Search strategy

We identified studies by searching the Medline, Global Health, and Popline databases, using a combination of keywords and MeSH terms covering the following broad themes: (1) sub-Saharan Africa, (2) contraception or childbirth services, and (3) private sector. Appendix 1

contains the full list of keywords and MeSH terms used. We conducted our search on October 26, 2016. A total of 3,620 records were identified from the three databases and imported into Covidence, an online systematic review management platform. After removing duplicates, the titles and abstracts of 2,041 publications were screened for inclusion in the review [121]. Publications clearly outside of the scope of the review, covering topics unrelated to use of family planning or childbirth services in sub-Saharan Africa, were excluded at this stage, while the 126 studies that appeared definitely or potentially relevant were selected for full text screening. MLD and OOO screened the studies at each stage, and any discrepancies were discussed and resolved. Studies that did not present private sector use estimates for family planning or childbirth care, or that combined figures for multiple services, were excluded. Studies that did not present outcomes for at least one sub-Saharan African country, or presented estimates from sub-Saharan Africa pooled with those from other regions, were also excluded. We selected 37 studies for inclusion in the review; 16 additional papers were identified through systematically scanning the references of all included studies (Figure 2.1). MLD extracted information on the included studies' methods and results for this analysis.

2.4 RESULTS

2.4.1 Overview of included studies

Fifty-three papers met our inclusion criteria; 31 included outcomes on family planning, while 26 provided outcomes on childbirth services (Appendix 2). Studies on private sector provision of family planning and childbirth services in sub-Saharan Africa have proliferated in recent years, with the number of included papers published during the 6-year period from 2011 to 2016 exceeding the number published over the preceding 25 years combined (Figure 2.2).

The included papers provided estimates of private sector family planning or childbirth service use for 40 countries in sub-Saharan Africa over a 30-year period from 1984 to 2014. Certain countries, such as Ghana, Kenya, and Zimbabwe, were studied extensively over time while others, such as the Gambia and Somalia, were not studied at all (Appendix 3).

More than half of the included studies focused on a single country (n=31); the remaining studies included multi-country comparative analyses of two to 36 countries. The majority of studies looked at cross-sectional data at one point in time (n=40), while 13 studies examined trends over time using repeated cross-sectional data [99,120,130–132,122–129].

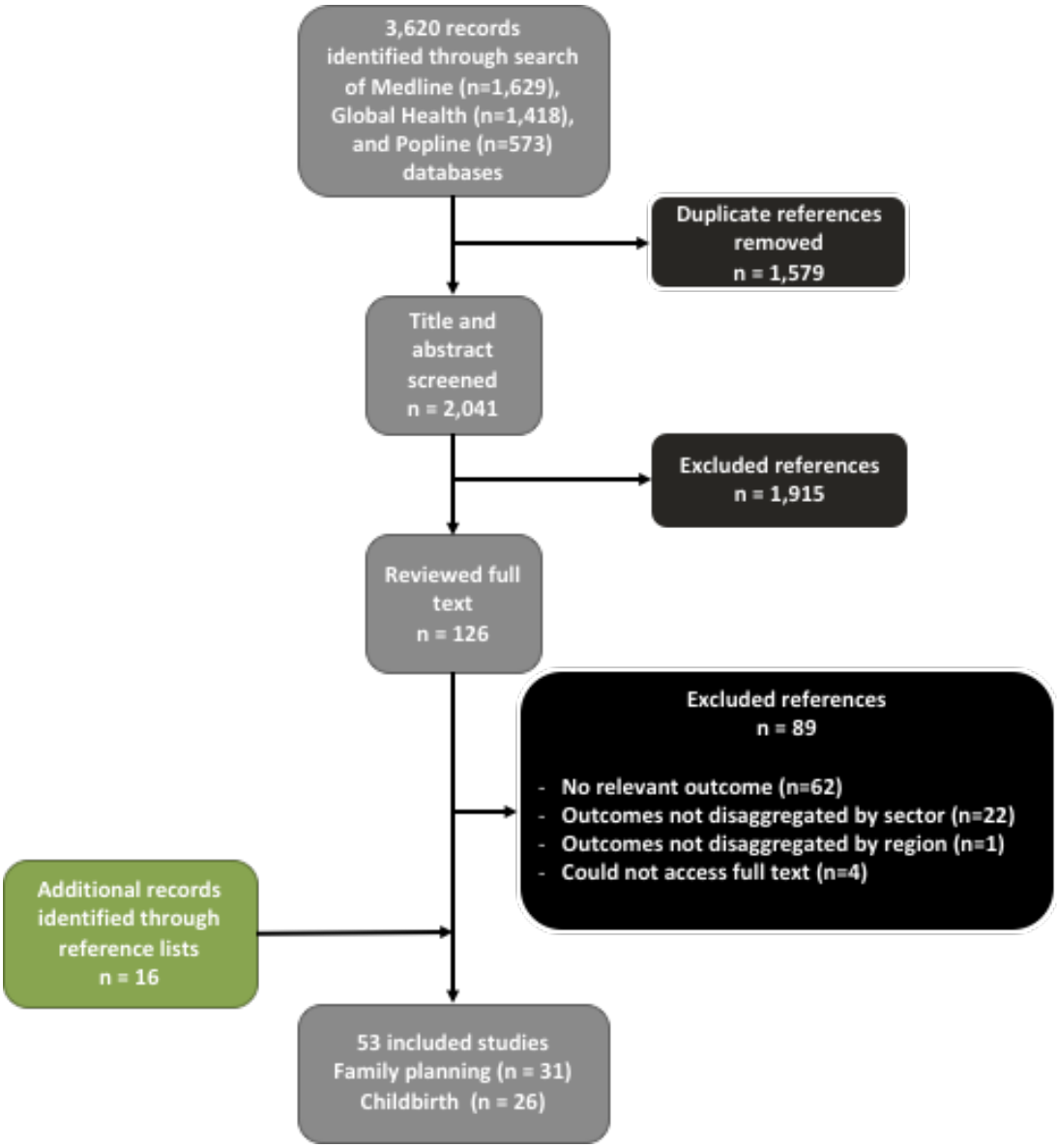

Figure 2.1 PRISMA flow diagram

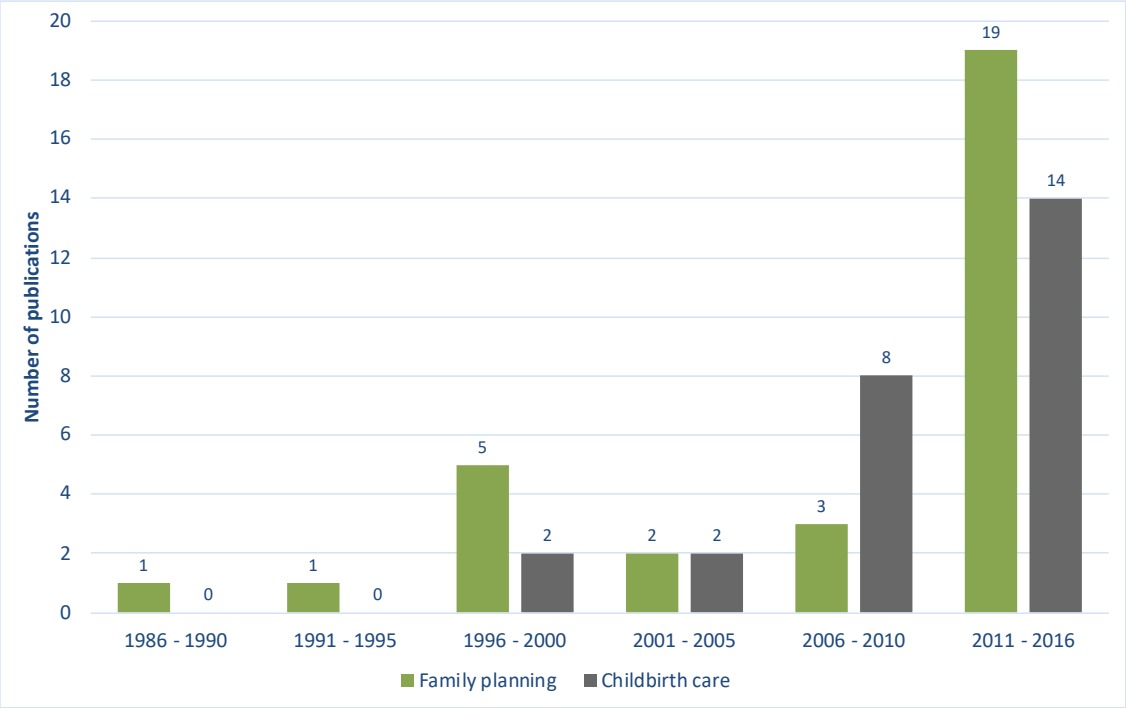

Figure 2.2 Number of studies included by publication date

2.4.2 Measuring use of private sector family planning & childbirth services

2.4.2.1 *Data sources*

Forty-seven of the 53 studies used household survey data to estimate use of private sector family planning and/or childbirth services; the majority of these studies used the Demographic and Health Surveys (n=27), while others used data from demographic surveillance sites [133,134], national maternal health surveys [135], or other smaller, sub-national surveys [99,131,144–149,136–143]. Three studies conducted surveys that sampled women at a health facility [150], market [151], or through respondent-driven sampling [152]. The remaining three studies used routine health service statistics to estimate the proportion of facility births that occurred within the private sector [153–155].

2.4.2.2 *Source of care: defining the private sector*

The studies included in this review contained over 40 unique terms to describe private sector sources of family planning and childbirth services (Appendix 4). Throughout the literature, the "private sector" referred to a range of for-profit, not-for-profit, faith-based, medical, and informal providers that were managed by non-government actors. While some studies reported on service use from any private sector source, others distinguished private sector providers by two key characteristics: (a) their commercialization or profit orientation and/or (b) their position within or outside of the medical sector (Figure 2.3). Among the included

studies, the private for-profit sector included both medical and non-medical providers, while the private non-profit sector seemed to refer exclusively to medical providers. Appendix 4 displays the frequency with which each unique private sector term appeared in the included studies, categorized by profit orientation.

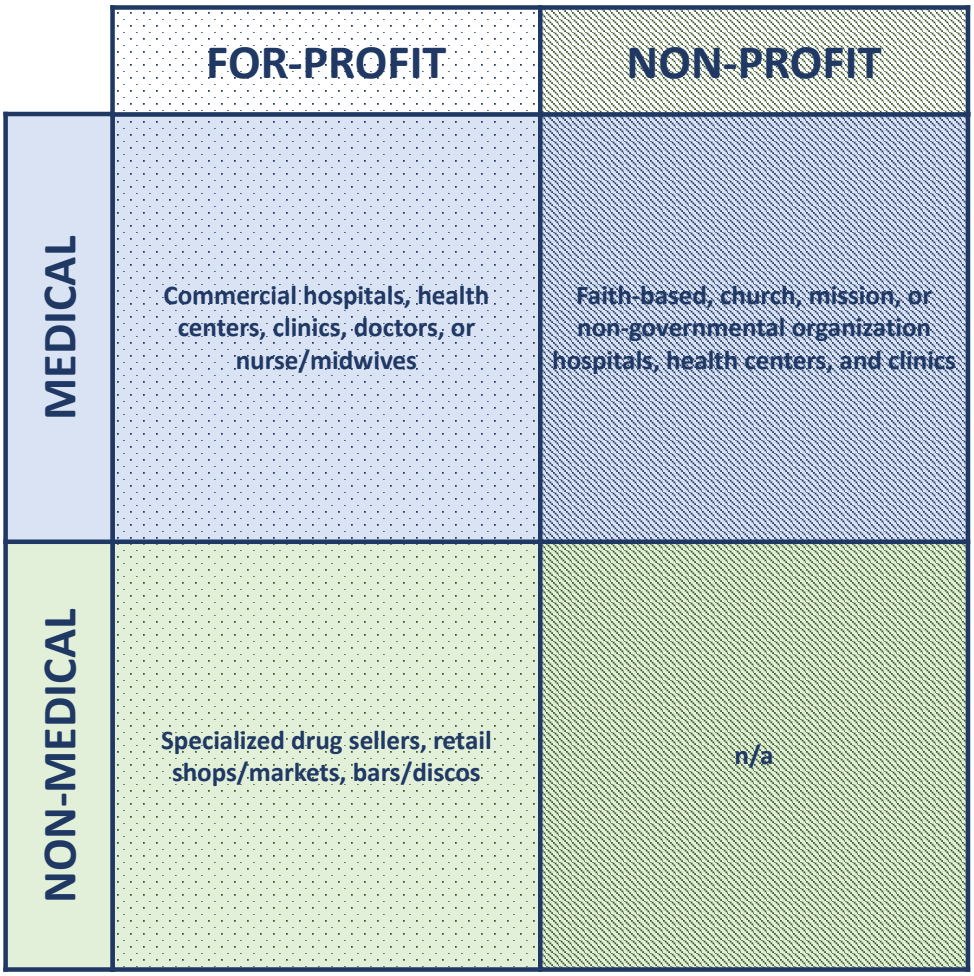

Figure 2.3 Classification of private sector providers

2.4.2.3 *Populations under study: coverage vs. market share*

The studies included in this review examined private sector use within two general population groups: (1) women in need or "at risk" of needing family planning or childbirth services and (2) users of those services. We used the term private sector coverage to indicate the proportion of women in need who were using family planning or childbirth services from a private sector source, or the proportion of health service need met by the private sector. Private sector market share, on the other hand, refers to the proportion of family planning or childbirth service users who received care from a private sector source. Of the 31 studies that examined use of private sector family planning services, five reported coverage estimates [40,119,120,156,157], 30 reported market share estimates, and four reported both market

share and coverage estimates [40,119,120,157] (Appendix 5). For childbirth services, 22 of 26 papers presented private sector coverage estimates, seven reported on private sector market share [40,134,151,153–155,158], and three reported both market share and coverage estimates [40,134,159] (Appendix 5). Although we grouped these outcomes into two broad categories, there was substantial variation within each category in how these populations were defined. For instance, three studies considered the population in need of family planning to be all women married or in union (regardless of fertility preferences or desires) [120,156,157], while two studies reported use among all women with a need for family planning (regardless of marital status) [40,119], following the most recent consensus definition of need for contraception [160]. We summarized the different populations used to examine private sector coverage and market share in Figure 2.4.

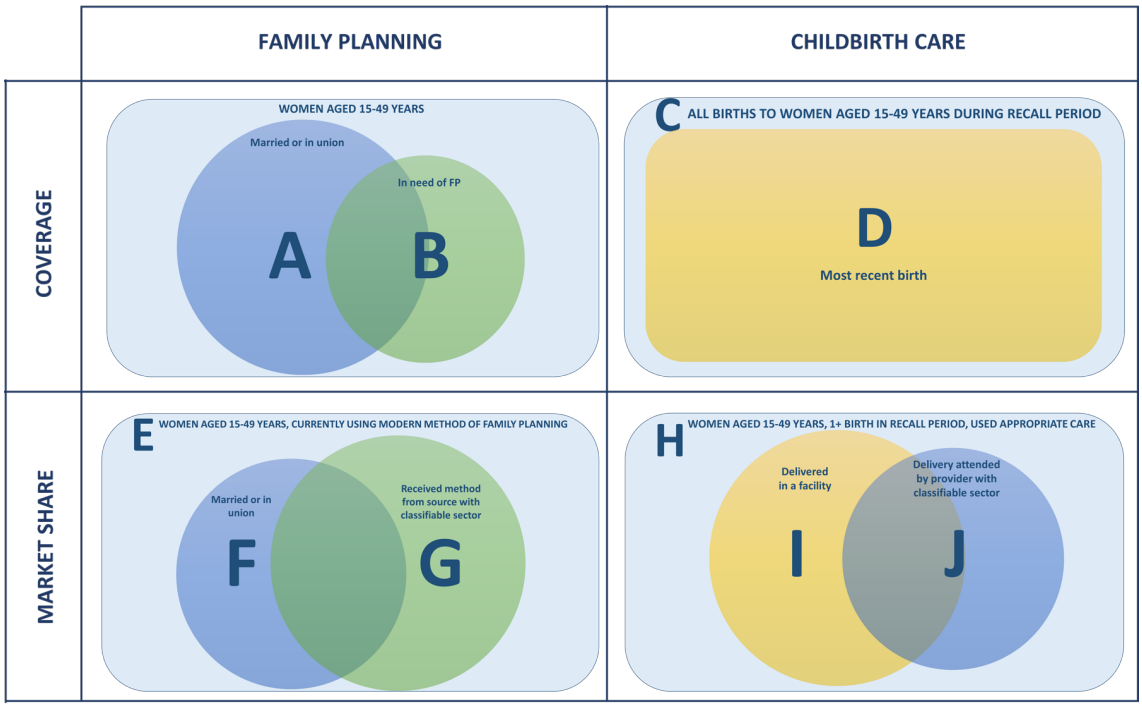

Figure 2.4 Denominators for measuring private sector coverage and market share in included studies

2.4.2.4 *Unit of Analysis*

There were differences between studies in the unit of analysis for examining source of family planning and childbirth services. Of the 31 studies that reported on use of private sector family planning services, 13 described source of care during women's most recent supply of contraceptives [119,122,156,157,161,123,126,128,131,132,143,148,152] and one described where women obtained care when they first started using their current method [147]. The

majority of studies (n=17), however, did not state their unit of analysis [40,118,150,162–166,120,124,125,137,138,145,146,149].

When describing use of childbirth services, the included studies generally adopted either a birth-based (n=6) [43,99,153–155,167] or a woman-based approach (n=13) [40,127,144,158,166,131,135,136,139–143]. The unit of analysis for birth-based approaches was all births that occurred over the study recall or review period. The woman-based approach, on the other hand, included only one birth per woman, and all of the included studies adopting this approach used a woman's most recent birth as the unit of analysis. One study used a hybrid approach, taking information about all of a woman's births and categorized her according to where she sought care across births [129]. Six of the 26 studies that reported on use of private sector childbirth services did not state their unit of analysis [133,134,151,168–170].

2.4.2.5 *Treatment of missing information*

Although missing information on source of care and family planning and childbirth service use and need has the potential to bias estimates, relatively few studies described how they treated such missing information.

Of the studies that examined private sector market share for family planning and childbirth services, only 9 out of 30 [40,119,124,131,132,147,149,161,165] and two out of seven [40,158], respectively, indicated how missing data on source of care was treated. Among the studies that did provide this information, the convention was to either include women with missing information as part of the market but report their source of care as missing or unknown, or to exclude them from the market entirely.

Of the five studies that reported on private sector coverage of family planning services, only two described how they treated women with missing data on family planning need [40,119] and three described how they treated women with missing data on source of care [40,119,156]. In those studies, women with incomplete information on family planning need were considered to be not in need of contraception, while those with missing information on source of care were considered to not have received care in the private sector. For childbirth services, all reported deliveries were considered in need of care. Campbell et al. (2016) is the only study that discussed missing information on delivery care need, and the authors found no missing data for that variable [40]. Six of the 22 studies that examined private sector coverage of childbirth services reported that women with missing information

on source of care were considered to have not received care in the private sector [40,131,134–136,158].

2.4.3 Use of private sector family planning and childbirth services in sub-Saharan Africa

Given the differences in how use of private sector family planning and childbirth services were defined and calculated, as well as the many settings and periods in which these studies took place, we observed considerable heterogeneity in the estimates of our key outcomes of interest. To assess trends in outcomes for the region as a whole, and to highlight the influence of methodological differences, we summarized the minimum, maximum, and median national and sub-national estimates of private sector coverage and market share for family planning and childbirth services in sub-Saharan Africa by period under study in Figures 2.5-2.8. Aggregated regional estimates are not represented in the figures. To facilitate comparisons between studies, we only included those that provided coverage or market share estimates representing at least one of the following private sector provider classifications: (1) all private sector, (2) private for profit, (3) private non-profit, (4) private medical, or (5) private non-medical. For family planning studies, we only included estimates for private sector market share and coverage for all modern methods; estimates for individual methods or that included traditional methods were excluded.

2.4.3.1 *Family planning coverage*

Ugaz et al. (2015) estimated that private sector coverage among women married or in union was relatively low in the sub-Saharan Africa region, ranging between 3-6% from 1992 to 2012 [120]. Looking exclusively at the population of women in need of contraception, regardless of marital status, Campbell et al. (2015 & 2016) estimated higher private sector coverage, with 14% private sector coverage of modern contraceptive need [40,119]. Similarly, comparing Figures 2.5A and 2.5B, we observed that estimates of private sector family planning coverage tended to be higher among women in need compared to all women married or in union [119,120,156,157]. As expected, the proportions of women using modern methods from private non-profit or for-profit providers was smaller than the proportion of women using modern methods from any private sector source.

2.4.3.2 *Childbirth service coverage*

Benova et al. (2015) estimated that 10% of women in sub-Saharan Africa delivered in the private sector for their most recent birth, either at a private facility or in a non-facility location with a private medical provider, while Wodon et al. (2012) generated a lower estimate, at

6.8% of women [159,166]. Yoong et al. (2010) estimated that an average of 7.7% of all births in the region received childbirth care from a private medical provider, specifically in a private medical facility [43]. In Figures 2.6C and 2.6D, estimates of private sector coverage appeared to be quite similar and increasing between the 1985 – 1999 and 2000 – 2014 periods, with median values increasing from 5% to 14% and 4% to 11% among all births and most recent births, respectively [99,127,131,135,139,141,143,166,167]. Private non-profit provider coverage of most recent births was estimated around 17% in both periods, and private for-profit provider coverage appeared negligible; however, the studies reporting on this outcome were conducted exclusively in rural areas in Kenya and Tanzania with access to a mission hospital [139,142].

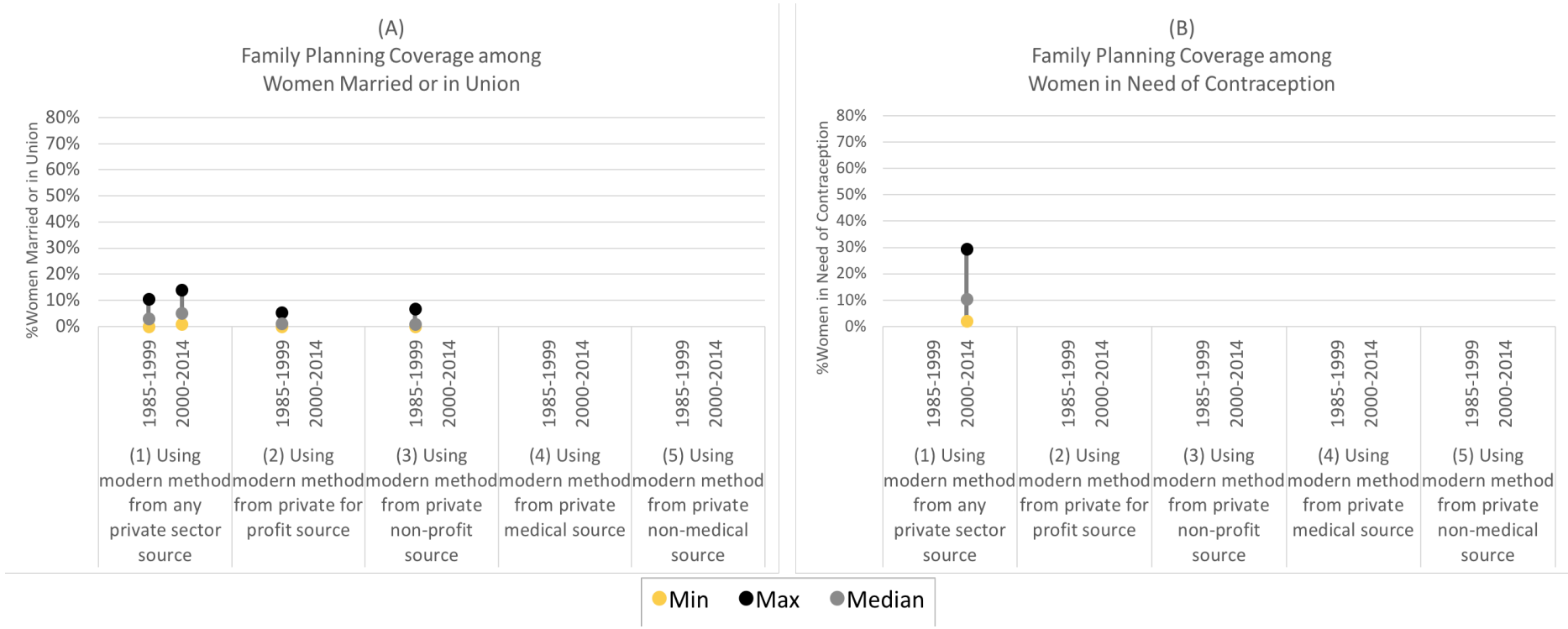

Figure 2.5 Family planning coverage estimates

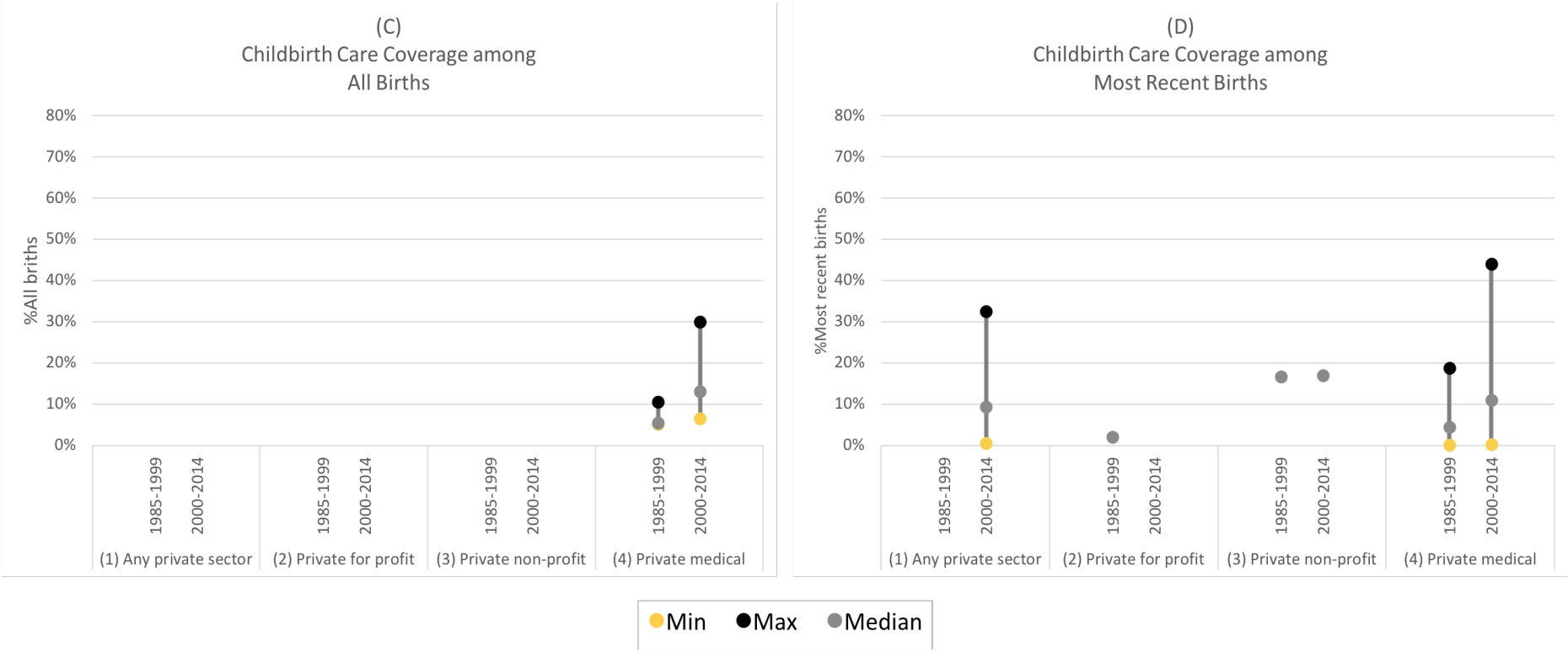

Figure 2.6 Childbirth care coverage estimates

2.4.3.3 *Family planning market share*

We observed much greater heterogeneity in private sector market share estimates for sub-Saharan Africa compared to those of private sector coverage. Campbell et al. (2015 & 2016) estimated that 35% of all modern family planning users and 38% of modern family planning users who received their method from a source with a classifiable sector obtained care from a private sector provider [40,119]. Figure 2.7G shows that the family planning market share among women who obtained care from a source with a classifiable sector ranged from 6% in Rwanda (2010) to 80% in Gabon (2012) [119].

Both Ugaz et al. (2015) and Wodon et al. (2012) estimated that approximately 28% of all modern family planning users in sub-Saharan Africa received their method from a private medical provider. This ranged from countries with less than 2% private medical market share (Burundi, 1987; Sao Tome and Principe, 2008/9) to countries with greater than 60% private medical market share (Democratic Republic of the Congo, 2007; Nigeria, 2008) (Figure 2.7E) [143,166,171].

Among all users of modern contraception and those married or in union, private for-profit providers appeared to have a greater market share compared to private non-profit providers (Figures 2.7E & 2.7F) [122,126,130,148,157,164–166]. There also seemed to be greater use of private medical providers compared to non-medical providers among current users of modern contraception; however, this may be because Wodon et al. (2012) classified pharmacies as medical providers while others distinguished facilities from pharmacies or specialized drug sellers (Figure 2.7E) [143,165,166].

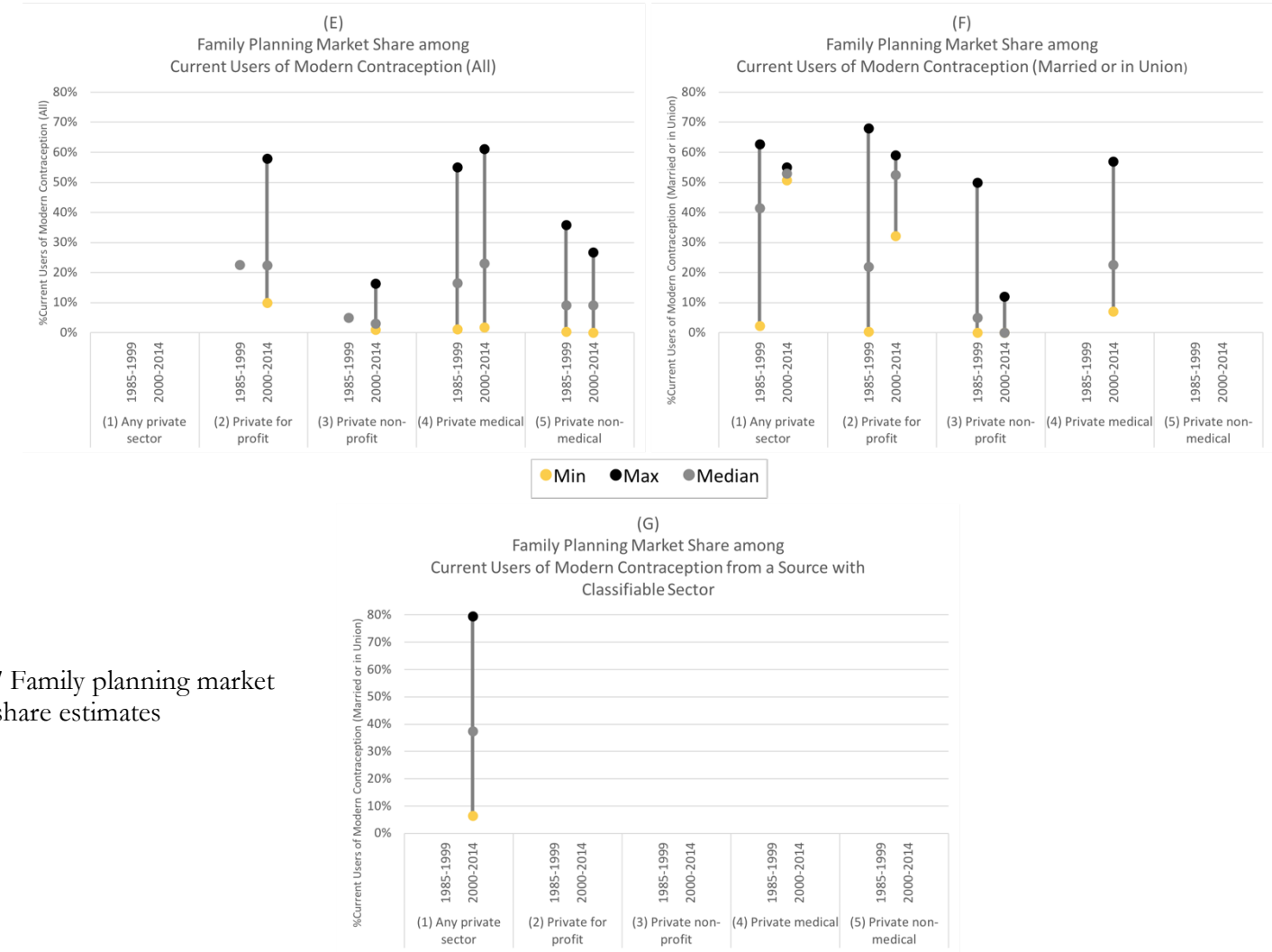

Figure 2.7 Family planning market share estimates

2.4.3.4 *Childbirth service market share*

Only two studies comprehensively examined childbirth service market share across a large number of countries [40,159]. Benova and colleagues estimated that 20% of women who gave birth under appropriate care conditions (in a facility or with a skilled-birth attendant) in sub-Saharan Africa received care in the private sector (Figure 2.8H) [159]. Looking at source of care among women who received appropriate care from a provider with a classifiable sector increased this estimate slightly to 22% (Figure 2.8J) [40,159]. Three smaller studies from Kenya, South Africa, and Uganda examined private sector market share among facility births, and estimates ranged from 15% (South Africa, 1990) to 36% (Uganda, 2007) [134,153,154]. One study from Kenya found that private for-profit providers had a greater market share among facility births (10%) compared to private non-profit providers (3%) [153]. In contrast to private sector family planning market share, none of the estimates of private sector market share for childbirth services exceeded 45%.

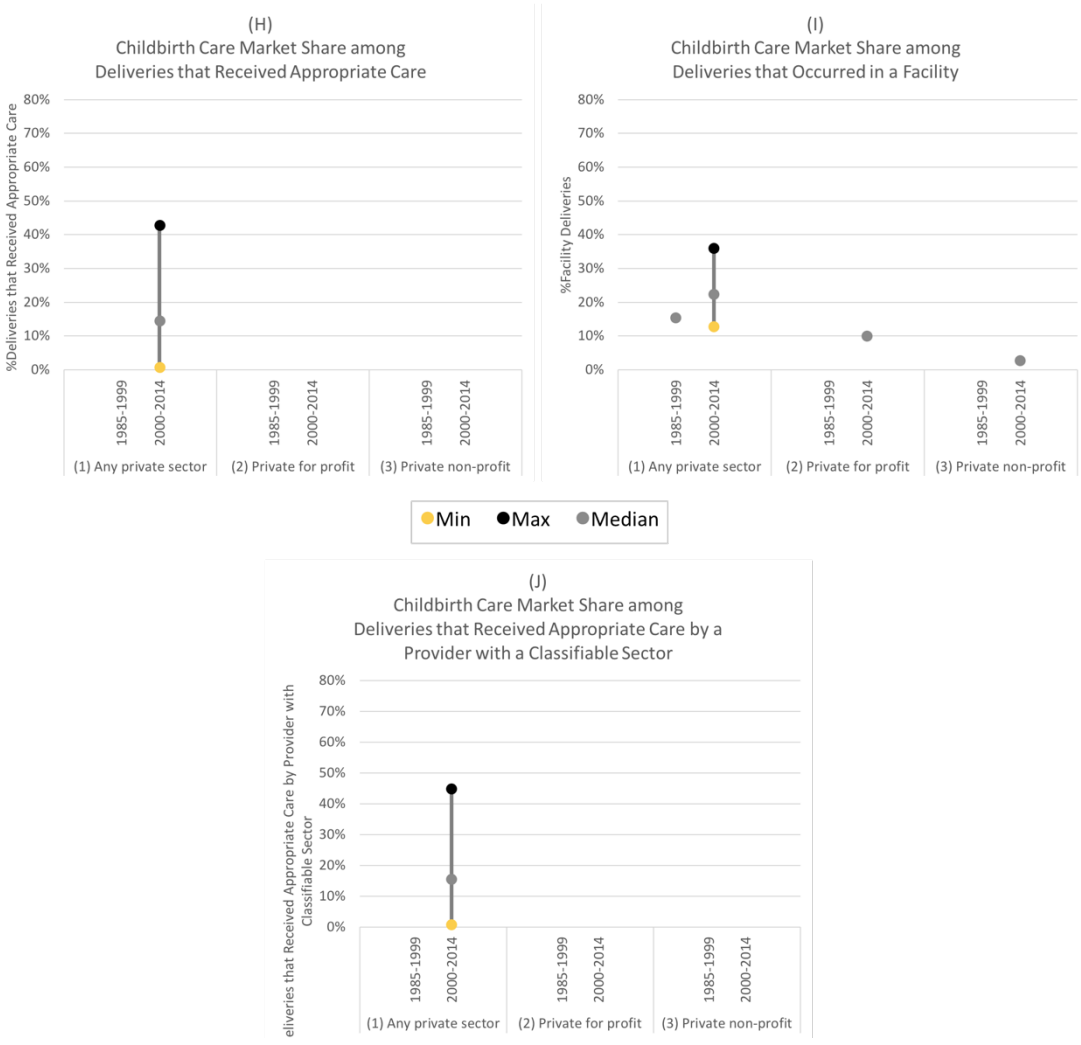

Figure 2.8 Childbirth care market share estimates

2.5 Discussion

We identified 53 papers that estimated use of private sector family planning and childbirth services in sub-Saharan Africa. Consistent with beliefs about the private sector's role in the delivery of healthcare in low- and middle-income countries more generally, our findings suggest that in many African nations, the private sector provides a substantial proportion of both family planning and childbirth services among service users [19,118]. However, among women in need of these services, private sector coverage is comparatively low. Further, these results suggest that the private sector provided more family planning services than childbirth care in the region. This is due to the less specialized nature of certain family planning methods such as condoms, which allow for provision of services by lower-skilled drug sellers and commercial shops.

Although the included studies provided estimates for a majority of countries in the region, the summary measures must be interpreted cautiously. Many of the included studies' estimates were based on national-level survey data. However, some countries were not studied or had estimates that were outdated and potentially not reflective of the current service use patterns. Among the studies with more recent, national-level data, the lack of disaggregation may have masked important differences in use of the private sector within countries. We used the median, minimum, and maximum as the summary measures for each indicator to account for the fact that there were outliers that could skew the distribution. At the same time, using a median meant that all data points were given equal weight, regardless of the populations of the countries being studied. These summary measures were intended to demonstrate the variability of private sector service use across settings rather than to provide comprehensive and precise estimates for the region.

More revealing, however, are our findings on the lack of consistency with which researchers defined the private sector and measured its use. While there is clear heterogeneity between countries in the actual role of the private sector, methodological differences also have the potential to greatly affect estimates of private sector participation. It is therefore important to understand the strengths and weaknesses of each analytical approach when interpreting findings.

When it comes to defining the private sector, a more inclusive definition naturally yields a higher estimate. The extent to which including or excluding certain segments of the private sector biases an outcome depends both on context and the service being examined. For instance, while private non-medical providers can conceivably provide a number of modern

family planning methods such as condoms or pills, appropriate delivery care should, according to World Health Organization recommendations, occur with a skilled health provider, namely a midwife or doctor [172]. Thus, only examining private medical provision of services is likely to present an incomplete picture of the role of the private sector in delivering family planning services, but a more accurate picture for appropriate childbirth care. As has been noted elsewhere, non-profit and faith-based services are often provided in collaboration with governments and therefore may be difficult to distinguish from public sector care, particularly when relying on women providing self-recall survey data [114,115,173–175]. Estimates of all private sector and private non-profit sector service provision are therefore likely to underestimate their true contributions.

Selecting which population to study also requires careful consideration. Examining use of the private sector within a broader population tends to yield lower estimates compared to use among a more narrowly defined population group. As a result, coverage estimates are always equal to or less than market share. In contexts where use of a service is universal or very high within a population, coverage will be equal or similar to, but lower than, market share. In contexts where use of a service is moderate or low, coverage will be much lower than market share.

Because private sector coverage is bounded by total use of a service, comparing private sector coverage estimates between countries with very different levels of total use is challenging. For example, a country (A) with very high use of family planning services, but very low use of the private sector among users, might have the same absolute private sector coverage as a country (B) with low use of family planning services, but very high use of the private sector among users. In such a case, examining coverage alone would lead to the conclusion that the private sector plays a similar role in service provision in each country; however, looking at market share would reveal very different dynamics at play. Similarly, looking at market share alone might lead one to conclude that the private sector serves a greater proportion of the population in country B than in country A, whereas coverage estimates would indicate that the share of total need satisfied by the private sector is similar in both countries.

Population selection also has important implications on estimates within the categories of coverage and market share. Researchers frequently measure private sector family planning coverage as the use of modern contraception from a private sector source among women married or in union, and less frequently among all women in need of contraception. To estimate the latter requires including women who are sexually active but not in union and

excluding women not in need of contraception because they are pregnant or because they wish to have more children in the near future. For secondary analysis of survey data with limited information on fertility preferences and need for contraception, examining use of private sector services among married women might be a reasonable approach. However, this will certainly underestimate private sector coverage given that some proportion of the married population desire to become pregnant and are therefore not in need of contraception. The papers included in this review have also looked at market share among all current users of modern contraception and current users who are married or in union only. Given that service use by married women might not represent the population of women in need, it is preferable to look at source of care for all current users, unless the purpose of the analysis is to compare the experiences of married women to the general population or to unmarried women.

Among papers that looked at private sector family planning market share among all users of modern contraception, regardless of marital status, some limited analysis to women who received care in the private or public sectors. Excluding women who received care from a source whose sector could not be classified from the population under study leads to slightly higher estimates of private sector market share; the extent of overestimation depends on the size of the "unknown sector".

Another consideration when estimating private sector family planning market share is whether to examine source of care when a woman most recently received her current method or when she first received the method. While most papers in this review examined most recent source, it might also be important to understand where women went to start and whether they switch the source of their current family planning method.

For private sector childbirth care coverage estimates, researchers generally used a birth-based approach, looking at use of private sector childbirth services among all births that occurred during a given period, or a woman-based approach, examining source of care for a woman's most recent birth. Analyzing all births allows for a larger sample size and better represents births that occurred within a given period among women with both short and long birth intervals. Analyzing private sector childbirth care use among most recent births only, on the other hand, will over-represent births to women with longer birth intervals. As women with short birth intervals are often less likely to deliver in a facility or have a skilled attendant at birth [64,176], private sector coverage among all births is likely to be lower than among coverage for most recent births only. Nevertheless, estimates using all births and those using

the most recent birth appear similar; suggesting neither approach greatly affects the conclusions about source of care.

Some studies that examined private sector market share for childbirth services specifically looked at the use of the private sector among women who received appropriate delivery care, defined as either by a skilled birth attendant or in a health facility. Estimating the market share among facility births only excludes provision of care at home or in another non-facility setting by a private medical provider, and therefore may underestimate private sector market share for childbirth services. However, in contexts where home deliveries with a skilled birth attendant are rare, looking exclusively at facility births is unlikely to greatly affect private sector childbirth service market share estimates. As with family planning market share, focusing solely on use of the private sector among users of childbirth services from providers with a classifiable sector generated a slightly greater estimated private sector childbirth care market share compared to analysis of use among all users of appropriate childbirth services.

Although missing data on need for services and source of care has the potential to impact estimates of private sector provision of family planning and childbirth services, relatively few papers in this review discussed the extent or treatment of missing data. To ensure that findings can be clearly interpreted, it is important for researchers to acknowledge and describe the effects of missing information on their outcomes.

On a more practical level, data collection methods also influence the type of private sector use outcome that can be estimated. As private sector coverage requires information on the number of women in need who do not seek care, it can only be measured through population surveys. Facility records can be used to estimate private sector market share among facility births if private sector facilities report births, and this would approximate private sector market share for childbirth services in settings where home births with skilled attendants are uncommon. If health facility records are accurate and women tend to seek care within their catchment area, this may be more cost effective than population surveys for estimating private sector childbirth service market share for a given geographic region. Considering the wide range of private sector medical and non-medical outlets through which modern methods of family planning can be accessed, it would be much more difficult to ascertain private sector family planning market share through facility records.

2.6 CONCLUSION

Our review suggests that the private sector plays a substantial role in the delivery of family planning and childbirth services in sub-Saharan Africa. Interest in the role of private sector provision of health services in low- and middle-income countries continues to grow; however, there appears to be lack of consensus on how to appropriately measure and report the use of private sector services. Though a plethora of studies have examined the role of the private sector in providing family planning and childbirth services in sub-Saharan Africa, inconsistencies in how researchers define the private sector and measure its use make it difficult to compare results across studies and contexts. Slight changes in methodology can have substantial impact on private sector service provision outcomes. To ensure correct interpretation of findings, it is therefore imperative that researchers better describe their methods and acknowledge the potential biases in their analytical approaches. Additionally, national- and regional-level policymakers should consider the implications of both private market share and coverage estimates and take care in interpreting data on the scale of private sector health service provision without a clear understanding of the methodologies used.

3 KENYA: SETTING THE CONTEXT

To contextualize the studies presented in chapters 5-7, this chapter provides a brief summary of the socio-demographic, economic, and health system conditions in Kenya as well as trends in key maternal health outcomes. This overview illustrates that Kenya's pluralistic approach to financial protection and health service provision combined with its slow progress in reducing maternal mortality makes it an interesting case study for examining the impact of health financing strategies and public-private partnerships on equity in service-seeking and quality of care for maternal health services.

3.1 GEOGRAPHIC, SOCIAL, AND ECONOMIC CONTEXT

Geographically located on the eastern coast of Africa, Kenya had an estimated population of 49.7 million in 2017 (Table 3.1) [177]. Kenya has a registered refugee and asylum-seeker population of 476,695, of which 78% are women and children [178]. Kenya is administratively divided into 47 self-governing counties, and historically grouped into eight broader regions: Central, Coast, Nairobi, North Eastern, Nyanza, Rift Valley, and Western (Figure 3.1). With a total fertility rate of 3.8 births per woman and crude birth rate of 30.5 live births per 1,000 individuals, Kenya's population is growing at an annual rate of 2.7% [177,179]. Rapid urbanization accompanies Kenya's population growth; however, its population remains largely rural, with only 27% living in an urban [177,180]. Life expectancy at birth for the 2015-2020 period was estimated at 67.3 years [177].

According to the 2014 Kenya Demographic and Health Survey (DHS), Kenya is predominantly Christian, with 71% of women and 68% of men identifying as Protestant or another Christian denomination, and 20% and 21% of women and men, respectively, identifying as Catholic. Kenya also has a comparatively small but substantial Muslim population, with approximately 7% of women and men identifying as Muslim [179].

Kenya is a member of a cooperative economic bloc, the East African Community (EAC), which also includes Burundi, Rwanda, South Sudan, the United Republic of Tanzania, and Uganda. As the only country in the EAC classified as lower middle-income and not low-income, Kenya is experiencing rapid economic growth of approximately 6% per annum and has the highest gross domestic product (at purchasing power parity) per capita in the region, at $3155 (Table 3.1) [181,182]. Despite this economic growth, Kenya received approximately $2.2 billion of official development assistance (ODA) in 2016 and was the fifth highest recipient of ODA in Africa, following Ethiopia, Egypt, Tanzania, and Nigeria [183]. The

largest donors to Kenya from 2016 to 2017 were the United States government and the World Bank [178].

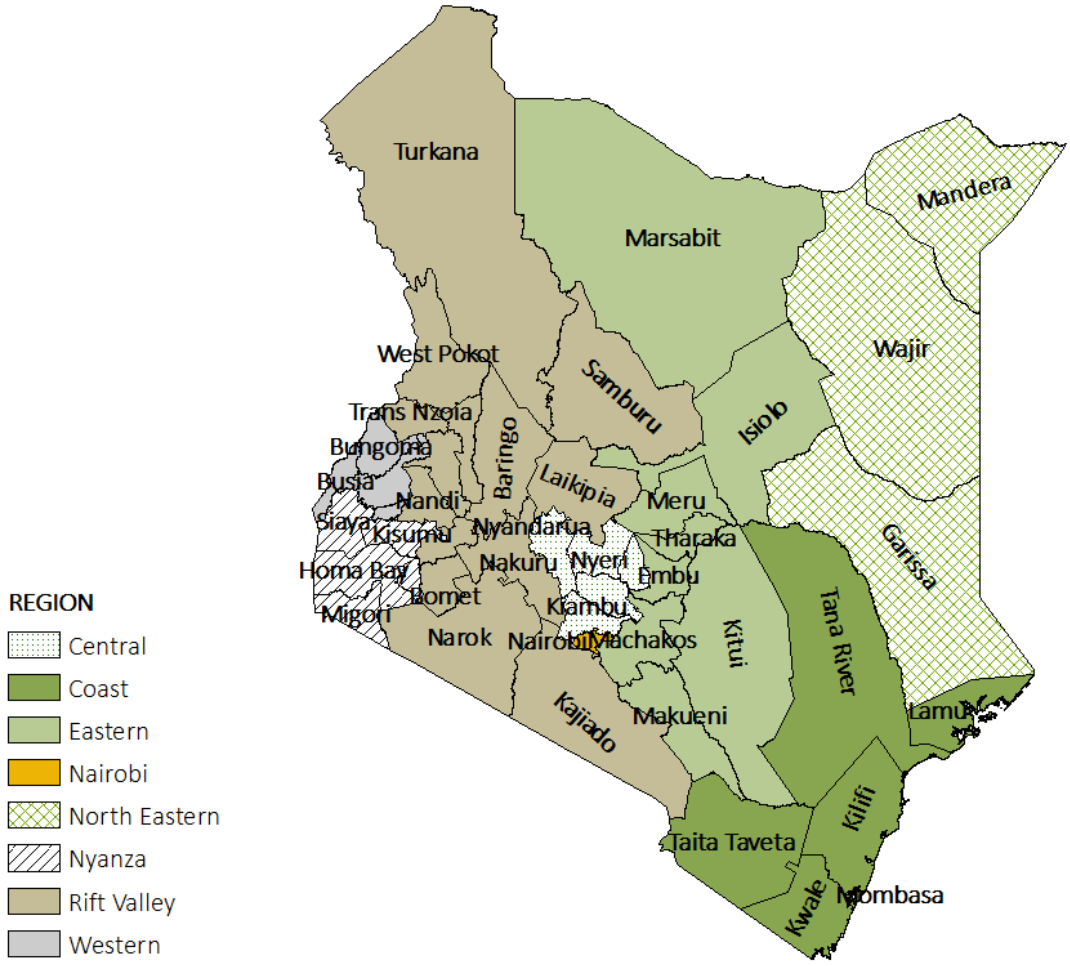

Figure 3.1 Map of Kenya counties and regions

Kenya has fairly high literacy rates, with 88% of women aged 15-49 years and 92% of men in Kenya estimated to be literate [179]. The 2015/16 Kenya Integrated Household Budget Survey found that the national unemployment rate was 7% and women comprised 65% of the unemployed population [184]. The study also revealed that one out of five employed individuals were underemployed (working fewer hours than desired and able to work more), and women were more likely than men to be underemployed [184]. Further, some studies estimate that as much as 80% of the employed population work in the informal sector, meaning they are not guaranteed the benefits and protections given to those in formal employment, such as health insurance coverage [185].

Table 3.1 Snapshot of population, economic, and health conditions in East African Community

	Population			Economy			Health		
	Population size (millions), 2017[177]	**Population growth rate (annual %), 2015-2020**[177]	**%living in urban area, 2018**[186]	**World Bank Income Classification**[181]	**GDP (PPP)ł per capita, 2016**[182]	**GDP growth, (annual %), 2016**[187]	**Life expectancy at birth, 2015-2010**[177]	**Maternal mortality ratioα, 2015**[59]	**Infant mortality rateβ, 2017**[188]
Burundi	10.9	3.3%	13.0%	low	$778	-0.6%	58.0	712	43
Kenya	49.7	2.7%	27.0%	lower middle	$3155	5.8%	67.3	510	34
Rwanda	12.2	2.5%	17.2%	low	$1913	5.9%	67.6	290	29
South Sudan	12.6	2.9%	19.6%	low	$1925*	-6.3%*	57.5	789	63
Tanzania	57.3	3.2%	33.8%	low	$2786	7.0%	66.7	398	38
Uganda	42.9	3.4%	23.8%	low	$1819	4.7%	60.3	343	35

ł PPP: purchasing power parity
α Number of maternal deaths per 100,000 live births
β Number of deaths of children aged one year and below per 1,000 live births
***** Estimate from 2015

3.2 KENYA'S HEALTH SYSTEM

3.2.1 General Overview

Kenya's 2010 Constitution enshrines every person's right to health services and to not be denied emergency medical treatment [189]. Under this constitution, management of the health system occurs at two levels: nationally and within each of the country's 47 counties. At the national-level, the government is responsible for overseeing health policy development; managing national referral health facilities; and providing technical support to counties as needed [189]. County governments, on the other hand, are responsible for all county-level health service provision, which involves management of the majority of health facilities, pharmacies, and health workers in the country [189]. Within this governance structure, health service provision in Kenya is organized into six levels (Figure 3.2) [190]. Levels one (community-based health promotion) through five (secondary referral hospitals) are managed by county governments, while level six (tertiary referral hospitals) is managed at the national-level. In 2013, Kenya had 507 hospitals and 8,426 primary care facilities [191]. In addition to care provided through these formal structures, many Kenyans also seek health services and commodities from informal channels such as drug sellers, retail shops, traditional healers and other non-medical sources [179,192].

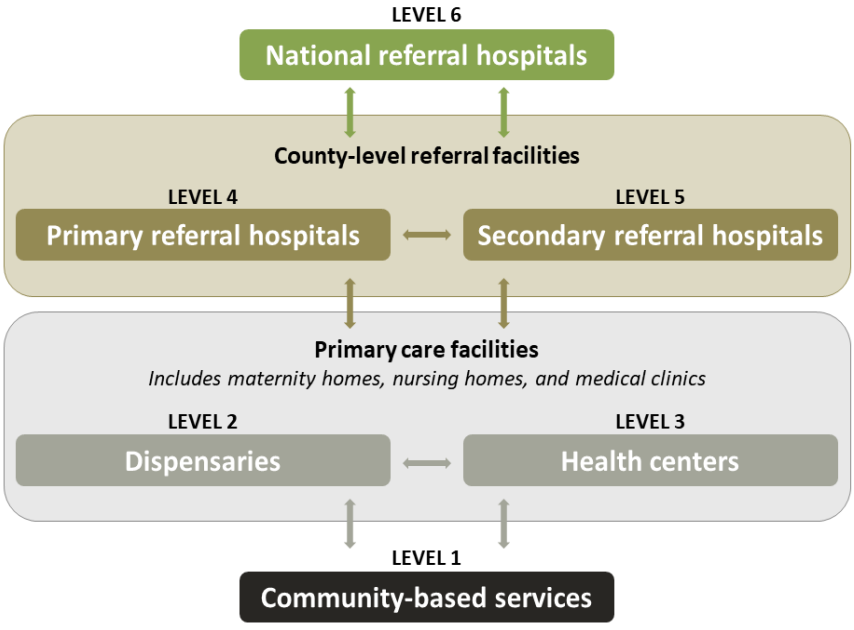

Figure 3.2 Levels of health service provision in Kenya

Although the World Health Organization recommends that each country should have a minimum of 23 doctors, nurses, and midwives per 10,000 population, Kenya's estimated

health worker density was approximately 18 per 10,000 population in 2014 [193,194]. Despite falling short of this global recommendation, Kenya has the highest health worker density in the East African Community [194]. The majority of health workers are believed to work in the public sector; however, the government does not have complete records on the total number of health workers who provide care in the private sector exclusively or in addition to their work in the public sector (dual practice workers) [191]. The Kenya Health Policy for 2014-2030 indicates that the challenges associated with the inadequate numbers of health facilities and health workers in the country are further compounded by the urban-centered geographic distribution of infrastructure and human resources for health [189].

In 2015, total health expenditure in Kenya amounted to 5.2% of the gross domestic product and 6.1% of all government expenditures were allocated to health, compared to 6.3% and 9.9% globally [195,196]. External sources financed 19.5% of total health expenditures in Kenya in 2016, and the remaining 80.5% came from domestic sources [197]. The government covered 36.2% of total health expenditure in 2016, while the other 44.4% came from private sources [197]. Among the 44.4% of health expenditures from domestic private sources, 10.8% came from voluntary insurance payments and 5.9% came from other private sources such as private non-profit organizations [197]. Additionally, 27.7% of health expenditures came from out-of-pocket spending, placing an undue burden of health financing on the poor [197].

In terms of financial protection, Kenya's National Health Insurance Fund (NHIF) has provided mandatory health insurance coverage for individuals employed in the formal sector since 1966 [198]. This scheme was expanded in 1972 to allow voluntary enrollment by those in the informal sector [198]. The government launched the Health Insurance Subsidy for the Poor (HISP) pilot program in 2014, which provided fully subsidized health insurance coverage to households containing poor orphans and vulnerable children; this was scaled up to additional counties in 2016 [199]. In addition to this national scheme and subsidy program, voluntary private and community-based health insurance schemes are also available [198]. In 2014, roughly 20% of men and women in Kenya were insured, and among those with health insurance, more than 75% were covered through NHIF [179]. Further, there were large disparities in coverage by employment status, with approximately 52% of formally employed individuals enrolled in health insurance, compared to only 18% of the informally employed and 10% of the unemployed [200].

To extend access to financial protection to the uninsured, the government also eliminated and reduced user fees in public health facilities on multiple occasions in the past several decades. User fees in Kenya were removed shortly after independence in 1963 and re-introduced decades later in 1989 [198]. Apart from a brief suspension of fees in 1990, user fees were charged in all public facilities until 2004, when the government removed fees in all public dispensaries and health centers, and replaced them with nominal registration charges of 10 and 20 Kenyan Shillings [198]. In 2007, the government exempted women seeking childbirth services in primary care facilities from paying these "10/20" registration fees. Later, in 2013, the government announced that all primary care services would be provided with no charges in public health centers and dispensaries, and childbirth care would be provided for free in all government health facilities [201]. Additionally, from 2006 to 2016, the government piloted a reproductive health voucher program, which provided poor women with subsidized access to a range of reproductive services in participating public and private sector facilities, including family planning, antenatal care, delivery care, postnatal care, gender-based violence recovery care [202].

3.2.2 Private sector health services in Kenya

Approximately half of all health facilities in Kenya are owned by the government (public sector), while the other half are owned by private for-profit, not-for-profit, and faith-based actors (private sector) [203,204]. Of these private facilities, approximately 16% are faith-based, 6% are non-profit, and 78% are for-profit [204]. The majority of private facilities in Kenya are level 4 (primary hospital) or below [205]. According to the 2010 Kenya Service Provision Assessment (KSPA), private facilities tend to offer curative care, such as outpatient services for children, and are less likely than government facilities to provide preventative services, such as antenatal care [205]. Health facilities in Kenya tend to be more concentrated in areas that are urban or of higher socioeconomic status [189]. Similarly, the proportion of health facilities that are privately-owned varies by geographic area, ranging from 12% in Elgeyo Marakwet to 86% in Nairobi [204].

With regard to the private sector's market share, in 2010, the Kenyan government estimated that more than 40% of all health services were provided by the private sector [205]. Chapter 2 demonstrates that in many countries, the private sector's market share tends to vary by service type. Findings from the 2014 Kenya DHS suggest a similar pattern, with 37% of modern contraceptive users receiving obtaining their method from a private facility or shop; 25% of women who gave birth in a health facility receiving care in a private facility; and 29% of children who sought care for a fever used a private health facility [179]. In terms of the

types of private providers used, in 2014, approximately 2% of modern contraception users and children with fever obtained care from a faith-based provider [179]. Use of for-profit health facilities and shops was much higher among both groups, estimated at 34% among modern contraception users and 26% of children who sought care for a fever [179].

The price of seeking care is generally higher in private facilities than in public facilities. However, the size of the difference in the price of seeking care in private facilities compared to government facilities depends on the level of care and the type of facility visited. For example, the 2010 KSPA found that 67% of women who used public sector family planning services reported paying out-of-pocket fees compared to 64% of private non-profit users, 81% of private for-profit users, and 92% of faith-based facility users [205]. Among those who paid fees, the average fee paid was KSh 21 (2010 $US 1 = 79 KSh) in public and private non-profit facilities, 51 in faith-based facilities, and 81 in private for-profit facilities [205,206]. Similarly, a 2004 study found that the cost for receiving delivery care was higher in private facilities at all levels of care [207]. For instance, the average cost for vaginal deliveries in a public health center was KSh 181 (2004 $US 1= 79 KSh), compared to KSh 1,242 in private health centers [206,207].

3.3 MATERNAL HEALTH OVERVIEW

From 1990 to 2015, the maternal mortality ratio (MMR) in Kenya decreased by 25.8% from 687 to 510 maternal deaths per 100,000 live births [59]. Only decreasing by approximately 0.8% annually, this reduction was insufficient for achieving the MDG 5 target MMR of 147 by 2015, and leaves Kenya a long way from attaining the target global MMR of 70 by 2030 under Sustainable Development Goal 3 [59,208]. Additionally, the estimated perinatal mortality in Kenya is 29 deaths per 1,000 pregnancies and the neonatal mortality rate is 22 deaths per 1,000 live births [179]. Kenya's persistently high perinatal, neonatal, and maternal mortality rates are accompanied by insufficient and inequitable coverage of essential reproductive, maternal, and neonatal health interventions. In terms of infrastructure and equipment, the Kenya 2010 Service Provision Assessment, for instance, found that only 36% of health facilities that offered childbirth services had a bed, examination light, and privacy necessary for delivery care [205]. Furthermore, the assessment found that the adequately equipped facilities were concentrated in Nairobi [205]. In terms of service coverage, a substantial proportion of women in Kenya continue to have an unmet need for contraception. In 2014, only 71% of women with a need for family planning (FP) were using a modern method of contraception (Figure 3.3)[179]. Although nearly all pregnant women

(96%) made at least one antenatal care contact in 2014, only 20% of women made their first contact in the first three months of their pregnancy, and only 58% made 4+ ANC contacts, as recommended by the World Health Organization until 2016 [62]. Coverage of appropriate childbirth services was also sub-optimal: 61% and 62% of women gave birth in a health facility or had a skilled attendant at birth in 2014, respectively. Additionally, only 53% of women reported receiving a postnatal check by a health worker within 48 hours after giving birth.

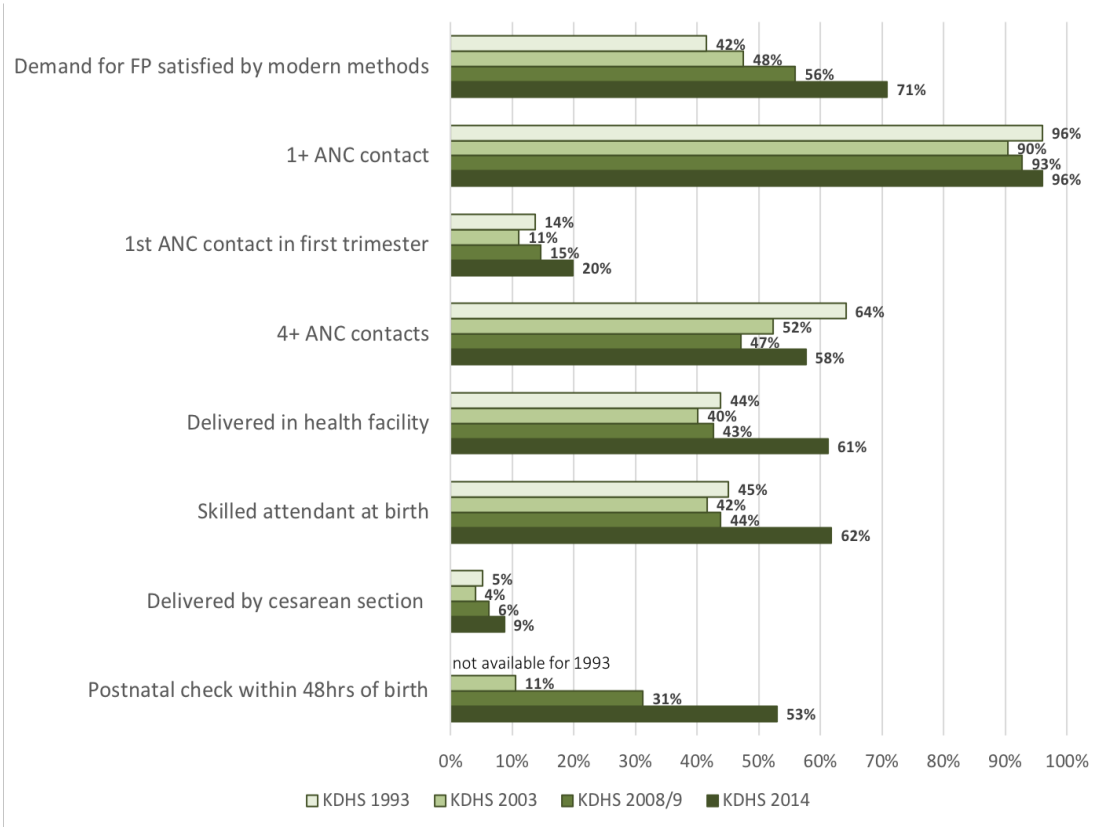

Figure 3.3 Time trends in key reproductive and maternal health service indicators, Kenya (1993-2014)

Data source: Measure DHS STATCompiler, Kenya Demographic and Health Surveys [209]

In terms of time trends, some indicators, such as demand for FP satisfied by modern methods and postnatal check within 48 hours of birth appear to have steadily improved from 1993 to 2014 (Figure 3.3). Others, such as having the 1st ANC contact within the first trimester, delivering in a health facility, and delivering with a skilled birth attendant appear to have primarily improved between 2008/9 and 2014. Finally, it is unclear whether there have been any improvements since the early 1990s in the proportion of women making 1+ or 4+ ANC contacts. However, even where improvements have occurred, inequities continue to exist, with more marginalized populations, such as adolescent girls, poor women,

and women living in rural areas, less likely to receive any or good quality care [179,201,210]. This is illustrated in Figure 3.4, which presents key reproductive and maternal health indicators from the 2014 Kenya DHS stratified by urban and rural residence.

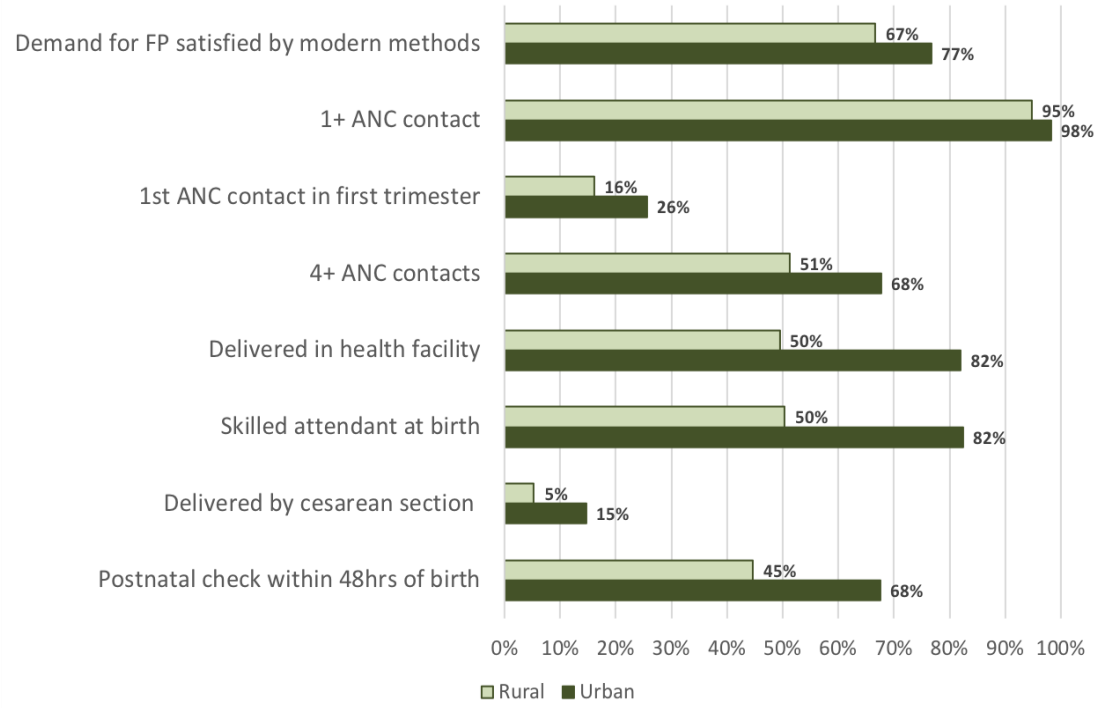

Figure 3.4 Urban/rural differences in key reproductive and maternal health service indicators, Kenya (2014)

Data source: Measure DHS STATCompiler, Kenya Demographic and Health Surveys [209]

This chapter has provided a brief summary of the socio-demographic, economic, health system, and maternal health conditions in Kenya. This overview suggests that Kenya's pluralistic health service provision, substantial unmet need for maternal care, and persistent equity gaps make it and interesting context in which to study approaches to achieving universal coverage of key maternal health services.

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SECTION A – Student Details

Student	Mardieh Dennis
Principal Supervisor	Oona Campbell
Thesis Title	Pragmatic pluralism for health: Understanding the role of public financing and public-private engagement on use, quality, and equity in access to maternal health services in Kenya

If the Research Paper has previously been published please complete Section B, if not please move to Section C

SECTION B – Paper already published

Where was the work published?			
When was the work published?			
If the work was published prior to registration for your research degree, give a brief rationale for its inclusion			
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SECTION C – Prepared for publication, but not yet published

Where is the work intended to be published?	BMC Health Services Research
Please list the paper's authors in the intended authorship order:	Mardieh L. Dennis, Katerini Storeng, Lenka Benova, Oona M.R. Campbell
Stage of publication	**Not yet submitted**

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	With input from my co-authors, I designed the study, conducted the document review, conducted interviews and qualitative analysis, and wrote the manuscript.

Student Signature: _____ **Date:** 1 September, 2019

Supervisor Signature: _____ **Date:** 1 September, 2019

4 FROM AFRICAN SOCIALISM TO PRAGMATIC PLURALISM: A HISTORICAL ANALYSIS OF HEALTH FINANCING REFORMS AND THE POLICY ENVIRONMENT SURROUNDING PRIVATE HEALTH PROVIDERS IN KENYA

This chapter presents an unpublished qualitative research paper (paper 2) seeking to answer the second research question of this thesis, examining how Kenya's pluralistic financing policies and public-private engagement strategies for health have emerged and evolved since independence.

4.1 INTRODUCTION

The global goal of achieving universal health coverage (UHC), broadly defined as all people being able to access quality and affordable services they need without suffering financial hardship, is nearly ubiquitous among modern African nations' development plans and policies [5,11]. Sustainable and effective strategies for financing and providing the health services needed to achieve UHC, on the other hand, are quite elusive for low- and middle-income (LMIC) countries. Early guidance from the World Health Organization on policy development for UHC recommended that countries take one of two general approaches: establishing a social health insurance fund or developing a tax-financed public health system [4]. However, the large commitment of domestic financial resources and institutional capacity required to make these strategies a reality has resulted in many countries struggling to make sufficient progress towards achieving UHC in practice [11,211].

Many sub-Saharan African governments have developed alternative strategies aimed at taking more feasible, incremental steps towards UHC [11]. For many countries this has involved eliminating user fees for a basic package of essential services in some or all government facilities. A number of African governments have also developed financial risk pooling schemes targeting certain sub-populations [11]. In some countries, such as Kenya and Nigeria, this has taken the form of contributory national health insurance schemes managed by the government or a parastatal entity primarily serving those in the civil service or formal workforce [11,212]. Other countries, such as Rwanda and Tanzania, have developed voluntary community-based health insurance schemes aimed at providing a financial protection mechanism for the informal sector [11,213,214]. As the private sector provides a substantial proportion of health services in sub-Saharan Africa [40,215,216], many

countries have also explored how interventions such as social franchising of private health providers; social marketing of health commodities; accreditation of private health facilities; providing subsidized access to private facilities using vouchers; and contracting private providers can help expand health service coverage [17,216].

Numerous studies have attempted to measure the impact of the many and diverse health financing reforms and public-private partnerships for health across Africa and in LMICs more generally [17,71,96,102,214,217–219]. However, these attempts to isolate the effect of specific policies and interventions on health outcomes typically do not take into consideration the concurrent implementation of other related policies and interventions in the study countries. The varying results between and within countries are likely related to contextual factors that cannot easily be quantified. In order to better understand why some approaches have worked in some settings and not others, and to elicit the important lessons that can be shared across settings, it is imperative to assess how contextual factors may have influenced the adoption and implementation of these strategies in each country.

Kenya's journey from trying to develop an equitable post-colonial health system to current efforts to achieve UHC provides an interesting case study because it involves a mix of health financing reform strategies, including user fee removals and reductions, contributory health insurance for the formal sector, and attempts to create a more inclusive social health insurance fund [198,199,220]. Additionally, with half of the country's health facilities operated by non-state providers [205], the Kenyan government has also piloted multiple strategies of public-private partnership for health service provision [202,221,222]. A considerable number of policy studies have been conducted to examine perceptions about these reforms and interventions, describe their implementation, and outline the factors facilitating and inhibiting their success [198,199,202,223–229].

This study extends this literature by examining the evolution of all of these approaches together within the broader history of Kenya. This study uses a retrospective policy analysis approach to examine how the confluence of contextual factors and events have contributed to the contemporary policy environment surrounding UHC in Kenya. In particular, this study seeks to describe the roles of the political environment, economy, internal and external actors, and societal values in driving the evolution of health financing reforms and policies concerning public-private engagement for health in Kenya. Finally, this study also aims to summarize key actors' views on why the private for-profit sector is such an important provider of health services in Kenya and whether the degree to which the government's

current level of engagement with the private for-profit sector is an unregulated response to market forces or a strategic effort to maximize efficiency in the health sector.

4.2 METHODS

4.2.1 Document review & key informant interviews

This study used an iterative approach, combining information from a qualitative desk review and key informant interviews, to examine the various factors that have influenced Kenya's policy environment surrounding UHC, health financing, and public-private engagement for health service provision. For the purposes of this study, I considered the 'private sector' to include all for-profit and non-profit (including non-governmental organizations (NGOs) and faith-based organizations (FBOs)) involved in formal healthcare provision.

An initial desk review of health policies in Kenya and peer-reviewed literature related to health-financing and public-private partnerships for health in Kenya helped me to frame the study's research questions and develop a preliminary list of key informants. I spent May to July 2017 in Nairobi working closely with a health policy researcher at the Population Council Kenya office who helped me to finalize my discussion guide and list of informants to invite to participate in my study. My Population Council colleague facilitated connections with potential key informants.

From June to July 2017, I conducted 12 interviews with 13 key informants (at one NGO, the director and a program manager requested a joint interview). The final list of participants represented the following groups: Ministry of Health at the national (1 respondent) and sub-national (1) levels; private for-profit managers (both single facilities) (2); non-governmental organization (NGO) social franchise managers (3); NHIF (1); health providers in the public (1) and private (2) sectors; donors (1); and researchers (1). Each interview was conducted with a semi-structured interview guide (Appendix 6), in English, voice recorded, and covered topics broadly related to the respondent's work in the health sector; participation in health policy formation; awareness of existing public-private partnerships for health; and the role of the private sector for health in Kenya and the factors contributing to its growth. Interviews typically lasted approximately 45 minutes.

To complement the emerging ideas from the interviews, triangulate certain details, and fill in gaps in the information reported by the interview participants, I then conducted a more comprehensive review of historical and contemporary national policy documents (Appendix 7); visited the websites of organizations mentioned during the interviews to search for

relevant reports and newsletters; and scanned the websites of local newspapers for articles on important events emerging from the interviews. I also reviewed relevant books, grey literature, and peer-reviewed articles, including those that conducted historical analyses of politics and various aspects of health policy formation and implementation in Kenya.

4.2.2 Data management and analysis

A research assistant transcribed each interview verbatim. I checked each transcript for accuracy and imported all finalized transcripts, policy documents, newsletters and newspaper articles into Nvivo for qualitative data management and coding [230]. I analyzed the data using thematic content analysis, and examined themes within each source and across sources.

I developed a coding framework using a mix of deductive codes generated from the qualitative interview guide and inductive codes generated from my first readings of the included interviews, policies, and other documents. I conducted preliminary coding of a few documents and adjusted the codes as needed to finalize the final framework to be used for analysis. After coding all of the documents, I reviewed each node and created research memos in which I summarized emergent themes and my interpretation of the findings.

4.2.3 Ethical approval

This study received ethical approval from the institutional review boards of the London School of Hygiene and Tropical Medicine (LSHTM) (Appendix 8) and Amref Health Africa in Kenya (Appendix 9). All participants provided written informed consent. Given the study's small sample size, and at the behest of the LSHTM ethics board, I contacted each participant to share their interview transcript and the opportunity to flag any parts of the interview that they felt were identifying or required revision. Only one participant requested to make changes to their transcript; these included inserting additional comments to explain some of the statements made during the original interview; editing the text to clarify language; and replacing a couple of critical sections of the interview with less detailed, more general critiques.

4.2.4 Limitations

This study has some limitations. Due to the retrospective study design, it was sometimes difficult to find documentation on certain events and to resolve conflicting information between documents. It was also challenging to schedule interviews with all policy actors of interest. Additionally, I did not have funding to conduct interviews outside of Nairobi. As a result, the views of some key actors, such as representatives of the faith-based sector and

those based in the 46 counties outside of Nairobi, are missing from this analysis. Finally, although informal health providers also offer a significant amount of care in Kenya [231], this study focuses exclusively on the role of formal providers.

4.3 RESULTS

The findings for this chapter are separated into two main sections. Sections 4.3.1 and 4.3.2 provide a historical description of the ways in which the political, economic, and social environment shaped the development of policies around health financing and service provision in Kenya from independence to the late 1990s (Section 4.3.1) and from the early 2000s to date (Section 4.3.2). The events outlined in these sections were identified primarily through the desk-based review, but also informed by discussions during the key informant interviews. Finally, Section 4.3.3 moves away from a descriptive history into analyzing key informants' perspectives on the key drivers behind Kenya's substantial private for-profit market share.

4.3.1 Historical approaches to expanding access to health care

Since Kenya gained independence from British colonial rule in December 1963, a number of economic, social, and political factors have facilitated a shift from more socialist views around state provision of services, to the normalization of the idea that private actors and external donors are critical to ensuring universal access to social services such as healthcare.

4.3.1.1 *'African Socialism' and the post-independence period*

Kenya was colonized for six decades, and during this time, its people were systematically oppressed and excluded from political and economic participation in society [232]. This colonial history strongly influenced Kenya's political priorities under the nation's first president, Jomo Kenyatta, during the immediate post-independence period. Kenyatta's government emphasized the ideals of democracy, equitable distribution of resources, and social welfare [233,234]. Additionally, policymakers during this period were deeply wary of the role of external actors in Kenyan society and the potential for neo-colonial relationships, and instead aimed for 'Africanization' of the economy and public service [233,234].

One of independent Kenya's earliest policy papers declared that the country was committed to the principles of 'African Socialism,' which valued political freedom and democracy for all and obligated the government to provide essential social services, including healthcare, education, and social security [233]. African Socialism differed from more traditional socialist views in that it aimed to be more adaptable and pragmatic. For instance, the Government of

Kenya acknowledged that given limited domestic capital, exclusive nationalization of industries and services would be at odds with the country's goals of fast economic growth. Instead, the government called for a culture of 'mutual social responsibility' and *harambee,* a Swahili word meaning that citizens had an obligation to work hard and create solutions for the betterment of their own lives and communities [232,233]. Additionally, the government encouraged private investment and partnerships, provided that private companies complied with government regulations and reinvested their profits domestically [233]. Thus, although Kenya's first government was heavily influenced by key aspects of socialism, it never fully considered itself "socialist" [232,233].

The post-independence period was one of accelerated economic growth for Kenya—the gross domestic product is estimated to have increased between six and seven percent per year from the 1960s to the 1970s [234]. During this time, the government allocated substantial funding to improving access to healthcare in Kenya, with a focus on growing the health workforce, providing health services for free through tax-financing, and increasing the number of health facilities, particularly in underserved areas [226,232,234,235]. In addition to the infrastructure developed by the government, many of the new facilities in rural areas were constructed through *harambee,* with communities self-funding and building health centers [232]. Prior to this large-scale investment in the health sector by both the government and local communities, Kenya's health facilities were predominately built and operated by Christian missions from Europe and North America [236,237]. After independence, the government asserted itself as the lead health policymaker, regulator, and service provider in Kenya [232,237]. Many churches transferred management of their larger, urban hospitals to the government and shifted focus towards their smaller facilities in more rural areas [232,238]. During this period, the government recognized the faith-based community as essential partners for expanding access to health services in Kenya. Although it appears that there were no formal agreements between the government and faith-based medical sector, there was an informal cooperative relationship between the two parties [238,239]. For instance, the government periodically provided church-operated facilities with access to subsidized drugs and supplies, and many churches closed or upgraded their dispensaries to align with newly developed government standards [237].

In terms of health financing, Kenya's 1966 introduction of the National Hospital Insurance Fund (NHIF) served as both the first national health insurance scheme in Africa and first large-scale effort to make inpatient and private health services more widely attainable in Kenya [10,11]. The NHIF was initially established as a mandatory contributory insurance

scheme for those employed in the formal sector earning above a threshold salary. NHIF policies were later amended in 1972 to allow for voluntary enrollment and contributions by those who were unemployed or informally employed, though this reportedly was not implemented in practice until decades later [220]. Although the NHIF's introduction exclusively catered to the formally employed, the government attempted to simultaneously reduce financial barriers to care for individuals with lower ability to pay by removing the user fees previously charged in public sector facilities prior to independence [240].

4.3.1.2 *Slowed economic growth, structural adjustment, and the rise of public-private engagement for health service provision*

As Kenya's burgeoning economy began to slow in the late 1970s, the country's high population growth increased demand for services and employment beyond what the government could provide [232,234]. A new approach to health financing thus began to develop, shaped by the country's poor economic situation; the growing influence of non-state actors operating within the country; and pressure to comply with an emerging global focus on community involvement in healthcare financing and provision. Although the Kenyan government aimed to provide free health care for its citizens, the public sector was at a 'breaking point' [240] and struggled to cope with the high expenditures required to actually achieve this goal throughout the 1970s and the decades following [232,235]. This overextension of government resources led to unsustainable levels of borrowing from bilateral and multilateral lenders, such that when Daniel arap Moi became president in 1978, the country was entering an economic crisis [232,241]. Unable to repay its growing debts, Kenya received its first structural adjustment loan from the International Monetary Fund and World Bank in 1980 followed by a number of additional loans over the following decade [241]. In return for this financial support, the World Bank pressured the government to make certain policy changes, including reducing the size of the civil service; lowering tax rates to encourage investment; liberalizing interest rates to facilitate commercial borrowing; and reducing tariffs on imports and trade. These reforms were implemented with varying levels of compliance and aimed to reduce government spending in all areas, including health, while creating a favorable market for private sector contributions to the country's economic development plans [33,232,241].

Kenya's precarious economic situation in the late 1980s also created opportunity for external donors to increase their influence on the country's health priorities and policy formation. Given the ideological principles of the ongoing structural adjustment program and the

accompanying ideas about the inefficiency of the public sector, leading international donors to Kenya began to channel their funding through non-state actors [242,243]. This led to a shift from a civil society characterized by more informal, locally-led organizations and *harambee* groups to an externally-dependent development system centered around the growing number of more formalized national and international NGOs [243]. The number of NGOs operating in Kenya was estimated to have increased from approximately 120 in 1970 to between 400 and 500 by the 1990s [242]. As these NGOs solidified their roles as important service providers, the government became uneasy that citizens' and donors' reliance on non-governmental actors could serve to delegitimize and reduce the autonomy of the state [242]. The government therefore introduced the Non-Governmental Organizations Co-ordination Act of 1991, legislation to regulate and control NGOs' activities [242]. However, this was met with contention and resistance by both NGOs and the bilateral donors supporting them due to concerns that the law would limit their autonomy and divert relief efforts away from geographic areas inhabited by political opposition groups rather than to foster improved coordination [242,243]. The NGOs began to lobby and negotiate with the government for key changes to be made to the Act and the government finally began to implement it in 1992, after a number of amendments were made to remove some of its more restrictive conditions [242,244].

In 1990, the United States Agency for International Development (USAID) capitalized on this new era of NGO-led activity in Kenya by funding the six-year $15 million Kenya Health Care Financing Project. A program of this size was unprecedented in Kenya at the time and afforded USAID great policy influence as the largest financial contributor to the country's health financing reform process [239]. The project had three key policy imperatives, to: (1) introduce user fees in government facilities; (2) increase health insurance coverage, and (3) encourage greater provision of care by private providers [239].

With regard to shifting global health priorities, in 1978, the World Health Organization convened delegates from 134 countries to adopt the Declaration of Alma-Ata, a document that established health as a human right and urged governments to place a greater emphasis on achieving health equity through community-level interventions to increase access to primary health care [2,245]. Additionally, in 1987, African health ministers met in Mali and signed the Bamako Initiative, a resolution to improve women's and children's health through co-financing of health services between the government and communities or health service users [246], for example by introducing user fees.

Within this context of economic challenges, increasing influence of NGOs, and pressures to focus on primary care, the Kenyan government officially re-introduced public sector user fees in 1989. Under this reform, all government facilities at the health center level and above charged user fees, while primary care in dispensaries continued to be provided for free [241]. The government introduced a fee waiver policy targeting marginalized populations; however, unclear systems and inconsistent implementation frequently excluded those who lacked the ability to pay from accessing essential care [12,15–17]. At the same time, Kenya's then Minister of Health established a task force to adapt the principles of the Bamako Initiative to the Kenyan context [15]. Following the recommendations of this task force, the government began to implement a program nicknamed the 'East Africa Initiative' in 1989, which aimed to expand affordable access to essential drugs and basic care by establishing community pharmacies operated by community health workers (CHWs) and overseen by village health committees [15]. Given the strategy's reliance on CHWs, the scope of care provided through the East Africa Initiative was very limited and could not overcome the financial barriers to care-seeking for the poor in need of more advanced care.

Due to concerns that the increased patient volumes resulting from new fee structure was contributing to reduced quality of care and the poor being denied access to services, the government quickly removed fees for outpatient service in 1990, months after they were introduced [241,247]. Following this suspension, the government continued to charge for inpatient care and other services while developing improved management and reporting structures; a more transparent fee waiver system; and a strategic implementation plan [247,248]. In 1992, after two years of decreased revenue and increasing financial pressure, the government re-introduced and increased user fees in phases, to allow for adjustments as necessary and to slowly gain public acceptance [241,247,249].

Although the introduction of user fees aimed to allow for more efficient use of government resources, the financing reform alone was insufficient for meeting the country's demand for health care, particularly as the HIV epidemic emerged and placed additional strain on Kenya's health system in the 1980s [232,241]. In the early 1990s, the government estimated that private actors managed approximately 40% of the health facilities in the country [250]. Given this large presence of private actors, and in line with the objectives of the USAID-funded Kenya Health Care Financing Project, the government sought to increase the participation of private health providers through a number of strategies. For example, the Kenya Health Policy Framework of 1994 outlined plans to contract out health care provision to private for-profit and non-profit facilities in order to increase efficiency of public spending

[250]. Aside from contracting private providers, the government also aimed to create an enabling environment to encourage private actors to participate in the health sector through incentives such as tax exemptions, offering land to those willing to build health infrastructure in underserved areas, and reducing the barriers to the registration and licensing of private health facilities and providers [250]. The government also took steps to better integrate the operations of public and private providers through initiatives such as incorporating health providers working at mission facilities into government-led doctors' and nurses' trainings; inviting private non-profit providers to participate in continuous or on-the-job trainings; and seconding government-paid health workers to mission hospitals [239]. The government also sought to offload a large share of the burden of providing curative care to private for-profit and non-profit providers while focusing on primary care and curative services for select target groups [250].

The government's efforts to share responsibility for the health sector with non-state actors also impacted the management of the NHIF. In 1998, the NHIF Act transferred NHIF from a government entity to an autonomous parastatal organization managed by a board of directors [251]. This Act required the NHIF board to include members representing both government and non-governmental providers to ensure both public and private interests were considered in the management of the fund [252].

As the number of private health facilities grew over the 1990s, there was increased demand for government doctors to leave their posts to work completely or partially in the private sector. Rather than banning providers from practicing in both public and private facilities, or 'moonlighting,' the Kenyan government has attempted to regulate the practice. Since the 1990s, the government has required public sector doctors to register with a regulatory board in order to obtain a license to practice in a private sector health facility [253,254]. To establish a mechanism for accountability, the government required doctors engaging in dual practice to share their schedule for working in both sectors [254]. The permission to practice in both the public and private sectors ("moonlight") was only extended to senior doctors and therefore excluded junior doctors [254]. In recent years, dual practice has been a source of conflict between the government and health workers. While many public sector doctors feel that their working conditions and pay are inadequate, the government leadership, on the other hand, feels that dual practice has been so poorly regulated that doctors are receiving government salaries while spending most of their time in the private sector [255]. In response to this challenge, the Kenyan government very recently announced that public sector doctors will have to obtain permission to practice in the private sector from the government facility

where they are working rather than from the regulatory board [256]. By placing responsibility for monitoring doctors' working hours with the public health facilities, the government aims to improve accountability, and ensure that dual practice remains beneficial for both the public and private sectors rather than simply reducing human resources for health in the public sector.

4.3.2 Recent shifts in the health policy environment

The previous section demonstrates how Kenya transitioned from a country primarily dominated by socialist ideals in the years immediately following independence in the 1960s to one increasingly reliant on the private sector as important providers of health services by the late 1990s. This section continues this descriptive history by highlighting key events that have characterized health financing policies and public-private engagement in Kenya in the past two decades.

4.3.2.1 *Pushing for national social health insurance and the institutionalization of public-private engagement*

When Kenya's third president, Mwai Kibaki, assumed office in 2002, the government made economic recovery its top priority. Despite efforts to increase the efficiency of the public sector in previous decades, Kibaki's government viewed the inefficiency and mismanagement of public resources as ongoing inhibitors to economic prosperity in Kenya [257]. The 2003-2007 Economic Recovery Strategy for Wealth and Employment Creation outlined a plan for re-accelerating economic growth that relied heavily on leveraging the private sector, calling for the government to 'downsize the public sector and make it more efficient and investor-friendly in order to promote private sector-led growth and poverty reduction' [257]. At the same time, health and other social services were framed not only as fundamental rights, but as vehicles for increased productivity and wealth creation [257–259]. Thus, notwithstanding this invitation for non-government actors to lead poverty reduction efforts, Kibaki's government also sought to ensure that certain economic goals were achieved by reinforcing the state's role as a provider of affordable services. This was achieved through initiatives such as state-funded universal access to free primary school education and the establishment of the National Social Health Insurance Fund (NSHIF) [240,257,259].

In 2002, the government established a task force to outline a plan for transforming the NHIF into the NSHIF, a mandatory social health insurance scheme that would extend financial protection to the unemployed and informally employed [198,251]. Between June 2003 and June 2004, the World Health Organization and German Technical Cooperation Agency

(GTZ) conducted a series of six mission visits to Kenya to advise the Ministry of Health on the development of a social health insurance strategy [198,260]. As this strategy was being finalized, the Minister of Health announced on 1 July 2004 that with immediate effect, outpatient health services in public dispensaries and health centers were to be provided for free with nominal registration charges of 10 and 20 Kenyan Shillings (2004 US$1 ≈ 2004 KSh 79) [261]. Months after this "10/20" policy was introduced, an NSHIF Bill was passed by parliament in December 2004 [260]. While many interest groups expressed apprehensions about how they might be affected by the NSHIF Bill, the strategy was most strongly opposed by private insurance organizations and private facility managers, who felt that they were not sufficiently involved in the development of the policy and feared that the new scheme would discourage enrollment in private insurance schemes and result in insufficient reimbursement of private providers [260,262]. Citing concerns about the financial sustainability of the plan, the president did not ratify the bill and instead recommended it go back to parliament for further amendment. Interest in pushing the NSHIF agenda forward resurfaced in 2007 with the launch of Kenya's Vision 2030 plan, which listed the establishment of an equitable national health insurance scheme as a flagship project for the health sector; however, an amended bill was never ratified [198,259].

This seeming juxtaposition of promoting privatization to foster economic growth while maintaining certain principles of welfare states persists in present-day Kenya under the leadership of President Uhuru Kenyatta, who took office in 2013. As Kenya rapidly modernizes, advancing the economy remains at the forefront of national priorities. Simultaneously, Kenya strives to attain global social development targets such as the Sustainable Development Goals, which include the goal of universal health coverage, through increased public financing of healthcare and expansion of insurance coverage [61,263].

With these goals in mind, private sector engagement is becoming increasingly institutionalized in Kenya. In 2013, the government introduced the Public Private Partnerships Act, a law that governs the procedures for establishing a public-private partnership for all sectors [264]. This formalization process is also occurring within the health sector, as the Ministry of Health now has a public-private partnership unit and is currently developing a public-private partnership strategy specifically for health. Despite these steps to institutionalize health sector public-private engagement, some key informants indicated that this coordinated approach has not translated into systematic, sector-wide approaches in practice. One reason given for this is that many of the larger-scale private sector engagement

strategies in Kenya have historically been donor-financed vertical programs. These include, for example, the social marketing of treated mosquito nets supported by the Global Fund and the contracting of private providers to offer subsidized reproductive health services through the Reproductive Health Vouchers Program funded by the German Development Bank (KfW) [202,265,266].

This tendency towards vertical approaches remains today. For instance, in 2013, the Kenyan government announced that maternity services were to be provided for free in all government health facilities. Three years later, in 2016, the government transferred the management of this free maternity services policy to the NHIF, expanded it to include small private facilities, and rebranded it as the Linda Mama program. While this commitment to providing financial protection for maternal health services is seen as a key step in the path towards UHC, qualitative evidence suggests that both potential beneficiaries and providers alike feel that the program would be more helpful if it included additional services for mother and baby, or, even better, provided care for the entire family [223].

In contrast to these vertical approaches, there have also been multiple recent attempts to horizontally improve financial access to care through broader user fee removals and reforms to the NHIF. In 2013, for instance, the government removed user fees and registration charges for outpatient care in all public health centers and dispensaries [267]. In 2014, the government piloted the Health Insurance Subsidy for the Poor (HISP) program, which aimed to provide fully subsidized health insurance coverage for the poorest and most vulnerable households [199]. Although this program was scaled-up in 2016, evidence suggests that the targeting mechanisms were ineffective. For instance, the poor have reported challenges in both qualifying for the HISP program and affording the standard premiums for voluntary NHIF enrollment, while a large proportion of the HISP beneficiaries come from wealthier households [199,223,224].

In recent years, the NHIF has expanded its network beyond larger private hospitals in urban and wealthier areas by accrediting smaller for-profit providers. The African Health Markets for Equity (AHME) project, funded by the Bill and Melinda Gates Foundation and the United Kingdom Department for International Development (DFID), has helped to support this incorporation of smaller commercial healthcare providers into the NHIF. The AHME project works with private for-profit clinics participating in NGO-led social franchising networks to undertake quality assessments, implement quality improvement measures, and navigate the NHIF accreditation process [221]. This expansion of the NHIF network to

include providers located in more marginalized areas, in turn, is seen as critical to extending coverage and making the NHIF more equitable [199].

The NHIF is also partnering with private for-profit firms to improve registration and payment processes [240]. For instance, NHIF's 2009 partnership with Safaricom to allow payments through their M-PESA mobile money platform has improved the ability of the informally employed to make contributions [268]. Before the program was introduced, voluntary NHIF subscribers had to make monthly cash payments at designated NHIF branches; now, the majority of voluntary NHIF payments are made through M-PESA [268]. By transferring the bulk of voluntary payments from a cash- and paper-based system to a mobile money platform, this partnership is believed to have increased the efficiency of the payment system and relieved the burden of having to travel to make payments in person for voluntary subscribers [268]. However, the positive impacts of this payment system may be limited, as reports from a qualitative study of voluntary NHIF subscribers from the informal sector suggest that a number have experienced challenges in accessing care due to issues with NHIF linking their M-PESA payments to their member accounts [224].

4.3.3 Explaining the increasing prominence of for-profit health providers in Kenya

The previous sections describe the evolution of the health system in Kenya from the early post-independence period, when health facilities were predominantly owned and operated by the faith-based sector, to today's pluralistic system with the government as the predominant service provider and a substantial private for-profit sector. Although private for-profit providers' significant contributions to health service provision are not new, the Kenyan government appears to be moving towards more formalized engagement with the private sector. To better make sense of these changes, this section outlines key informants' views on *why* this shift seems to be occurring.

4.3.3.1 *Engaging for-profit actors for health as a pragmatic response*

When asked why the government appears to hold increasingly favorable views about working with the private for-profit sector to expand access to care, most respondents framed public-private engagement for health as a pragmatic, and sometimes opportunistic, response to the broader social and economic context in the country and specific recent events in the health sector. For instance, some key informants interviewed felt Kenya's increasing engagement with the private for-profit sector is due to the country's more general contemporary ideological leanings. As one Ministry of Health official explained, Kenya is a unique free market economy, because it is not fully capitalist and maintains strong social values:

> *We are not socialists, so we are not going to say here that the government is going to provide everything. We are more of a free market economy to the extent that health care can be provided in that free market…We cannot allow the market to fall in supply and demand…You see there are some elements of socialism. It is not pure American. That is why we are also not copying the American system where people don't care…there is social agenda and social policies and social security. Don't leave it also so open otherwise it will be so capitalistic.*

Despite these notions of capitalism versus socialism, most believed that the government's increasing engagement with the private for-profit sector for health is rooted in pragmatism and acceptance of the large market share of the for-profit providers in the Kenyan health system rather than ideology. Although a couple of respondents expressed some doubts regarding whether the private for-profit sector could be used as a vehicle to equitably increase access to health services, the general feeling was that there was no strong opposition movement against its growth in Kenya. As one Kenyan researcher explained, the country seems to have moved on from the debate regarding whether the for-profit providers should be engaged at all and instead onto *how* it should be engaged:

> *That is an interesting thing. I have never been in a setting where people are opposed to private [for-profit] sector engagement. I think there is political will to engage with the private sector…In Kenya's sort of development health system discourse there isn't any ideology around …you know… is private sector good or bad? That is not one of the things we would talk about.*

The informants also expressed a prevailing notion that given the large number of existing private for-profit health facilities [205] and the high unmet demand for health care, working with for-profit providers would be more efficient than building new state-owned infrastructure.

Many also felt that the growth of the private for-profit health sector has been in direct response to key strengths and weaknesses of the government. With regard to strengths, in 2015, the World Bank reclassified Kenya from a low-income country to a lower-middle income country [269]. Although Kenya was one of the top ten global recipients of gross bilateral official development assistance in 2016, as the nation continues on its path to achieving middle-income status, some stakeholders anticipate that its decreasing level of donor support will require greater private sector participation to ensure that the population's needs are met [236,270–272].

In terms of weaknesses, some participants speculated that corruption and financial misappropriation have contributed to distrust of the public sector, creating opportunity for private for-profit providers to thrive. For instance, an audit released in 2016 reported that the Kenyan Ministry of Health diverted and misused 5 billion Kenyan Shillings (approximately $50 million) worth of funds intended to cover free maternity services in

government facilities. Following this so-called 'Afya House' scandal, USAID suspended the portion of its direct health aid to the Kenyan government that covered administrative costs such as salaries, travel, meetings and workshops, while maintaining funding for essential drugs and medical supplies [273].

Additionally, the perception of better working conditions in the private sector and the government's poor management of human resources for health have contributed to unprecedented nationwide nurses' and doctors' strikes over the past few years, leaving public facilities crippled. Given all providers' legal obligation to treat emergency cases regardless of ability to pay, both private for-profit and faith-based facilities were credited with ameliorating the crisis caused by the unavailability of government health services [271,274]. Although private providers were seen to have helped as much as possible, the strikes were generally believed to have exacerbated inequities due to the higher cost of care in the private for-profit sector and resulted in a number of people delaying care-seeking, going untreated, and dying [275–279]. Despite these drawbacks, many informants felt that the strikes demonstrated the important role that the private sector plays in helping to reduce the negative impacts of shocks to the health system. As a donor agency representative put it:

> *…without the private sector, the impact of the strike would have been disastrous…a lot of the burden from public facilities was taken up by the private facilities, for the people who can afford—that is the problem. But I think the private sector had the important role of cushioning the effects, definitely.*

4.3.3.2 *The influence of powerful individuals & interest groups on public-private engagement for health*

Although many key informants viewed the increasing interest in working with private for-profit providers to expand access to healthcare as responsive to broader country-wide or health sector conditions, some informants viewed this shift as the result of deliberate actions taken by certain powerful individuals or interest groups. For example, with regard to the doctors' strike, some participants alluded to corruption and competing interests in the government influencing strike negotiations. For instance, one government medical officer shared that some health workers believed that certain public officials intentionally elongated negotiations during the doctors' strike to increase client volumes in their privately-owned facilities:

> *I can say anecdotal from my other social engagements with colleagues, especially during the strike…they feel that the owners . . . the owners of the private [for-profit] sector are senior people in the government who are out to frustrate the doctors in the public sector so that they don't offer the services well so that then they will have clients in the private [for-profit] sector.*

In addition to powerful individuals in the government creating situations requiring increased reliance on the private for-profit health sector to provide essential health services, many of the key informants interviewed highlighted the important role of coordinated action in amplifying the voices of the private for-profit sector and increasing the number and types of public-private partnerships for health. As one Kenyan social franchise program manager commented on the value of these advocacy groups:

> *Create bigger voices and the government will listen to you; but if you are just shouting alone, probably no one will pay attention to you.*

Established in 2004 as the health sector board of the Kenya Private Sector Alliance (KEPSA), the Kenya Healthcare Federation (KHF) is private for-profit health sector umbrella coalition, and advocates for the strategic interests of for-profit healthcare institutions and other health-related organizations [280]. Most interview participants noted the particularly influential role that KHF has played in shaping health financing policy development in Kenya. As the government aims to transition the NHIF into a social health insurance scheme that offers more comprehensive and universal coverage to all citizens, KHF has been vocal in protecting the interests of private for-profit health facilities and insurance agencies [281–283]. For instance, KHF has opposed NHIF's revised premiums and expansion to include outpatient services in fear that it would jeopardize the private insurance market [281,283]. Additionally, KHF has engaged in several debates with the government and NHIF over planned reimbursement rates for services received at private facilities [284–286]. KHF also acknowledges its lobbying efforts as the reason why previous attempts to introduce social health insurance have failed in Kenya, and this was corroborated by many of the key informants interviewed [280].

In addition to strong organization, KHF's effectiveness as an advocacy coalition is derived from the platforms that the government has made available to them. For instance, the government established a Ministerial Stakeholder Forum, co-chaired by KHF, where non-government actors from the for-profit, faith-based, and non-profit sectors meet with Ministry of Health officials on a quarterly basis to discuss priorities for the sector and lobby for their interests. The topics discussed in the Ministerial Stakeholder Forum are also raised to a higher level at the Presidential Round Table discussion, where Kenya Private Sector Alliance leaders meet with top-level government officials to highlight key issues affecting private actors across sectors. Many participants, including this private sector health executive, felt that the creation of these platforms signified a turning point in public-private partnerships in Kenya:

> *I think things have shifted. I think that is why as…private sector, our voice is now sitting at the Ministerial Stake[holder] Forum and Presidential Stake[holder] Forum. It is saying that we see and value the contribution of private sector.*

The success of KHF as an advocacy coalition has also been bolstered by the presence of current and former private sector executives in key decision-making positions in the government, including the former chair of KHF [287]. For example, a senior doctor suspected that the process of developing a new health financing strategy and setting reimbursement rates for facilities was influenced by some policymakers' personal investments in private insurance companies:

> *The insurance companies are owned by who is who in the Republic, right? The upper echelons of power. Yes, and they are the ones who determine how much they are going to pay for a procedure for example.*

Similarly, a representative from a private insurance agency felt that the inclusion of individuals with private sector backgrounds in high-level government positions has created a more favorable environment for public-private partnerships:

> *So, for example the current Cabinet Secretary for Health, or the Minister of Health, is actually a former CEO of the leading private hospital here. And look at the Cabinet Secretary for ICT; again, he has been in the private sector for many years…and what that does is to give confidence to the private sector that within government there are people who understand the needs of private sector who can actually discuss and engage in dialogue and be sensible.*

While the need to work with the private for-profit sector to expand access to healthcare in Kenya appeared to be a given among the key informants, these concerns shared by the informants highlight the insidious ways in which private sector interests have influenced health service provision and policy development.

4.4 Discussion

This study used retrospective document review to explore the structural and situational conditions that have influenced Kenya's evolving approach to health financing and engaging with private health providers. Additionally, this study presents an analysis of key informants' views on why the private for-profit health sector has grown to such prominence in Kenya.

The findings suggest that Kenya's approach to expanding health coverage has been strongly shaped by its political economy, international actors' demands and priorities, and powerful local individuals and interest groups. Since independence, each new political regime has faced a different set of economic circumstances resulting in different health systems priorities. This has caused Kenya's health financing strategy to waver in its balance between a system oriented towards provision of free services for all and one aimed at ensuring adequate cost

recovery for both government and private sector providers [198,199,247]. At the same time, as the Kenyan government has grown increasingly dependent on international donors and externally-funded health providers, these actors have capitalized on the power dynamics of their relationship with the government to shape and reframe Kenya's health policy environment in alignment with evolving international health policy priorities and resolutions [198,239]. Finally, as the health system in Kenya has become increasingly pluralistic, private for-profit actors have influenced the highest levels of government and formed coalitions to collectively advocate for their shared interests and inclusion in policy development and approval processes, with varying degrees of effectiveness [199]. This study also demonstrates that underlying weaknesses in Kenya's public health system—such as limited infrastructure and resources, corruption, competing interests, and health worker dissatisfaction—have given space for these new political regimes, international actors, and advocacy groups to have high influence on national policy development and priority setting. On the other hand, these powerful actors have also contributed to a vicious cycle wherein their actions and influence have created conditions that have weakened the health system.

These findings highlight some key issues that must be considered as Kenya finalizes its health financing strategy and develops plans to accelerate progress towards achieving UHC. The Kenyan government's 2013 decision to devolve from one centralized government to a central government with 47 county governments has affected the political environment across sectors, including health [288]. Although interest in achieving equitable access to healthcare has been consistent throughout Kenya's history since independence, health financing reforms have been closely linked to political elections. Discontinuity between administrations has resulted in fragmented approaches and challenges in agreeing on a health financing strategy. With devolution, the country must now overcome shifting priorities in two dimensions: over time, between consecutive administrations, and sub-nationally, between county governments. While decentralization may help to prevent one individual or group from having undue influence on the national health system, it has also multiplied the number of stakeholders whose interests must be considered in the policy development process. As the Kenyan government finalizes its new health financing strategy and considers the possibility of establishing a national social health insurance scheme, it is critical for the central government to understand the needs of and gain buy-in from county-level actors.

With Kenya's recent reclassification from a low to lower-middle income country and its hopes of becoming an upper-middle-income country by 2030, its relationships with transnational and domestic actors are also likely to change [259,269]. As Kenya's economy

continues to grow, the amount of international donor and NGO support for the health system is likely to decrease. Given the government's current prioritization of economic growth and 'creating wealth through health' [258], this shortfall will likely be addressed through higher government spending on health and attempts to improve efficiency through increased engagement with private sector actors [259]. Creating a well-regulated environment for public-private engagement will thus become increasingly important. With its inter-sectoral Public Private Partnerships Act of 2013 [264] and established platforms for public-private communication and engagement within the health sector, this process is clearly underway. However, as Kenya strives to achieve UHC, policymakers must give greater thought to the balance of power that existing systems create between the government and various private sector actors, and between different groups of private sector actors. As Kenya's experience with trying to create a national social health insurance fund has demonstrated, the for-profit private sector has interests that do not always align with those of the government, and the power to derail the adoption of policies that go against their interests [198,280]. To ensure that the future health financing strategy and other health policies foster equitable expansion of health coverage in Kenya, the government must prioritize engagement with actors whose values align with the principles of UHC. One way that this could potentially be achieved is through establishing and strengthening platforms that allow non-profit private actors, such as local civil society, faith-based organizations, health professional councils to counterbalance the influence of for-profit interest groups; participate in policy development processes; and effectively advocate for the communities they serve.

4.5 Conclusion

Our study demonstrates that Kenya's current health systems priorities and policies are products of a complex set of political, economic, and social factors that have evolved throughout its history. By describing this context, this study provides key insights into why certain approaches may or may not have worked in Kenya and key factors to consider when developing new policies and implementation plans. This case study on Kenya contributes to the literature on strategies to achieve universal health coverage in low- and middle-income countries by examining the evolution of multiple approaches within one country over a period of five decades.

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SECTION A – Student Details

Student	Mardieh Dennis
Principal Supervisor	Oona Campbell
Thesis Title	Pragmatic pluralism for health: Understanding the role of public financing and public-private engagement on use, quality, and equity in access to maternal health services in Kenya

If the Research Paper has previously been published please complete Section B, if not please move to Section C

SECTION B – Paper already published

Where was the work published?			
When was the work published?			
If the work was published prior to registration for your research degree, give a brief rationale for its inclusion			
Have you retained the copyright for the work?*	Choose an item.	Was the work subject to academic peer review?	Choose an item.

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SECTION C – Prepared for publication, but not yet published

Where is the work intended to be published?	International Journal for Equity in Health
Please list the paper's authors in the intended authorship order:	Mardieh L. Dennis, Lenka Benova, Catherine Goodman, Edwine Barasa, Timothy Abuya, Oona M. R. Campbell
Stage of publication	**Not yet submitted**

SECTION D – Multi-authored work

For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	With input from my co-authors, I designed the study, conducted the analysis, and wrote the manuscript.

Student Signature: _____ **Date:** 1 September, 2019

Supervisor Signature: _____ **Date:** 1 September, 2019

5 EXAMINING USER FEE REDUCTIONS IN PUBLIC PRIMARY HEALTHCARE FACILITIES IN KENYA, 1997-2012: EFFECTS ON THE USE AND CONTENT OF ANTENATAL CARE

This chapter presents the first of three quantitative research papers (paper 3) seeking to answer the third research question of this thesis, examining the impacts of user fee removals and subsidized vouchers on use, sector of use quality, continuity, and equity of maternal care in Kenya. This paper examines the relationship between the 10/20 user fee reduction policy and three primary outcomes: four or more antenatal care visits, timing of ANC initiation, and content of care. The secondary outcomes explored include source of care (public vs. private) and level of care (primary vs. secondary or higher).

5.1 ABSTRACT

Background

In 2004, The Kenyan government removed user fees in public dispensaries and health centers and replaced them with registration charges of 10 and 20 Kenyan shillings (2004 $US 0.13 and $0.25), respectively. This was termed the 10/20 policy. We examined the effect of this policy on the coverage, timing, source, and content of antenatal care (ANC), and the equity in these outcomes.

Methods

Data from the 2003, 2008/9 and 2014 Kenya Demographic and Health Surveys were pooled to investigate women's ANC care-seeking. We conducted an interrupted time series analysis to assess the impact of the 10/20 policy on the levels of and trends in coverage for 4+ ANC contacts among all women; early ANC initiation and use of public facility-based care among 1+ ANC users; and use of public primary care facilities and receipt of good content, or quality, of ANC among users of public facilities. All analyses were conducted at the population level and separately for women with higher and lower household wealth.

Results

The policy had positive effects on use of 4+ ANC among both better-off and worse-off women. Among users of 1+ ANC, the 10/20 policy had positive effects on early ANC initiation at the population-level and among better-off women, but not among the worse-off. The policy was associated with reduced use of public facility-based ANC among better-

off women. Among worse-off users of public facility-based ANC, the 10/20 policy was associated with reduced use of primary care facilities and increased content of ANC.

Conclusions

This study highlights mixed findings on the impact of the 10/20 policy on ANC service-seeking and content of care. Given the reduced use of public facilities among the better-off and of primary care facilities among the worse-off, this research also brings into question the mechanisms through which the policy achieved any benefits and whether reducing user fees is sufficient for equitably increasing healthcare access.

5.2 BACKGROUND

In the decades since the widespread African independence movements of the mid-1900s, countries in sub-Saharan Africa have struggled to develop economically sustainable healthcare financing models that ensure universal coverage of essential health services. Faced with budgetary constraints and external pressures to both independently finance local healthcare systems and reduce government spending, many African countries introduced user fees in public sector health facilities in the late 1980s [33,246]. Proponents of user fees argued that these charges would improve efficiency and the quality of health services by generating revenue to help cover costs for general operations and the supply and maintenance of health commodities and infrastructure [33]. Others argued that user fees were important for discouraging unwarranted use of care and ensuring that people attach value to health services [289].

In reality, as user fees were being introduced widely across African countries from the late 1980s to 1990s, emerging evidence during that same period raised doubts as to whether the expected benefits of user fees were always achieved in practice. For example, in settings such as Burkina Faso, the Gambia, Ghana, Kenya, Lesotho, Mozambique, Niger, Swaziland, Zaire, Zambia, and Zimbabwe, the introduction or increase of user fees was immediately followed by reduced care-seeking in public sector health facilities [247–249,290–296]. Also, contrary to expectations, available evidence at that time suggested that unwarranted health service use comprised a small proportion of the cases contributing to reduced service volumes [295]. Research from Kenya, Lesotho, and Swaziland further suggested that introducing or increasing fees in public facilities sometimes shifted patients away from the public sector and into the private sector, rather than decreasing overall demand [248,290,291]. Studies on health service cost recovery from several countries in Africa revealed that while user fees did generate revenue, often this was low and insufficient for making impactful investments in quality improvement [249,291,295,297,298]. Further, evidence from countries such as Ghana, Kenya, and Zimbabwe suggested that inefficient management of this revenue also inhibited user fees from translating into large improvements in quality of care [249,294,297].

Kenya, similarly to these other African countries, has struggled to develop a health financing system that sustainably and equitably increases access to good quality care while ensuring that its citizens have financial risk protection from the hardship that may result from out-of-pocket healthcare payments. Kenya's public health system is organized into six levels ranging

from community-based care (level 1) to tertiary hospitals (level 6) [190,299]. Level 1 consists of health promotion and awareness-raising activities at the community level; levels 2-3 include primary health care facilities, including dispensaries and health centers; and levels 4-6 include county and national referral hospitals [190,299].

Since introducing user charges in 1989 for the first time after independence, Kenya has implemented a series of user fee removals, re-introductions, and reductions, sometimes targeting specific levels of care (Figure 5.1) [198,241]. Although these user fees were introduced in conjunction with a waiver system for fee exemptions based on ability to pay, there were concerns about the negative impact of the user fees on access to health services among the poor. This led to fees being suspended in 1990 and subsequently re-introduced in phases between 1991 and 1992, with a stronger focus on ensuring that the user fee policy and fee waiver system were implemented properly [241,247]. In 2003, the Kenyan government developed an economic recovery strategy that declared that investing in a healthy population, and in particular the poor, was a necessity for accelerating economic growth [257]. Within this context, Kenya's Minister of Health in 2004 declared that user fees were to be eliminated in public primary healthcare facilities (health centers and dispensaries), effective 1 July 2004, and instead replaced with nominal registration charges of 10 Kenyan shillings (KSh) in dispensaries and KSh20 in health centers (2004 US$0.13 and 0.25). Under this 10/20 policy, certain groups and services were exempted from any payment, including the poor, children below 5 years, and those seeking treatment for malaria and tuberculosis [227]. While multiple reports indicate that pregnant women seeking antenatal care (ANC) were also intended to be exempted from any payment under the 10/20 policy, this may not have been implemented consistently in practice [207,267,300]. In 2007, the government also announced that women seeking facility-based childbirth care would be exempt from paying the 10/20 registration fees [227]. Most recently, in 2013, the Kenyan government removed user fees for all services provided in public health centers and dispensaries, and introduced free maternity services in public facilities at all levels from primary to tertiary [301], policies which both stand to this day.

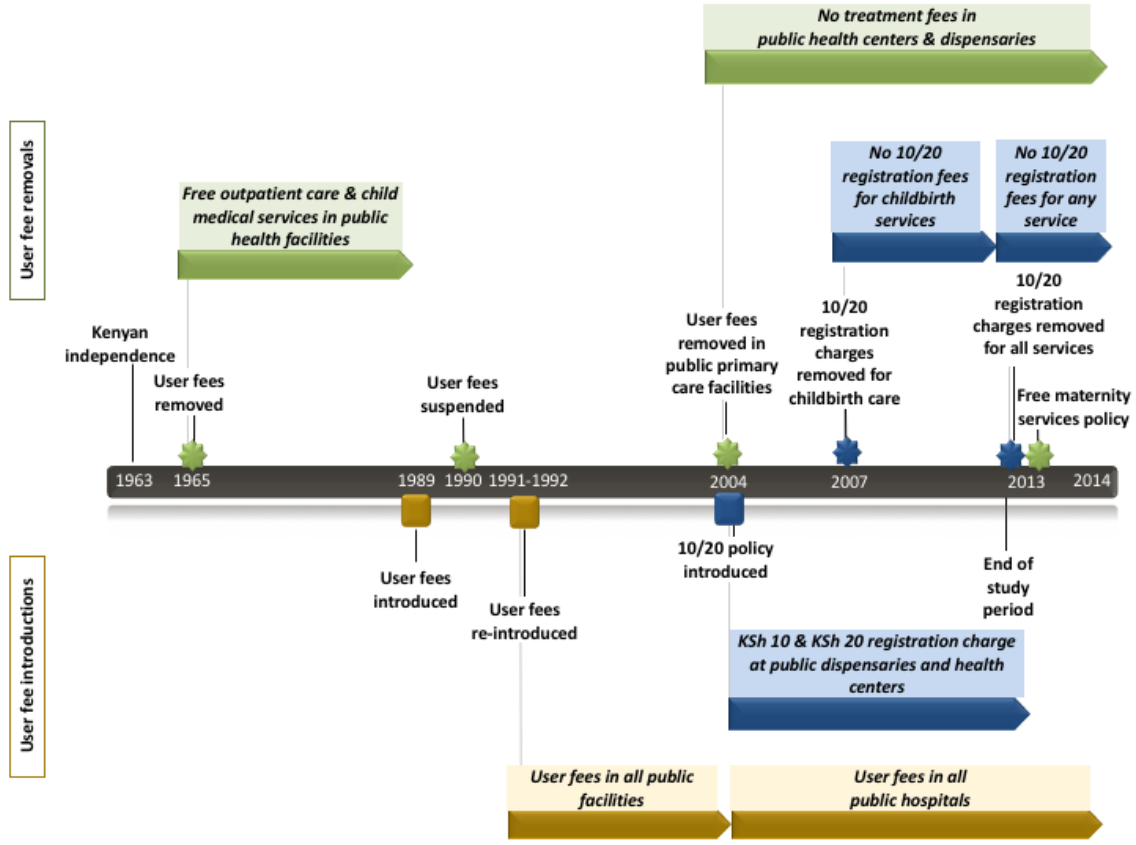

Figure 5.1 Timeline of user fee reforms in Kenya

While a few studies have examined the short-term impact of the 10/20 policy, there is little evidence of the long-term effects of the policy leading up to Kenya's 2013 health sector financing reforms. An evaluation conducted shortly after the 10/20 policy was introduced in 2004 suggested that public health centers and dispensaries experienced a sharp increase in patient volumes in the months immediately following the policy change [227,267]. The rate of increase in patient numbers eventually declined, but the patient volumes remained higher than those seen before the policy [227,267]. A more recent study of the long-term population-level effects of the 10/20 policy on women's source of childbirth care by Obare and colleagues found that the 2004 policy did not increase the proportion of women delivering in public sector facilities or the change in public facility deliveries over time; instead the policy was associated with an immediate increase in the proportion of poor women who delivered outside of a health facility [81]. Further, the study found that after the removal of 10/20 registration fees for childbirth care in public health centers and dispensaries in 2007, there was an immediate increase in the use of public facility-based childbirth care and decrease in non-facility births among the wealthiest women, but no change in childbirth service-seeking among the poorest women.

As the government of Kenya continues to develop their health financing mechanisms for maternal health, it is critical to understand the long-term effects of past reforms and identify strategies for ensuring that current and future financing policies have lasting impact. Given the strong link between ANC and subsequent use of intrapartum and postpartum maternal health services [302–309], it is important to investigate the relationship between the implementation of the 10/20 policy and women's experiences during pregnancy, and whether this may help explain why the policy did not increase coverage of facility deliveries, particularly among the poor. Additionally, studying ANC allows us to examine the effect of the policy on multiple dimensions of service use beyond coverage, including number and timing of visits, type of provider, and content of care. The objective of this paper is therefore to examine if the introduction of the 2004 10/20 policy was associated with any changes in ANC care-seeking practices and quality of care, as measured by the content of ANC. Specifically, this study assesses if the removal of user fees and introduction of the 10/20 registration charge policy was associated with increases in frequency of ANC visits, early ANC initiation, and use of public sector ANC services. As the 10/20 policy specifically targeted public primary care facilities, we also examined whether there was a shift from secondary and tertiary healthcare facilities (hospitals) towards lower-level facilities among users of public sector care. Additionally, we investigated whether any such evidence of increased use of ANC services was accompanied by reduced content of care, resulting from higher demand on public health services. Lastly, as the policy was intended to ensure that the most vulnerable could access essential care, we explored whether any observed changes in service-seeking and content of care associated with the 10/20 policy were equitable between better-off and worse-off women.

5.3 METHODS

5.3.1 Data and study population

We used the 2003, 2008/9 and 2014 Kenya Demographic and Health Survey (DHS) woman's questionnaire datasets for this analysis. We excluded earlier surveys (1998, 1993, 1989), as they did not collect information on one or more of the study's key outcomes of interest. The 2003 and 2008/9 datasets sampled a total of 8,561 and 9,057 households, respectively [310,311]. The 2014 dataset sampled a total of 36,430 households; of these, one in every two households was randomly selected to complete a long version of the woman's questionnaire, and the other half were administered a shorter woman's questionnaire [179]. As the shorter questionnaire did not ask questions related to the source or content of ANC,

we limited our analysis of the 2014 dataset to the 17,409 households in which women completed the full questionnaire.

All women aged 15-49 years in the included households were selected for participation in the surveys. Among the 31,380 eligible women interviewed across the three surveys, all 15,230 women who reported having their most recent live birth before January 2013 were included in this analysis. We used women's reports on their most recent live birth rather than all live births, as the included surveys only asked questions on ANC for women's most recent births.

5.3.2 Study outcomes

We examined one indicator of ANC coverage among all women in the analysis sample: 4+ ANC, defined as the proportion of women reporting four or more ANC contacts. We did not examine use of 1+ ANC, as this indicator has remained above 90% throughout the study period [179,310,311]. We examined the proportion of women receiving 4+ ANC because at the start of the pregnancies included in this analysis (2012 and earlier), the World Health Organization (WHO) was still recommending that women should make a minimum of four ANC visits during pregnancy, though they subsequently increased to a minimum of eight visits [62].

Among users of 1+ ANC, we examined timing of ANC initiation and source of care. We defined early ANC as ANC users who had their first ANC visit during the first three months of their pregnancy. For source of care, we categorized ANC users into two categories: any public sector facility-based ANC and no public sector facility-based ANC. We considered facilities owned by the government to be public and all other facilities, including for-profit, non-profit, and faith-based, to be private. As women could report receiving ANC from more than one location, we considered any public sector facility-based ANC to include (a) women who received ANC exclusively from a public health facility and (b) women who received care both in a public health facility as well as in a private facility or at home/other location. We categorized women who received care exclusively in a private facility and/or exclusively at home or another location as having received no public sector facility-based ANC.

Among users of public sector facility-based ANC, we investigated whether there were any changes in facility level and content of care. With regard to level of care, we examined the distribution of women who sought care in public primary care facilities (dispensaries or health centers) versus public secondary and tertiary facilities (hospitals). In terms of content of care, we examined six components of ANC routinely assessed in the DHS questionnaires:

(1) blood pressure measured; (2) urine sample taken; (3) blood sample taken; (4) received tetanus injection; (5) given iron supplements; and (6) told about pregnancy complications, at least once during pregnancy [312]. We considered women who reported receiving all six of these components to have received good content of care. Although the 10/20 policy specifically targeted public primary care facilities, we were unable to examine the impact of the 10/20 policy on the subset of women who received care in public primary care facilities due to small sample sizes in some of the study periods (Appendix 10). We therefore examined content of care among all users of public facility-based ANC.

In addition to estimating the effects of the 10/20 policy on the key study outcomes, we conducted stratified analyses to examine whether any observed effects were equitable between women of different socioeconomic groups. We defined women's socioeconomic status using wealth quintiles based on the household asset indices derived from the DHS household questionnaire [179]. For each of the ANC outcomes, we ran the analyses separately among women from the top two (40%) household wealth quintiles (better-off) and among women in the bottom three (60%) quintiles (worse-off). We included tables with the results stratified by urban and rural residence in Appendix 11.

5.3.3 Statistical analysis

We conducted an interrupted time series analysis using segmented linear regression models to assess the impact of the introduction of the 10/20 policy in 2004 on the study outcomes. To set up the data for analysis, we appended the three DHS datasets and estimated outcomes for each half-year from July 1997 to December 2012. Each half-year estimate was weighted to account for the multi-stage cluster sampling design of the DHS.

As this study aimed to examine whether the 10/20 policy influenced timing of ANC initiation, measured from the start of pregnancy, and subsequent use of ANC, we categorized each woman's outcomes into a half-year period according to her estimated time of conception. We assumed each birth had a gestational age of 38 weeks, based on a weighted median of the most recent estimates of the distribution of full term and preterm birth in sub-Saharan Africa [313,314]. Appendix 12 contains our calculations for the weighted median gestational age. To approximate time of conception, we subtracted 38 weeks from the date of each woman's most recent birth. Based on these calculations, approximately 2% of women included in the sample could potentially access ANC services both before and after the 10/20 policy was introduced, as their pregnancies spanned the period immediately before and after the policy change. Our analysis categorized women according to when their

pregnancy began; thus, this 2% sub-sample was treated as if they received care before the policy change.

For each model, we tested for evidence of the impact of the 2004 10/20 policy introduction on the study outcomes. As there are too few data points after the introduction of the free maternity services policy in June 2013 to examine its impact, our analysis excludes births that occurred in the half-years beginning January 2013 and later. We tested the data for autocorrelation using the Cumby-Huizinga test and identified evidence of serial autocorrelation in even number lags [315]. We assumed that this was due to seasonality, with observations from one half-year (e.g. January to June of year X) correlated with observations from two half-years prior (e.g. January to June of year X-1). We corrected for this using the Newey estimator with a lag of two [315]. For the purposes of this analysis, we considered the period from July 1997 until just before the policy change on 1 July 2004 to be "pre-policy," (14 half-year periods) and the period from just after 1 July 2004 through December 2012 to be "post-policy" (17 half-year periods). As the estimates for each half-year period were derived from survey data and have different sample sizes and levels of uncertainty, we weighted our time series analysis by the inverse of the variance for the estimates at each half-year period. This means that time points with greater uncertainty around the estimate contributed less to the model, while time points with lower uncertainty contributed more to the models. Appendix 10 contains a table listing the sample size for each study population by half-year and Appendix 13 provides the results produced for each model when the estimates from each time point are weighted equally. All analyses were conducted in Stata SE version 14 [316].

For each outcome, we reported two measures of the impact of the 10/20 policy: the immediate change in level and the immediate change in slope. The immediate change in level estimates the amount by which the percent of the study population reporting a particular outcome changed immediately after the 10/20 policy was introduced. The immediate change in slope estimates the amount by which the change over time in the outcome sped up (accelerated) or slowed down (decelerated) immediately after the 10/20 policy was introduced.

In addition to these measures of the impact of the 10/20 policy, we also reported on three general estimates of the level and changes over time in the outcomes: the pre-policy starting level, the pre-policy half-yearly trend, and the post-policy half-yearly trend. The pre-policy starting level is a model-based estimate of the percentage of the study population reporting

the outcome of interest during the first half-year period in the analysis. As this is a model-based estimate rather than a direct estimate, it was possible for the results to return a point estimate or confidence interval below zero percent or above 100 percent. In such cases, we truncated the estimates and confidence intervals to between zero to 100 percent to exclude impossible values. The pre-policy half-yearly trend estimates the average change over time in the level of the outcome between each six-month period from the first half-year in the analysis until the period immediately before the 10/20 policy change. Similarly, the post-policy half-yearly trend estimates the average change over time in the level of the outcome between each six-month period after the 10/20 policy. Both of these measures refer to the general trends over time, rather than the effect of the 10/20 policy on these trends.

We also displayed the outcome measures graphically. In the graphs, the x-axis represents half-year periods. For example, "h1" represents the first half of the year (January-June) and "h2" represents the second half of the year (July-December). The lines represent the predicted trend over time in coverage of the outcome variable. The circles represent the estimated coverage during a given half-year. The size of each circle is proportional to the inverse of the variance for the estimated coverage during that half-year period.

5.3.4 Ethics

The DHS received ethical approval from the appropriate bodies in Kenya; obtained informed consent from study participants; and ensured the confidentiality of participants' personally-identifiable data. We also obtained ethical approval for this study from the London School of Hygiene and Tropical Medicine.

5.4 RESULTS

5.4.1 Number of ANC visits (4+ ANC)

Despite the consistently high percentage of women making at least one ANC visit during pregnancy, only 62.3% of women made the recommended minimum of four ANC visits during pregnancy at the beginning of the study period (Table 5.1, Figure 5.2). The results show that before the introduction of the 10/20 policy, the proportion of pregnant women who made 4+ ANC contacts decreased by approximately 1.2 percentage points every six months (p=0.009). After the 10/20 policy was introduced, the trend in use of 4+ ANC accelerated by 2.2 percentage points per half-year (p=0.001); however, there was no immediate change in the proportion of women who made at least four ANC visits. Use of

4+ ANC increased by 1.0 percentage points per half-year (p=0.004) after the 10/20 policy was introduced.

At the start of the study period, an estimated 51.6% of worse-off women and 78.9% of better-off women made a minimum of four ANC visits. Before the 10/20 policy was introduced, use of 4+ ANC significantly decreased over time among both worse-off and better-off women. Although the proportion of better-off women making 4+ ANC contacts increased by 11.5 percentage points immediately after the 10/20 policy was introduced (p=0.037), there was no immediate impact on the level of 4+ ANC use among worse-off women. The 10/20 policy was associated with 2.0 (p=0.001) and 2.7 (p<0.001) percentage points per half-year accelerations of the trends in 4+ ANC use among worse-off and better-off women, respectively. Thus, after the 10/20 policy was introduced, use of 4+ ANC increased by 1.2 percentage points per half-year (p=0.004) among worse-off women and 0.6 percentage points per half-year (p=0.033) among better-off women.

Table 5.1 Use of 4+ ANC among most recent births

	4+ ANC (All women)		4+ ANC (Worse-off women)		4+ ANC (Better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	62.3% [57.5%,67.1%]		51.6% [47.0%,56.3%]		78.9% [72.1%,85.7%]	
Pre-policy half-yearly trend	-1.2% [-2.2%,-0.3%]	0.009	-0.8% [-1.5%,-0.1%]	0.032	-2.0% [-3.2%,-0.9%]	0.001
Immediate change in level	+1.2% [-10.8%,13.2%]	0.842	-5.5% [-18.2%,7.3%]	0.389	+11.5% [0.7%, 22.3%]	0.037
Immediate change in slope	+2.2% [1.1%,3.4%]	0.001	+2.0% [0.9%,3.0%]	0.001	+2.7% [1.4%,4.0%]	<0.001
Post-policy half-yearly trend	+1.0% [0.3%,1.6%]	0.004	+1.2% [0.4%,2.0%]	0.004	+0.6% [0.1%,1.2%]	0.033

Table 5.2 Early ANC initiation among users of 1+ ANC

	Early ANC (All women)		Early ANC (Worse-off women)		Early ANC (Better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	14.0% [10.2%,17.9%]		4.5% [0.0%,9.5%]		20.4% [15.2%,25.6%]	
Pre-policy half-yearly trend	-0.3% [-0.9%,0.3%]	0.353	+0.7% [0.0%,1.3%]	0.046	-1.0% [-2.0%,0.0%]	0.048
Immediate change in level	+3.1% [-1.9%,8.1%]	0.209	-4.7% [-11.6%,2.1%]	0.169	+10.5% [0.6%,20.3%]	0.038
Immediate change in slope	+0.9% [0.2%,1.5%]	0.014	-0.1% [-0.9%,0.6%]	0.681	+1.8% [0.5%,3.0%]	0.005
Post-policy half-yearly trend	+0.6% [0.6%,0.8%]	<0.001	+0.5% [0.2%,0.9%]	0.002	+0.8% [0.3%,1.3%]	0.004

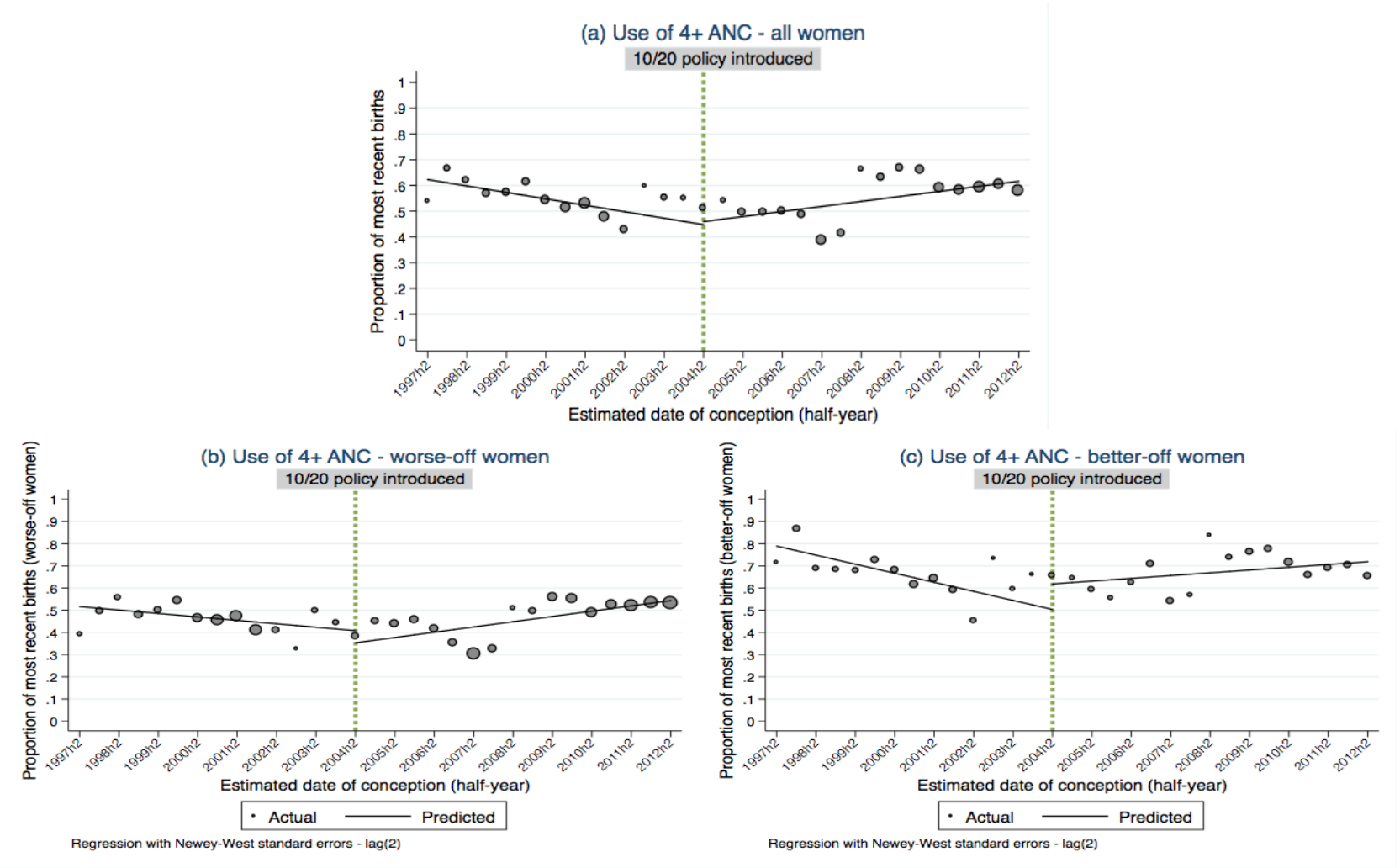

Figure 5.2(a-c): Use of 4+ ANC among most recent births

5.4.2 Timing of ANC initiation among users of 1+ ANC

At the start of the study period, only 14.0% of 1+ ANC users reported making their first ANC visit within the first three months of their pregnancy (early ANC initiation) (Table 5.2, Figure 5.3). Prior to the introduction of the 10/20 policy, early ANC initiation remained constant over time. While there was no immediate change in the percentage of women who started ANC early after the policy was introduced, the trend in early ANC initiation accelerated by 0.9 percentage points per half-year ($p=0.014$) after the policy change. After the introduction of the 10/20 policy, the proportion of 1+ ANC users who initiated ANC early increased by 0.6 percentage points every six months ($p<0.001$).

At the start of the study period, 20.4% of better-off ANC users started ANC within the first three months of pregnancy, while coverage of early ANC initiation was 4.5% among worse-off ANC users. Prior to the policy change, early ANC initiation increased by 0.7 percentage points per half-year among worse-off ANC users ($p=0.046$) and decreased by 1.0 percentage point per half year ($p=0.048$) among better-off ANC users. Among better-off ANC users, the level of early initiation increased by 10.5 percentage points ($p=0.038$) and the trend in early ANC accelerated by 1.8 percentage points per half-year ($p=0.005$) immediately after the 10/20 policy was introduced. In contrast, there was no immediate change in the level of or trend in early initiation among worse-off ANC users. In both groups, early ANC initiation gradually increased over time during the years after the 10/20 policy was introduced

Table 5.3 Use of ANC from a public sector health facility among users of 1+ ANC

	Any public facility (All women)		Any public facility (Worse-off women)		Any public facility (Better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	66.0% [59.7%,72.3%]		69.2% [59.2%,79.2%]		62.7% [58.2%,67.2%]	
Pre-policy half-yearly trend	+1.0% [0.0%,2.0%]	0.044	+0.7% [-0.8%,2.1%]	0.356	+1.5% [0.7%,2.2%]	<0.001
Immediate change in level	+2.6% [-6.4%,11.6%]	0.554	+8.7% [-3.9%,21.3%]	0.169	-5.4% [-13.4%,2.6%]	0.181
Immediate change in slope	-0.9% [-1.9%,0.0%]	0.060	-0.4% [-1.9%,1.0%]	0.538	-1.7% [-2.5%,-0.9%]	<0.001
Post-policy half-yearly trend	+0.1% [-0.1%,0.3%]	0.404	+0.2% [0.0%,0.4%]	0.033	-0.2% [-0.5%,0.1%]	0.227

Table 5.4 Use of primary care facilities among users of any public facility-based ANC

	Primary care facility (All women)		Primary care facility (Worse-off women)		Primary care facility (Better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	64.5% [59.2%,69.8%]		65.9% [59.0%,72.9%]		63.0% [57.3%,68.7%]	
Pre-policy half-yearly trend	+0.4% [-0.5%,1.3%]	0.355	+1.2% [0.3%,2.2%]	0.010	-0.7% [-1.6%,0.1%]	0.094
Immediate change in level	-5.2% [-15.2%, 4.7%]	0.290	-9.6% [-17.7%,-1.6%]	0.021	-0.1% [-9.8%,9.5%]	0.982
Immediate change in slope	-0.6% [-1.6%,0.4%]	0.246	-1.3% [-2.2%,-0.3%]	0.012	+0.3% [-0.7%,1.4%]	0.538
Post-policy half-yearly trend	-0.2% [-0.5%,0.2%]	0.401	0.0% [-0.3%,0.3%]	0.845	-0.4% [-1.0%,0.2%]	0.171

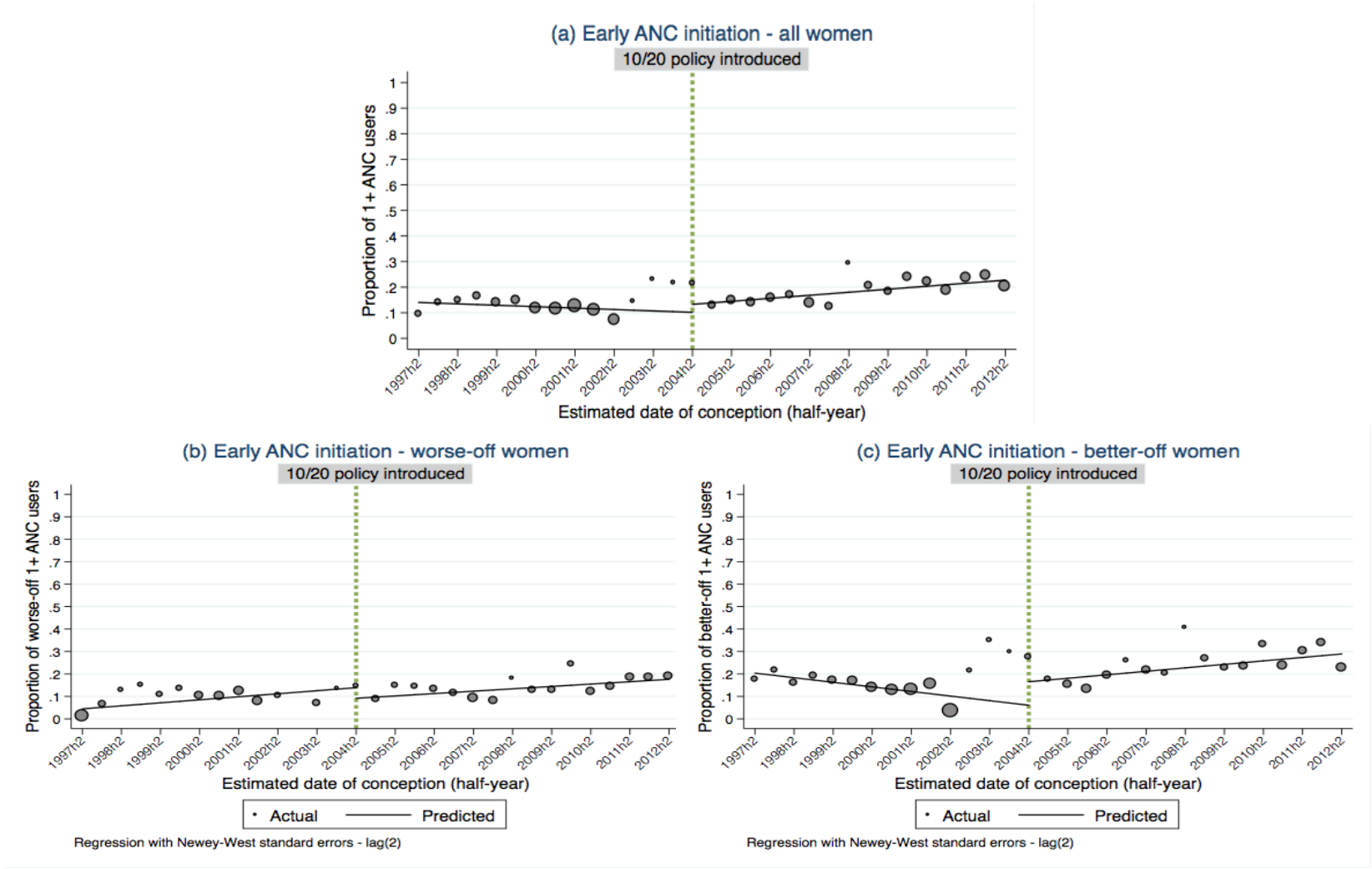

Figure 5.3(a-c): Early ANC initiation among users of 1+ ANC

5.4.3 Source of care among users of 1+ ANC

An estimated 66.0% of 1+ ANC users received care from a public sector health facility at the start of the study period in 1997 (Table 5.3, Figure 5.4). Use of public health facility-based ANC increased by 1.0 percentage points every six months before the 10/20 policy was introduced ($p=0.044$); however, the policy was not associated with any immediate change in the percentage of 1+ ANC users who sought care from a public facility. The results indicate that the 10/20 policy did not accelerate the previously increasing trend in use of public sector health facilities. After the 10/20 policy was introduced, use of public facility-based ANC remained constant over time.

At the start of the study period, approximately 69.2% of worse-off women and 62.7% of better-off women received their ANC from a public sector health facility. Before the 10/20 policy was introduced, use of public facility-based ANC increased by 1.5 percentage points per half-year among better-off ANC users ($p<0.001$), but remained constant over time among the worse-off. While the policy had no impact on the level of public facility-based ANC use among either group nor on the trend in use of public ANC services among the worse-off, the results suggest that the change over time in use of public facilities among better-off ANC users decelerated by 1.7 percentage points per half-year immediately after the policy change ($p<0.001$). In the years after the 10/20 was introduced, use of public facility-based ANC increased by 0.2 percentage points per half-year ($p=0.033$) among the worse-off.

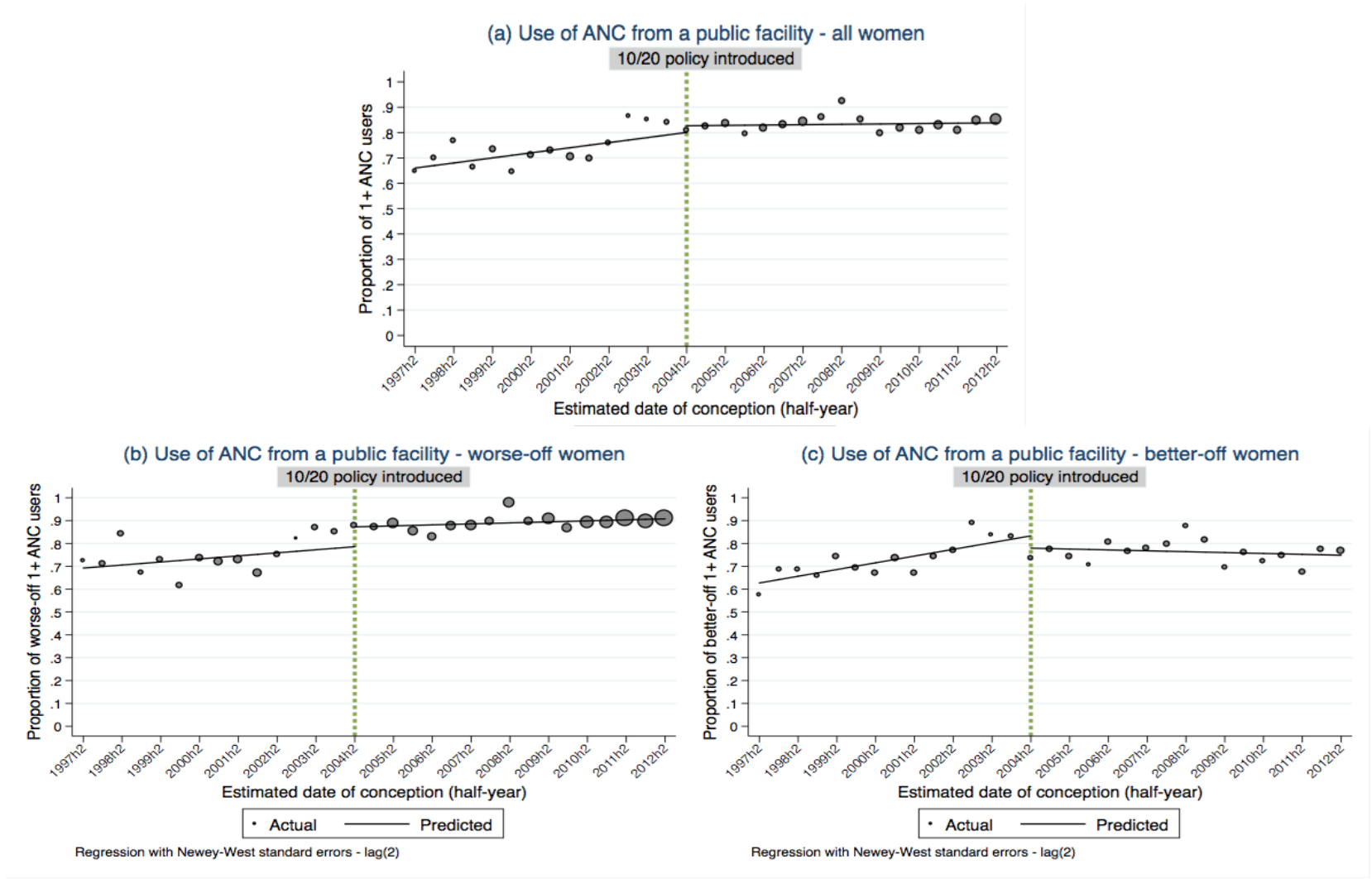

Figure 5.4(a-c): Use of ANC from a public sector health facility

5.4.4 Use of primary care facilities among users of public facility ANC

Approximately 64.5% of all public facility ANC users received care from a primary care facility (dispensary or health center) at the beginning of the study period (Table 5.4, Figure 5.5). Use of primary care facilities remained constant over time both before and after the 10/20 policy was introduced, and the policy did not have any measurable impact on the use of primary care facilities among public facility-based ANC users.

An estimated 65.9% and 63.0% of worse-off and better-off public facility-based ANC users sought care from a primary care facility at the start of the study period, respectively. Before the 10/20 policy was introduced, use of primary care facilities increased by 1.2 percentage points every six months ($p=0.010$) among worse-off women and remained constant or potentially decreased over time among better-off women. The share of worse-off public facility users who sought care from a primary care facility decreased by 9.6 percentage points ($p=0.021$) immediately after the 10/20 policy was introduced and use of primary care facilities decelerated by 1.3 percentage points per half-year ($p=0.012$). Among the better-off, on the other hand, the 10/20 policy was not associated with any immediate effects the level of or change over time in primary care facility use. During the period after the 10/20 policy was introduced, use of primary care facilities remained constant over time among both worse-off and better-off public facility users.

5.4.5 Content of care among users of public facility-based ANC

Only 9.4% of public health facility-based ANC users reported receiving all six routinely measured ANC components (good content of care), at the beginning of the study period in 1997 (Table 5.5, Figure 5.6). The results suggest that the percentage of public facility-based ANC users who received good content of ANC remained constant over time before the 10/20 policy was introduced, and the policy did not have any immediate effect on the level of coverage or change over time in receipt of good content of care. The proportion of public facility-based ANC users who received good content of care increased by 1.3 percentage points per half-year ($p<0.001$) in the years after the 10/20 policy was introduced. In Appendix 14, we included tables with estimates of the proportion of women who received each of the six components as well as all six components combined, stratified by source of care and number of ANC contacts.

At the start of the study period, only 9.0% and 9.9% of worse-off and better-off public facility ANC users reported receiving good content of care, respectively. The proportion of women receiving good content of care remained constant over time prior to the policy

change among both groups, and there was no immediate change in the proportion of women who received good content of care in either group. After the 10/20 policy was introduced, the rate of change in coverage of good content of ANC accelerated by 1.1 percentage points per half-year (p=0.019) among worse-off public facility-based ANC users only. The proportion of women who received good content of care increased over time among both groups after the 10/20 policy was introduced.

Table 5.6 contains a summary of the impact of the 10/20 policy on all of the ANC outcomes examined among all women and stratified by wealth group. Appendix 11 includes similar tables illustrating greater positive impacts of the 10/20 policy among women living in urban areas compared to those in rural areas.

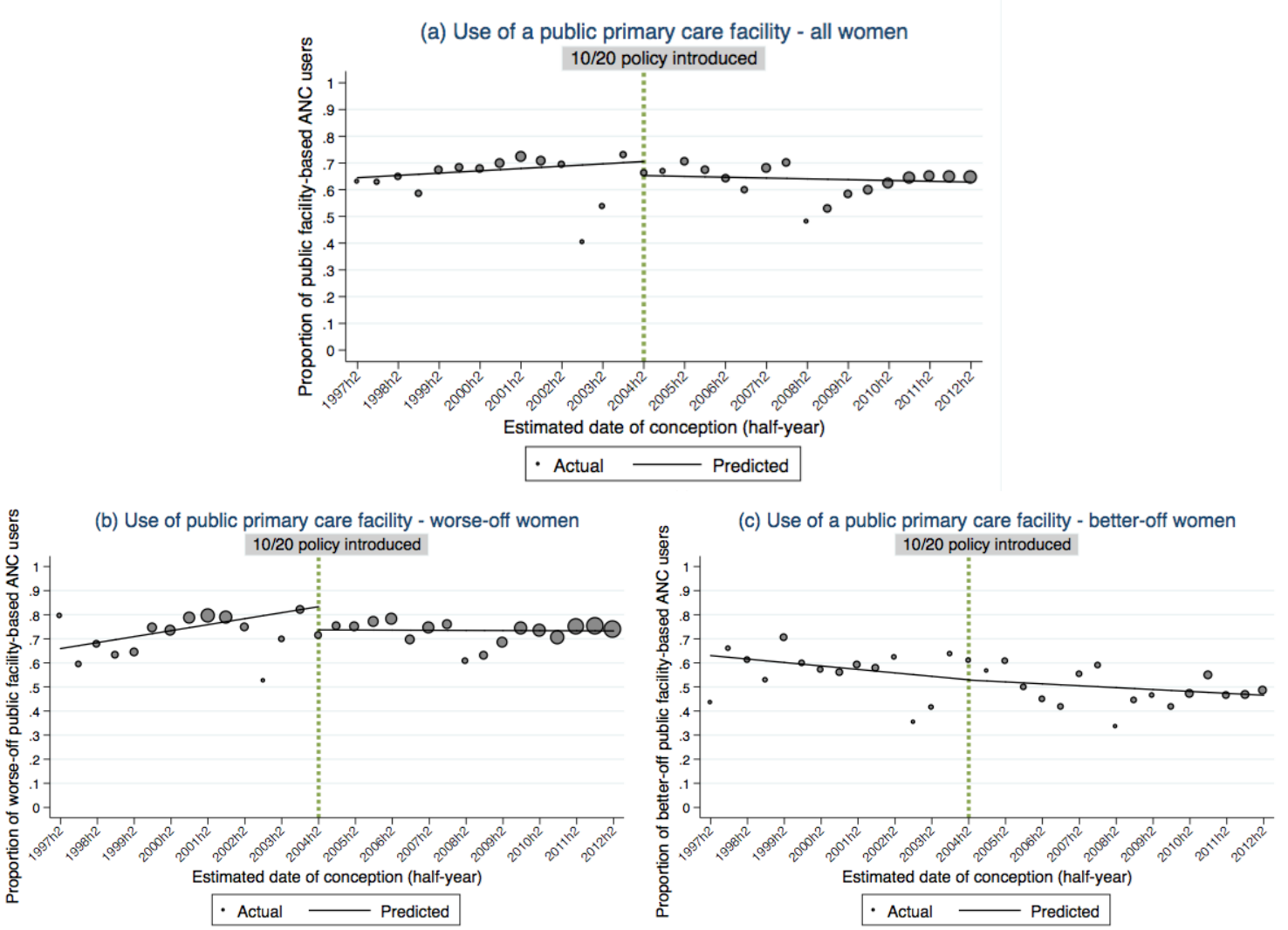

Figure 5.5(a-c): Use of primary care facilities among users of public facility ANC

Table 5.5 Received good content of care among users of public facility-based ANC

	Received all 6 routine ANC components (All women)		Received all 6 routine ANC components (Worse-off women)		Received all 6 routine ANC components (Better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	9.4% [4.7%,14.2%]		9.0% [4.6%,13.3%]		9.9% [3.9%,15.8%]	
Pre-policy half-yearly trend	+0.4% [-0.6%,1.4%]	0.401	+0.1% [-0.5%,0.8%]	0.740	+0.9% [-0.5%,2.3%]	0.203
Immediate change in level	+5.5% [-4.2%,15.2%]	0.254	+4.3% [-3.4%,11.9%]	0.263	+6.8% [-6.6%,20.1%]	0.307
Immediate change in slope	+0.9% [-0.2%,2.1%]	0.117	+1.1% [0.2%,2.0%]	0.019	+0.7% [-0.9%,2.3%]	0.375
Post-policy half-yearly trend	+1.3% [0.9%,1.8%]	<0.001	+1.2% [0.7%,1.7%]	<0.001	+1.6% [1.1%,2.0%]	<0.001

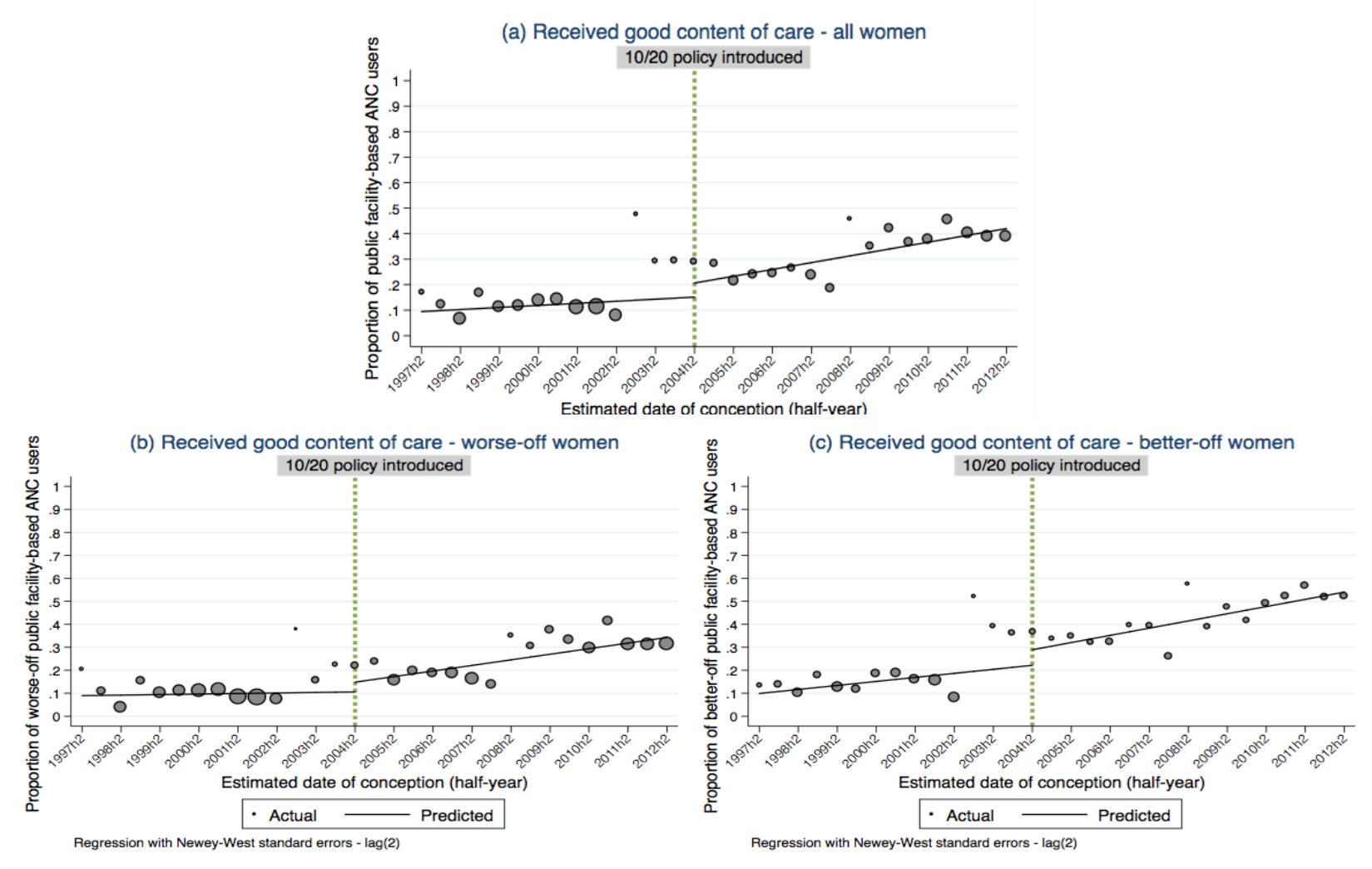

Figure 5.6 (a-c): Received good content of care among users of public facility-based ANC

Table 5.6 Summary of the effects of the 10/20 policy on ANC

	Immediate change in level	Immediate change in slope
(1) 4+ ANC (most recent births)		
All women	none	increased
Worse-off women	none	increased
Better-off women	increased	increased
(2) Early ANC (users of 1+ ANC)		
All women	none	increased
Worse-off women	none	none
Better-off women	increased	increased
(3) Public facility-based ANC (users of 1+ ANC)		
All women	none	none
Worse-off women	none	none
Better-off women	none	decreased
(4) Primary care (users of any public facility-based care)		
All women	none	none
Worse-off women	decreased	decreased
Better-off women	none	none
(5) Received good content of ANC (users of any public facility-based care)		
All women	none	none
Worse-off women	none	increased
Better-off women	none	none

increased: increasing effect or trend, $p<0.05$

decreased: decreasing effect or trend, $p<0.05$

none: no effect, $p>0.05$

5.6 Discussion

5.6.1 Summary of findings

Our study shows that over the past two decades, content of ANC has been universally low and there have been historical wealth-based disparities in the frequency and timing of ANC. The 10/20 policy was associated with the acceleration of the changes over time in use of 4+ ANC and early ANC initiation. The evidence suggests that the 10/20 policy was not associated with population-level increases in use of public facility-based ANC among ANC users nor on use of primary care facilities and content of care among users of public facilities. When disaggregated by wealth groups, the findings further suggest that the 10/20 policy may have been more beneficial to better-off women compared to poorer women.

5.6.2 Understanding the causal mechanisms driving the 10/20 policy's impact on ANC

Examining the findings stratified by wealth group raises important questions with regard to the causal mechanisms by which the 10/20 policy might have impacted the coverage, timing, frequency, and source of antenatal care. We hypothesized that reducing the cost of accessing ANC might lead to earlier ANC initiation and increased number of ANC visits. Additionally, we expected that any increases in 4+ ANC coverage would be accompanied by increases in the proportion of ANC users who sought care from the public sector and the proportion of public facility-based ANC users who sought care at a primary care facility. Finally, we hypothesized that increased patient volumes in public primary care facilities as a result of the 10/20 policy might contribute to reduced content of care in the public sector.

Instead, we found that while the 10/20 policy had no impact on the timing of ANC initiation among worse-off women, the proportion of worse-off ANC users who made four or more ANC contacts began to increase at a faster rate immediately after the 10/20 policy was introduced. This suggests that for worse-off women, the policy was unable to immediately change practices around the timing of the first ANC visit among users, but successfully increased the number of visits among women who made at least one ANC visit. We also found that while the policy did not increase the proportion of worse-off women using public sector care, it did accelerate improvements in receipt of good content of care among worse-off users of public facility-based ANC. As the policy change was associated with a shift towards greater use of public hospitals among worse-off users of public facility-based care, these findings suggest that the observed improvements in content of ANC among worse-off women may have been due to a combination of decreased use of public sector primary

care facilities and increased number of ANC visits. Among better-off women, the 10/20 policy was associated with improvements in the timing and number of visits. However, in contrast with our hypotheses, these improvements were also accompanied by decreased use of public sector facilities and no change in the use of primary care or content of care among users of public facility-based ANC.

A critical look into the design, implementation, and context of the 10/20 policy provides helpful insights for understanding these findings. For instance, the 10/20 policy aimed to improve the financial accessibility of primary care but did not include any interventions to address other barriers that influence whether a woman accesses one or more ANC visits during her pregnancy. Although indirect financial costs, such as paying for transportation to and from health facilities, can serve as a significant barrier to care, the 10/20 policy only addressed direct costs for ANC in public primary care facilities. A study on catastrophic health spending in Kenya found that transportation costs account for nearly one quarter of households' total out-of-pocket spending on health, and that the burden of transportation costs relative to total spending was highest among the poor [317]. This suggests that the high costs of transportation may have significantly influenced the impact of the 10/20 policy on ANC service use. In terms of non-financial barriers, a qualitative study on women's beliefs and practices around ANC in Kenya revealed that while raising money for out-of-pocket fees sometimes required women to postpone their first ANC visit, factors related to women's knowledge, beliefs, and traditions appeared to be more influential contributors to delayed ANC initiation [318]. Additionally, findings from two quantitative studies on determinants of ANC timing in Kenya also suggest that barriers including distance, knowledge, and customs might also inhibit early ANC initiation, as evidenced by the impact of factors such as living in a community with access to a community health worker, being from certain ethnic groups, parity, and being married on the timing of women's first ANC visits [319,320]. The fact that only better-off women experienced immediate increases in early ANC initiation after the introduction of the 10/20 policy therefore supports findings from other research suggesting that sometimes the impacts of user fee exemptions are inequitable because the poor tend to be disproportionally affected by indirect financial and non-financial barriers to healthcare [22].

With regard to source of care, there are many possible reasons why the policy did not lead to an increased use of public primary care facilities for ANC among the worse-off. For instance, although ANC services were intended to be available at the lowest levels of care, the 2004 Kenya Service Provision Assessment (KSPA) reported that only 77% of

dispensaries offered ANC, compared to 86% of health centers and 84% of hospitals [299]. Further, the 2004 KSPA found that among facilities offering ANC, availability of the resources and infrastructure necessary for quality ANC was low, particularly in health centers and dispensaries [299]. In addition to this lower availability of quality ANC services in public primary care facilities, distrust related to the lack of clarity around the conditions of the policy; facilities' failure to comply with the policy's recommended fees; and concerns about the policy's impact on quality of care may have also acted as deterrents. A qualitative study examining perceptions of the 10/20 policy among community members and health workers found that both the general public and health workers were confused about which aspects of care were covered under the policy and which services and groups were eligible for fee exemptions [227]. The study also found that some health providers and community members believed that the 10/20 policy reduced the cost of seeking care at the expense of quality of care, particularly in terms of drug availability [227]. Additionally, two nationally representative surveys of health facilities in Kenya found that six to eight years after the 10/20 policy was introduced, health facility staff reported routinely overcharging for ANC in both health centers and dispensaries [207,300]. An assessment conducted in 2012, for instance, found that public health centers and dispensaries reported charging KSh 58 and KSh 46 per ANC visit, respectively, while hospitals reported charging similar fees of KSh 55 per visit [207]. Finally, although the 10/20 policy purportedly reduced user fees in public primary care facilities, by many accounts, services were already being provided for free in some public dispensaries prior to the policy change [227,247,248,295]. Thus, in some areas, rather than decreasing fees at the dispensary-level, the 10/20 policy potentially introduced official fees that previously did not exist.

The decreased use of public sector care among better-off ANC users after the 10/20 policy could be due to the comparative costs of seeking care in public versus private facilities after the policy change. A nationally representative survey of the fees charged by health facilities years after the 10/20 policy was introduced revealed that the cost of ANC was comparable between public and private facilities at the dispensary level [207]. Although the study also found that the fees for ANC in hospitals and health centers were higher in the private sector than in the public sector, the difference in pricing may not have been a sufficient barrier to stop better-off women from switching to private sector care [207,227].

With regard to receipt of good content of ANC, the observed improvement in content of ANC among worse-off women may also be related to changes in the global guidelines on ANC around the same time that the 10/20 policy was introduced. From 1996 to 1998, the

WHO conducted a multi-country randomized control trial of a new four-visit model of ANC delivery. Later, in 2002, the WHO published guidelines on the focused, or four-visit, ANC model and which interventions should be provided during each visit [321]. Simultaneously in 2001, this model was piloted in two out of Kenya's then 72 districts and later scaled up to 19 additional districts in 2002 [322]. Although there were no national standards or guidelines for implementing focused ANC in Kenya at the time of the 10/20 policy change [322], it is plausible that as these guidelines were being piloted in select districts, there was a more general emphasis on improving the content of ANC throughout the country.

5.6.3 Comparing effects of 10/20 policy on coverage of ANC vs. delivery care

Our findings suggest that there were important differences and similarities between the impact of the 10/20 policy on coverage of antenatal care versus delivery care. In a recent paper using Kenya DHS data to examine the impact of the 2004 10/20 policy on coverage and source of delivery care, Obare et al. found that the proportion of women who delivered outside of a health facility immediately increased at the population level and among poor women (defined as the bottom two wealth quintiles), but had no immediate effect on home-based delivery care among wealthy women (defined as the top two wealth quintiles) [81]. Further, the study found no immediate effect of the 2004 10/20 policy on use of public facility-based delivery care; instead, the observed reduction in facility-based care was due to decreased use of private facilities and increased home-based births among the poor [81]. While Obare and colleagues' findings suggest that the 2004 10/20 policy change was associated with decreased coverage of institutional deliveries, particularly among the poor, our findings suggest that the policy change was associated with increased coverage of ANC, particularly among the better-off. Thus, although the 10/20 policy's impact on antenatal and delivery care coverage may have differed, both studies suggest that the policy contributed to better improvements in service coverage for women with higher socioeconomic status compared to those with lower socioeconomic status. These findings are consistent with other studies reporting that fee exemption policies may not always reduce inequities in access to care, particularly if non-financial barriers are not sufficiently addressed [22,23,323,324].

There are a few plausible explanations for why the impact of the 10/20 policy change in 2004 might have differed between ANC and delivery care. For example, the impact of the policy might be related to the nature of the service. While ANC is an outpatient, largely preventative and promotive service, facility-based childbirth care is an inpatient service requiring a skilled provider. As a result, the proportion of health centers and dispensaries

that offered delivery care in the early months after the policy change was substantially smaller than the proportion that offered ANC [299]. Due to these differences in service availability, the potential for the 10/20 policy to facilitate a population-level increase in use of facility-based delivery care was lower than for facility-based ANC. Secondly, it is likely that facilities' inconsistent compliance with the policy impacted ANC and delivery care differently. Qualitative research conducted after the 10/20 policy was introduced suggests that health facilities often did not adhere to the policy's recommended charges, and health care users were charged additional fees for certain drugs, laboratory tests, and services [207,227,300]. Health centers providing any inpatient services, in particular, reported that the 10/20 registration fees did not provide adequate cost recovery, which contributed to their noncompliance with the policy [207,227]. Additionally, a nationally representative survey of Kenyan health facilities conducted in 2010 found that facility in-charges reported higher levels of overcharging for delivery services compared to ANC [300]. This study was conducted six years after the 10/20 policy was introduced and the findings may therefore be related to the duration of time passed since the policy change. However, given the comparatively higher costs for providing delivery care, it is conceivable that this practice of greater overcharging for delivery care was also prevalent during the time immediately after the policy change.

5.6.4 Limitations

This study has some limitations. First, the data are subject to recall bias, as the DHS asks women to provide details about the antenatal care that they received for pregnancies that occurred up to five years prior to the interview date. Secondly, this analysis relies on categorizing women's pregnancies by their estimated dates of conception. As it is difficult to accurately estimate the duration of a woman's pregnancy using information on her child's birthdate alone, our assumptions may have resulted in the misclassification of some births into the wrong half-year period. There was also potential for women who conceived just before the policy change to be pregnant both before and after its implementation. Such cases, though relatively few (approximately 2% of the study sample), could potentially have contributed to a crossover effect, whereby the impact of the policy on ANC may have been underestimated due to women who were categorized as conceiving before the policy change having access to its benefits. Measurement of the policy impact may have also been affected by small sample sizes in certain periods (Appendix 10); however, we adjusted for this by weighting each half-year observation by the precision of the outcome's estimate for that period. Comparisons of urban and rural areas are challenging to interpret due to the

heterogeneity of the populations that live within a given area. The DHS categorized areas as urban and rural based on their population size and physical infrastructure, with no distinction between the different types of individuals who live in a particular environment [179,325]. For example, although women living in an urban slum environment are likely to have very different access to care compared to women in wealthier urban areas, these two groups were both considered 'urban' in this analysis. It is also unclear whether the methods used to classify areas as urban or rural changed over time, making it difficult to understand changes over time by residence. Additionally, because the 10/20 policy was implemented at the national level, it was not possible to compare the time trends in a comparable control group that was not exposed to the policy change. Finally, although we used the content of antenatal care as a proxy for quality of care, this is not a comprehensive measure of quality of care, as it only measured a relatively small number of ANC components and did not assess more systems-level aspects of service quality or aspects related to respectful care.

5.7 Conclusions

This study showed that the user fee reductions under the 10/20 policy in Kenya were associated with frequency of antenatal care. However, these improvements were not achieved through greater use of the public primary care facilities targeted under the policy, but instead through greater use of higher-level public facilities among the worse-off and private facilities among the better-off, leaving unanswered questions about the mechanisms through which the policy change may have affected service use patterns. This study also revealed that improvements in the timing and frequency of ANC were inequitable between better-off and worse-off women. On one hand, these findings imply that the policy may have increased out-of-pocket expenditures for the poor by pushing worse-off ANC users towards higher-level public-sector care for services that could be provided for lower costs in primary care facilities that complied with the 10/20 policy. On the other hand, the findings indicate that the policy may have stimulated more effective market segmentation by pushing the better-off towards the private sector and potentially increasing the public-sector resources available to those with lower ability to pay. Taken together, these findings contribute to the evidence that reducing user fees alone is not sufficient for equitably increasing access to primary healthcare services such as antenatal care. To ensure the success of the national health financing strategy that is currently being finalized in Kenya, policymakers must therefore develop strategies for concurrently addressing the key financial and non-financial barriers to recommended service-seeking practices.

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SECTION A – Student Details

Student	Mardieh Dennis
Principal Supervisor	Oona Campbell
Thesis Title	Pragmatic pluralism for health: Understanding the role of public financing and public-private engagement on use, quality, and equity in access to maternal health services in Kenya

If the Research Paper has previously been published please complete Section B, if not please move to Section C

SECTION B – Paper already published

Where was the work published?	BMJ Global Health		
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For multi-authored work, give full details of your role in the research included in the paper and in the preparation of the paper. (Attach a further sheet if necessary)	With input from my co-authors, I designed the study, conducted the analysis, and wrote the manuscript.

Student Signature: _____ **Date:** 1 September, 2019

Supervisor Signature: _____ **Date:** 1 September, 2019

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6 EVALUATING THE IMPACT OF A MATERNAL HEALTH VOUCHER PROGRAM ON SERVICE USE BEFORE AND AFTER THE INTRODUCTION OF FREE MATERNITY SERVICES IN KENYA: A QUASI-EXPERIMENTAL STUDY

This chapter presents the second of three quantitative research papers (paper 4) seeking to answer the third research question of this thesis examining the impacts of user fee removals and subsidized vouchers on use, quality, continuity, and equity of maternal care in Kenya. This paper examines the relationship between the introduction of the voucher program and free maternity services policy on three primary outcomes: coverage of antenatal care, facility births, and postnatal care. The secondary outcomes explored include continuity of care, defined as receipt of all three maternal health services studied, and source of care (public vs. private).

6.1 ABSTRACT

Introduction

From 2006 to 2016, the Government of Kenya implemented a reproductive health voucher program in select counties, providing poor women subsidized access to public and private sector care. In June 2013, the government introduced a policy calling for free maternity services to be provided in all public facilities. The concurrent implementation of these interventions presents an opportunity to provide new insights into how users adapt to a changing health financing and service provision landscape.

Methods

We used data from three cross-sectional surveys to assess changes over time in use of 4+ antenatal care visits, facility delivery, postnatal care, and maternal health care across the continuum among a sample of predominantly poor women in six counties. We conducted a difference-in-differences analysis to estimate the impact of the voucher program on these outcomes, and whether program impact changed after free maternity services were introduced.

Results

Between the pre-intervention/rollout phase and full implementation, the voucher program was associated with a 5.5% greater absolute increase in use of facility delivery and substantial increases in use of the private sector for all services. After free maternity services were introduced, the voucher program was associated with a 5.7% higher absolute increase in use of the recommended package of maternal health services; however, disparities in access to facility births between voucher and comparison counties declined. Increased use of private sector services by women in voucher counties accounts for their greater access to care across the continuum.

Conclusions

Our findings show that the voucher program is associated with a modest increase in women's use of the full continuum of maternal health services at the recommended timings after free maternity services were introduced. The greater use of private sector services in voucher counties also suggests that there is need to expand women's access to acceptable and affordable providers.

6.2 INTRODUCTION

Although maternal mortality has decreased substantially around the world over the past three decades, additional reductions are a top priority for the global development agenda [326]. In 2015, an estimated 303,000 women died from complications related to childbirth, largely from preventable causes [14,67]. The burden of poor maternal health is particularly acute in sub-Saharan Africa, where the maternal mortality ratio (MMR) of 546 deaths per 100,000 live births is 2.5 times greater than the global MMR and 46 times greater than that of high-income countries [67]. Despite the consensus on effective interventions for reducing the risks associated with pregnancy and childbirth, many women in low- and middle-income countries (LMICs) do not access high quality maternal health services due to a number of barriers, including limited availability, lack of transportation, and high cost of care [110,327].

In Kenya, the MMR declined from 590 maternal deaths per 100,000 live births in 1998 to 362 in 2014 [179,328]. Since independence in 1963, the Kenyan government has implemented a series of user fee introductions, reductions, and removals in an effort to strike a balance between ensuring adequate cost recovery for health facilities and affordable, universal access to essential services, including maternal health care, for individuals [205,220,226,227,300]. Nevertheless, according to the 2014 Kenya Demographic and Health Survey, nearly two in every five Kenyan women still reported giving birth outside of a health facility or without the supervision of a skilled birth attendant. The survey also found pronounced inequity in access to maternal health services in Kenya, with 70% of women in the poorest wealth quintile delivering under these suboptimal conditions compared to only 7% of women in the highest quintile [179].

Given persistent disparities, the Government of Kenya has piloted alternative health financing approaches to further reduce financial barriers and ensure universal access to care [329]. One such strategy, the reproductive health voucher program, aimed to make high quality maternal health, family planning, and gender-based violence services more available and affordable for poor women [55,202]. On the demand side, this program sought to reduce women's expenditures on maternal health services by selling highly subsidized safe motherhood vouchers that covered care across the maternal health continuum, including four antenatal care (ANC) visits, facility delivery (vaginal or cesarean), and postnatal care (PNC). These vouchers were sold for KSH 200 (equivalent to 2006 $USD 2.70/2016 $USD 1.94) and were intended to be specifically targeted to poor women, as determined by a poverty grading assessment administered to each potential user. On the supply side, the

voucher program sought to expand provider choice and improve quality of care by enrolling both public and private sector lower-level and referral facilities into the program. Facilities that met certain minimum standards could be accredited for participation in the program and were reimbursed at standard, pre-negotiated rates for each voucher service provided. Additionally, periodic quality assurance assessments were conducted and facilities that failed to uphold the minimum standards risked losing their accreditation. The voucher program was implemented in phases from 2006 to 2016, and managed by PriceWaterhouseCoopers on behalf of the Kenyan government with support from the German Development Bank (KfW). In the first phase, from 2006 to 2009, the voucher intervention was piloted in four counties (Kiambu, Kisumu, Kitui, and Nairobi). Following the pilot, the program was expanded to an additional county (Kilifi) as well as to additional facilities in the pilot counties, and implementation continued until late 2016 [202].

During the final implementation phase of the voucher program, on June 1, 2013, the Government of Kenya announced a major maternal health financing policy change: maternity services were to be provided for free in all public health facilities across the country with immediate effect. Facilities were to provide free maternal health care to all women and receive a standard reimbursement from the government for services provided. Thus, for over three years between 2013 and 2016, the voucher and free maternity services programs operated concurrently.

The unexpected and concurrent implementation of these two interventions is reflective of the challenges of real-world program evaluations and presents a unique opportunity to provide new insights into how health systems and users adapt to a changing landscape of health financing and service provision. Previous studies have explored the shorter-term effects of the Kenya voucher program on maternal health service use, out-of-pocket expenditures, and quality of care [99,101,131,330]. Building on this evidence base, this study aims to examine the longer-term impact of the voucher program on maternal health service use and to assess whether any observed effects of the voucher program persisted after free maternity services were introduced in 2013.

6.3 METHODS

6.3.1 Study design and setting

A quasi-experimental study was conducted with repeated cross-sectional surveys administered in May 2010 – July 2011, July – October 2012, and July – August 2016. Data

were collected in four intervention counties (Kiambu, Kilifi, Kisumu, and Kitui) and three comparison counties (Makueni, Nyandarua, and Uasin Gishu) selected based on having similar characteristics as the intervention counties in terms of geographic location, population, and health facility characteristics. Counties were selected as comparison sites if they (a) were adjacent to an intervention county, (b) had a similar population size to the intervention county, and (c) had similar availability of health services, both in terms of level of care (hospital, health center, dispensary) and sector of care (public, private non-profit, and private for-profit) [131]. The research team that designed the study used their expert knowledge of the context, and their discretion to select these comparison sites. To facilitate comparisons over time, one intervention county (Kilifi) was excluded from this analysis, as it was not surveyed in 2016. We included a map of the study counties and a table of basic characteristics of the counties in Appendix 15.

The study used a multi-stage sampling design. In the first stage, a random sample of 14 sub-locations were selected within each intervention county from those located within a 5-km radius of a facility accredited in the voucher program. In comparison counties, 14 sub-locations were selected among those within a 5-km radius of a facility that were comparable to the intervention facilities in terms of facility type and ownership. This was done to ensure that all surveyed women had similar physical access to the maternal health services offered under the voucher program. At the second sampling stage, simple random sampling was used to select three enumeration areas within each sub-location. These enumeration areas corresponded to the villages included in the study. Given that the voucher program intended to target poor women, the poorest households in each village were identified by local administrators and purposively selected for inclusion in the study. Local chiefs and village heads informed the study team on which households were poorest within the village [101]. The study team then administered a poverty grading tool to the identified households to assess their economic status [99]. In order to ensure that the sample represented women who were eligible to use the voucher, the study team aimed for households selected from each village to comprise 75% poor women and 25% non-poor women [99]. Within each household, women aged 15 to 49 years with at least one birth in the past 12 months or pregnant at the time of the interview were targeted for participation. In households with more than one woman meeting the target characteristics, the youngest woman was selected into the study. Additional details of the study protocol and sampling methods have been described previously [99,101,131,331].

Face-to-face interviews were conducted during each survey round using a tablet-based structured questionnaire covering a range of topics including women's sociodemographic characteristics, reproductive history, and maternal health service use. Each participant provided written informed consent to participate in the study.

6.3.2 Study outcomes

Table 6.1 defines the ten indicators of maternal health service use and sector of care examined in this study. In addition to examining use of individual services in each period, we also looked at the proportion of women receiving a complete package of all three services across the maternal health service continuum (complete care). We also estimated the proportion receiving complete care at the recommended timings, with the first ANC visit occurring during the first trimester and the PNC check occurring within 48 hours of delivery (recommended care).

Table 6.1 Definitions of indicators used in analysis

SERVICE USE	
(1) 4+ ANC visits	Births for which a woman attended four or more ANC visits were categorized as having received 4+ ANC visits. Births with missing information on the number of ANC visits were considered to have not received 4+ ANC visits.
(2) Facility delivery	All births that occurred in a health facility, regardless of birth attendant or sector of care, were categorized as facility deliveries. Births with missing information on delivery location were considered to have not occurred in a health facility.
(3) Postnatal care	Births after which a woman reported a health worker checking on her health were categorized as having received PNC. Using this definition, facility births that received a pre-discharge check for the mother's health were considered to have received PNC. Births with missing information on receipt of a PNC check were considered to have not received PNC.
(4) Complete care	Births that received: (a) 4+ ANC visits **and** (b) Facility delivery **and** (c) Postnatal care for mother
(5) Recommended care	Births that received: (a) 4+ ANC visits, with the first visit occurring in the first trimester **and** (b) Facility delivery **and** (c) Postnatal care for mother within 48 hours of delivery
SECTOR OF CARE	
(6) Public sector	Births that received a given maternal health service in a government-owned facility were categorized as having received care in the public sector. Births that received care in a facility owned by a non-government actor, at home, or with missing information (<1%) on sector of care were categorized as not having received care in the public sector.
(7) Private sector	Births that received a given maternal health service in a private for-profit, non-profit, or faith-based facility were categorized as having

	received care in the private sector. Births that received care in a government-owned facility, at home, or with missing information (<1%) on sector of care were categorized as not having received care in the private sector.
(8) All public	Births that received ANC, delivery, and PNC services all in the public sector among users of complete or recommended care. This category also includes a small number (n=4) of public facility births that received home-based ANC and/or PNC.
(9) All private	Births that received ANC, delivery, and PNC services all in the public sector among users of complete or recommended care.
(10) Both public and private	Births that received ANC, delivery, and PNC services from both public and private sector sources among users of complete or recommended care.

6.3.3 Statistical analysis

Respondents were asked to report on all of their births within the five years prior to the survey; data from the three cross-sectional surveys were pooled and reshaped to allow us to perform analyses on all reported births. We categorized these births into three periods according to when they occurred. Period 1 (May 2005 – December 2009) refers to the pre-intervention and rollout phase of the program. Period 2 (January 2010 – May 2013) refers to the post-rollout phase, when the program was implemented at full intensity. Lastly, Period 3 (June 2013 – August 2016) refers to the period when both the voucher program and the free maternity services policy for all government facilities were being implemented simultaneously.

For the data collected in 2016, a glitch in the survey programming resulted in 23% of women who reported giving birth at least once in their lifetime having a missing response to the question, "During the last five years, how many children have you given birth to?" This question was missing for less than 1% of respondents in both the 2010 and 2012 surveys. Based on the skip pattern of the instrument, only women who reported giving birth to one or more child in the past five years were asked subsequent questions about the key outcomes of this study related to maternal health service use for each child born within the period. Women who reported zero births or had missing information on their number of births in the past five years were not asked these questions; we were therefore missing outcome data for births that occurred within the past five years to women with missing information for the aforementioned question.

We conducted analyses to explore for any evidence of systematic biases in our estimates relating to the pattern of missing data in the question about the number of live births five years prior to the survey (Appendix 16). We found that after controlling for all relevant socio-

demographic characteristics, both marital status and county had strong effects on the odds of having missing data. The observed effect of county is due the fact that the data manager identified the glitch during the course of fieldwork and corrected it; the proportion of missing data therefore declined after the instrument was updated (Table A16.1). The mechanism behind the effect of marital status is unclear and may be due to chance. These findings suggest that the data are not missing completely at random (MCAR) and might either be missing at random (MAR) conditional on both county and marital status, or missing not at random (MNAR). However, because we know that the missing data mechanism was due to a software issue that is unrelated to the underlying values of our outcomes of interest, we have assumed the data to be MAR, and have conducted a complete case analysis controlling for both county and marital status [332,333]. Less than 1% of responses were missing for all other variables across all three surveys.

We performed Wald tests to assess cross-sectional differences in background characteristics between all surveyed women in voucher and comparison counties for each period. We used logistic regression models, adjusted by background characteristics, to estimate cross-sectional differences in women's maternal health service use for births that occurred in voucher and comparison counties. Our analysis of women's background characteristics used a logistic regression models adjusted for multi-stage clustering at the sub-location and village levels. Outcomes related to service use additionally accounted for clustering at the mother level, as some women reported more than one live birth within the five years prior to the survey.

We used a difference-in-differences approach with mixed effects linear regression models to approximate the impact of the voucher program and introduction of free maternity services on maternal health service use and sector of care with random effects included for county sub-location, village, and mother. To assess the impact of the voucher program, we estimated differences in the change over time in outcomes between births that occurred in voucher and comparison counties before (Period 1) and after (Period 2) the voucher program was fully implemented. We further assessed whether any benefits of the voucher program persisted after free maternity services were introduced by estimating the difference in the change in outcomes between births in voucher and comparison counties before (Period 2) and after (Period 3) user fees were removed.

We present these voucher program impact results controlled for key potential confounders, including location (urban/rural), wealth quintile, year of childbirth, insurance enrollment,

and mother's parity, education, marital status, and employment status. We used Stata IC version 15.1 (StataCorp LLC) to conduct this analysis [334].

6.4 RESULTS

A total of 7,136 births from 5,323 women were included. Across voucher and comparison groups and over time, the births in our sample were predominantly to women living in rural areas who were married, multiparous, educated to the primary school level or below, unemployed or informally employed, and uninsured (Table 6.2). Within each period, the women sampled from the voucher and comparison counties were similar with regard to many background characteristics. However, in Period 1, women from voucher counties were less likely to have completed secondary education or higher, and Periods 1 and 3, women from voucher counties were more likely to be younger than women from comparison counties. In Period 2, women from voucher counties were more likely to be unmarried and unemployed. Additionally, in Periods 1 and 2, women from voucher counties were less likely to have health insurance coverage.

6.4.1 Service use

Women in both voucher and comparison counties reported receiving 4+ ANC visits for 59.4% to 62.7% of the births that occurred during Periods 1 and 2 (Figure 6.1a); this increased moderately after free maternity services were introduced (Period 3). We estimated the odds ratio (OR) of attending 4+ ANC visits adjusted for differences in key sociodemographic background characteristics, and found that while use 4+ ANC was similar in voucher and comparison counties in Periods 1 and 2, a greater proportion of births in voucher counties received 4+ ANC visits in Period 3 (OR 1.46, p=0.006) (Table 6.3).

Delivery in health facilities increased from approximately half of all births in Period 1 to 83.2% (comparison counties) and 86.7% (voucher counties) of births in Period 3 (Figure 1b). Although there was no difference in use of facility delivery between voucher and comparison counties in Periods 1 and 3, a greater proportion of births in Period 2 were delivered in health facilities in voucher counties than in comparison counties (OR 1.65, p=0.008) (Table 6.3).

Use of postnatal care services for the mother increased steadily from nearly 60% of all births in Period 1 to 73.9% and 82.1% of births in comparison and voucher counties in Period 3, respectively (Figure 6.1c). In Period 3, births in voucher counties were more likely to have received PNC than those in comparison counties (OR 1.73, p=0.001) (Table 6.3).

Table 6.2 Women's background characteristics by study period

	Period 1 (Pre-voucher/rollout period) N=1,888			Period 2 (Full voucher implementation) N=2,198			Period 3 (Free maternity services introduced) N=1,237		
	Comparison counties	Voucher counties	p-value	Comparison counties	Voucher counties	p-value	Comparison counties	Voucher counties	p-value
Age group (years) (%)			p=0.002			p=0.079			p=0.018
15-24	23.1	32.3		32.5	38.8		32.8	39.5	
25-34	50.6	48.9		49.3	46.2		50.1	45.1	
35+	26.3	18.9		18.3	15.0		17.1	15.6	
Educational attainment (%)			p=0.021			p=0.351			p=0.382
Below primary	26.2	32.2		28.1	32.6		24.3	27.6	
Completed primary	58.1	55.3		53.6	51.2		51.5	47.4	
Completed secondary/higher	19.7	12.5		18.3	16.2		24.2	25.0	
Wealth quintile (%)			p=0.089			p=0.786			p=0.505
Poorest	18.1	20.3		21.1	20.1		17.7	22.3	
Poorer	19.6	21.7		22.4	20.6		22.8	20.0	
Middle	22.2	20.9		19.0	18.8		19.1	19.2	
Richer	19.8	18.4		18.1	21.4		22.1	19.7	
Richest	20.3	18.7		19.4	19.1		18.2	18.8	
Residence			p=0.4778			p=0.365			p=0.587
Rural	87.5	82.4		87.4	80.1		90.2	85.9	
Urban	12.5	17.6		12.6	19.9		9.8	14.1	
Current marital status (%)			p=0.265			p=0.014			p=0.957
Unmarried	16.7	19.1		16.1	20.8		22.5	22.3	
Married/cohabiting	83.3	80.9		83.9	79.2		77.5	77.7	
Woman's employment (%)			p=0.453			p=0.022			p=0.140
Unemployed	34.6	39.2		40.4	50.4		45.4	51.3	
Informally employed	43.6	41.1		48.0	39.1		48.1	39.8	
Formally employed	21.8	19.7		11.5	10.6		6.4	8.8	

Table 6.2 Women's background characteristics by study period (continued)

	Period 1 (Pre-voucher/rollout period) N=1,888			Period 2 (Full voucher implementation) N=2,198			Period 3 (Free maternity services introduced) N=1,237		
	Comparison counties	**Voucher counties**	**p-value**	**Comparison counties**	**Voucher counties**	**p-value**	**Comparison counties**	**Voucher counties**	**p-value**
Parity (%)			p=0.451			p=0.484			p=0.978
1 child	17.7	20.5		21.1	23.6		27.9	27.3	
2-3 children	44.2	43.4		43.6	43.0		44.6	45.0	
≥4 children	38.1	36.2		35.3	33.4		27.5	27.8	
Health insurance enrollment (%)			p<0.001			p=0.032			p=0.283
Uninsured	86.5	93.4		86.3	90.8		79.7	82.8	
Insured	13.5	6.6		13.7	9.2		20.3	17.2	
Total no. women	**871**	**1017**		**1066**	**1132**		**592**	**645**	

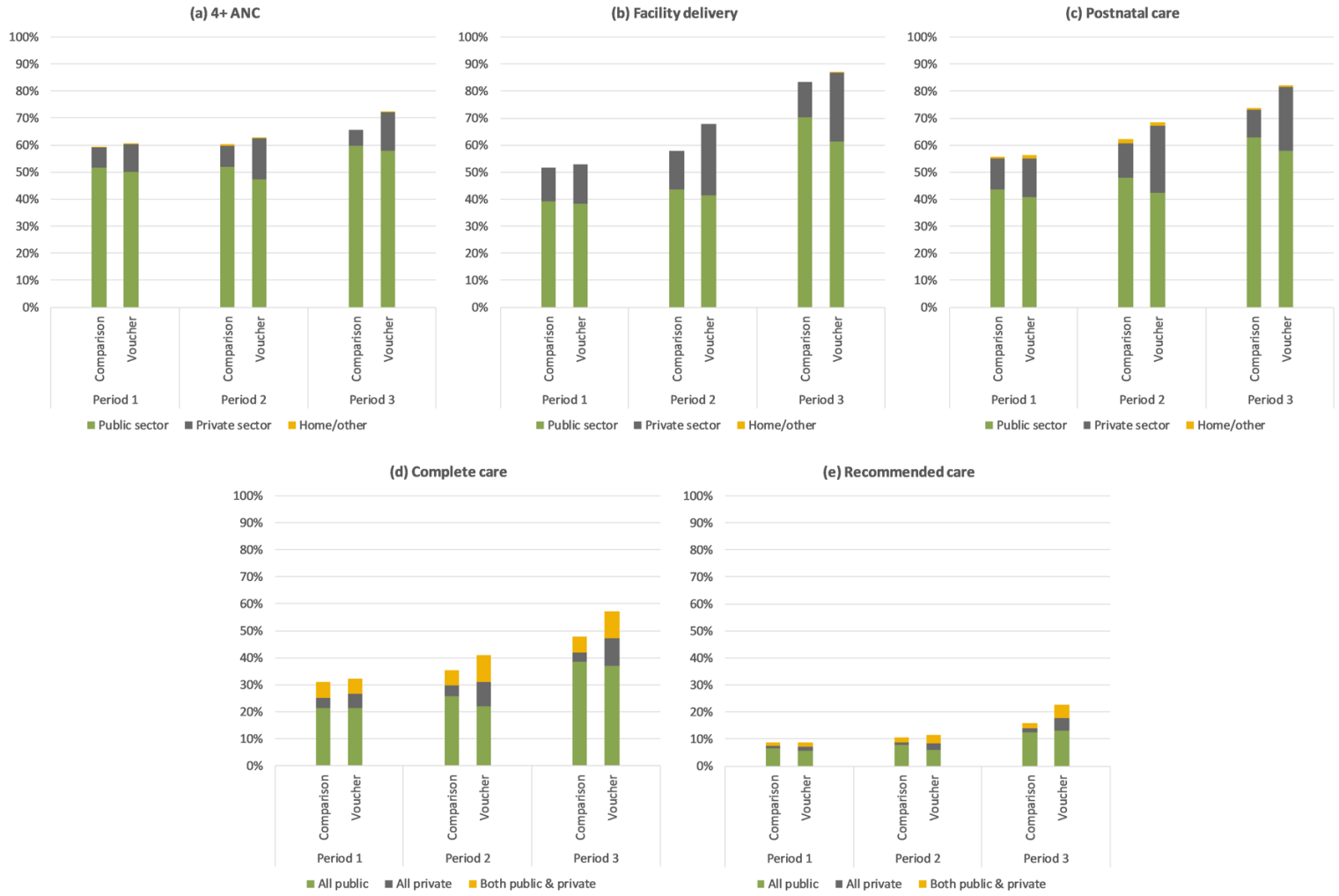

Figure 6.1 Use of maternal health services over time

Table 6.3 Adjusted cross-sectional comparison of service use and source of care in voucher vs. comparison counties

	Period 1		Period 2		Period 3	
	Adjusted odds ratio[a] [95% CI]	**p-value**	**Adjusted odds ratio[a] [95% CI]**	**p-value**	**Adjusted odds ratio[a] [95% CI]**	**p-value**
Service use						
4+ ANC visits	1.12 [0.94, 1.34]	0.201	1.18 [0.99, 1.40]	0.072	1.46 [1.11, 1.90]	0.006
Facility delivery	1.18 [0.85, 1.64]	0.315	1.65 [1.14, 2.37]	0.008	1.47 [0.91, 2.39]	0.115
PNC	1.13 [0.89, 1.46]	0.308	1.37 [1.01, 1.86]	0.043	1.73 [1.25, 2.40]	0.001
Complete care	1.20 [0.95, 1.51]	0.130	1.34 [1.02, 1.75]	0.037	1.58 [1.20, 2.10]	0.002
Recommended care	1.02 [0.75, 1.41]	0.871	1.07 [0.79, 1.44]	0.674	1.68 [1.23, 2.31]	0.001
Private sector market share						
ANC[b]	1.46 [0.86, 2.48]	0.158	2.11 [1.27, 3.49]	0.004	2.71 [1.38, 5.31]	0.004
Facility delivery	1.32 [0.84, 2.07]	0.220	2.02 [1.33, 3.07]	0.001	2.26 [1.36, 3.73]	0.002
PNC	1.44 [0.92, 2.28]	0.110	2.44 [1.55, 3.84]	<0.001	2.59 [1.47, 4.54]	0.001
Complete care[c]	1.33 [0.89, 2.00]	0.167	2.45 [1.58, 3.78]	<0.001	2.51 [1.50, 4.20]	0.001
Recommended care[c]	1.70 [0.88, 3.27]	0.112	2.59 [1.45, 4.61]	0.001	3.04 [1.43, 6.46]	0.004

[a] Logistic regression model adjusted for woman's age at birth, education, wealth, residence, marital status, employment, parity, and multi-stage sampling at the county sub-location, village, and mother levels

[b] Among users of 4+ ANC visits

[c] Proportion of users who received care from the private sector for at least one service in the 4+ ANC, delivery care, and PNC continuum

In both voucher and comparison counties and across time, the proportion of women who reported receiving either 4+ ANC visits, facility delivery, or PNC for their births individually substantially exceeded the proportion who received complete care, defined as all three services across the maternal health care continuum for a single birth (Figure 6.1d). For instance, while over 80% of births reported in Period 3 were delivered in a health facility, only 47.7% of births in comparison counties and 57.3% of births in voucher counties received complete care during that period. Further, an even smaller proportion of births received care both across the continuum and at the recommended timings. In Period 1, fewer than 10% of births in both intervention groups received recommended care (Figure 1e). Use of recommended care increased over time so that by Period 3, a greater proportion of births in voucher counties received recommended care than in comparison counties (OR 1.68, p=0.001) (Table 6.3).

6.4.2 Sector of care

The public sector was consistently the predominant provider of maternal health services for our sample; in each period, less than 40% of ANC, facility delivery, and PNC users reported receiving care from the private sector (Figure 6.1a-c). However, in all periods, the proportion of complete and recommended care users who sought care from the private sector for at least one service across the continuum was higher than the private sector market share for each of the three services individually (Figure 6.1a-e).

In Period 1, prior to the full implementation of the voucher program, there was no difference in use of the private sector for maternal health services individually or as a package between voucher and comparison counties in Period 1. The private sector market share increased substantially between Periods 1 and 2 in voucher counties, such that the proportion of all types maternal health care received from the private sector was significantly higher in voucher counties than in comparison counties for all services in Period 2. Between Periods 2 and 3, private market share of all services declined in both voucher and comparison counties; however, use of the private sector remained significantly higher in voucher counties (Table 6.3).

6.4.3 Impact of the voucher program and free maternity services policy

We found no effect of the voucher program or free maternity services policy on the use of 4+ ANC visits or receipt of PNC checks (Table 6.4). The increase in the proportion of births that were delivered in a health facility between the pre-intervention/rollout phase (Period 1) and the post-rollout phase (Period 2) was 5.5 percentage points greater (p=0.011) in voucher

counties than in comparison counties. However, the results from Period 3 suggest that the free maternity services policy decreased the disparities in access to facility births between voucher and comparison counties, and births in comparison counties may have experienced a greater increase in facility deliveries than those in voucher counties once the free maternity services policy was introduced. As a result, we found no difference in the use of facility delivery care between voucher and comparison counties in Period 3 (Table 6.3).

Table 6.4 Impact of voucher program and free maternity services policy on service use & source of care

	Period 1 – Period 2		Period 2 – Period 3	
	D-in-D estimator[a] [95% CI]	**p-value**	**D-in-D estimator[a] [95% CI]**	**p-value**
Service use				
4+ ANC visits	0.012 [-0.035, 0.059]	p=0.619	0.047 [-0.012, 0.105]	p=0.119
Facility delivery	0.055 [0.013, 0.098]	p=0.011	-0.049 [-0.102, 0.003]	p=0.064
PNC	0.038 [-0.005, 0.081]	p=0.083	0.009 [-0.045, 0.063]	p=0.733
Complete care	0.021 [-0.024, 0.066]	p=0.366	0.045 [-0.011, 0.101]	p=0.117
Recommended care	0.000 [-0.031, 0.031]	p=0.999	0.057 [0.018, 0.096]	p=0.004
Private sector market share				
ANC[b]	0.075 [0.043, 0.106]	p<0.001	0.025 [-0.015, 0.066]	p=0.218
Facility delivery	0.105 [0.049, 0.160]	p<0.001	0.000 [-0.059, 0.059]	p=1.000
PNC	0.110 [0.058, 0.162]	p<0.001	-0.001 [-0.067, 0.048]	p=0.744
Complete care[c]	0.147 [0.073, 0.222]	p<0.001	-0.008 [-0.086, 0.070]	p=0.842
Recommended care[c]	0.181 [0.045, 0.317]	p=0.009	-0.030 [-0.160, 0.100]	p=0.652

[a] Mixed effects linear regression model adjusted for child's birth year, woman's age at birth, education, wealth, residence, marital status, employment, parity, and random effects at the county sub-location, village, and mother levels
[b] Among users for 4+ ANC visits
[c] Proportion of users who received care from the private sector for at least one service in the 4+ ANC, delivery care, and PNC continuum

We did not observe any differences in the improvements over time in access to complete care between births that occurred in voucher and comparison counties. Although access to the recommended package of ANC, delivery, and PNC services at the correct timings was low in all study counties, we observed a 5.7 percentage point greater improvement (p=0.004)

in use of recommended care among births that occurred in voucher counties between Periods 2 and 3 (Table 6.4).

Between Periods 1 and 2, we observed 7.5-11.0% greater absolute increases ($p<0.001$) in the proportion of ANC, facility delivery, and PNC users seeking care in the private sector in voucher counties than in comparison counties (Table 6.4). Among users of complete and recommended care, increases in the use of private sector services at some point along the maternal health care continuum were 14.7 ($p<0.001$) and 18.1 ($p=0.009$) percentage points higher in voucher counties than in comparison counties between Periods 1 and 2, respectively. Use of private sector facilities appears to have decreased for all services types between Periods 2 and 3, and there was no evidence of differences in the change in use of private sector care between voucher and comparison counties after the introduction of free maternity services.

6.5 Discussion

These results suggest that between the pre-intervention/rollout and full implementation phases, the Kenya voucher program modestly increased use of facility deliveries and stimulated a shift towards greater use of private sector providers for ANC, delivery, and PNC services among a sample of predominantly poor women. However, after free maternity services were introduced, use of facility-based deliveries in comparison counties improved to levels similar to those observed in voucher counties, and there was greater use of public sector facilities for maternal health services across all counties. Although use of private sector services decreased universally after free care was introduced in government facilities, women in voucher counties continued to use the private sector at much higher levels than women in comparison counties after the policy change. Still, across all counties, periods, and service types, the public sector remained the majority provider of maternal health care.

We did not find any positive impact of the voucher program on access to 4+ ANC, facility delivery, or PNC services individually after free maternity services were introduced. While we similarly did not find any impact on the collective use of all three services across the continuum after the policy change, we found a greater increase in use of the recommended care package of all three maternal health services at the correct timings among births in voucher counties. Qualitative evidence from Kenya suggests that the free maternity services program overburdened public health facilities, resulting in reduced health worker motivation and quality of care [228,301,335]. Our findings suggest that differences in use of

recommended care may be partially explained by the greater ability of women in voucher counties to complement public sector services with care in the private sector, or exclusively seek care in the private sector, after free maternity services were introduced. However, given the difference in the observed trends in use of complete compared to recommended care, further research is needed to better understand how factors such as women's perceptions of quality of care and ability to pay may have encouraged more timely care seeking across the maternal health continuum.

Our finding that the voucher program moderately increased the proportion of births that occurred in health facilities between the pre-intervention/rollout and full implementation periods is consistent with previously reported results from evaluations of maternal health voucher programs from Kenya and other LMICs [96,98,99,101,336]. While other LMIC studies have inferred similar increases in access to 3+ or 4+ ANC and PNC services due to voucher programs, we did not find such an effect [96,100,337–341]. These results are also consistent with previous studies that have shown that offering affordable vouchers that can be redeemed in private facilities leads to greater use of private sector maternal health services [99–101]. To our knowledge, this is the first study from an LMIC to examine the impact of the voucher program on use of care across the ANC, delivery, and PNC service continuum.

This study has some key strengths that help to extend the body of knowledge generated by previous research on health voucher programs in LMICs. First, most studies on voucher programs to date have examined the immediate or shorter-term impact of the intervention on service use [96]. Ours is unique in that it looks at the mid- to longer-term effects of the intervention, and also examines how the voucher program performs against an alternative health financing strategy. Additionally, much of prior research on the effect of voucher programs on ANC, facility delivery, and PNC use from Kenya and other LMICs have relied on with-and-without and before-and-after study designs [96,98,99,101,336]. Both of these analytical approaches rely on key assumptions for causal inference that are often invalid in observational studies – namely, that there are no underlying differences between the intervention and comparison groups related to the outcomes of interest, and that without the intervention, there would be no differences in the outcome among study participants observed before and after implementation [342]. This study overcomes some of the biases introduced by these assumptions by using a difference-in-differences approach that compares the difference in the change in maternal health service use between treatment and comparison groups.

Despite these strengths, our study also has some important limitations. For instance, three aspects of the sampling approach were non-random. First, only villages located within a 5km radius of a voucher-accredited or similar health facility were included in the sample; we are therefore unable to assess the impact of the program in more remote areas. Thus, we may be overestimating the population-level effects of the program by only evaluating impact among communities within close proximity of maternal health services. This, along with the fact that our survey was implemented more than three years after the policy change, might help explain why more than 80% of women in both voucher and comparison counties reported giving birth in a health facility after free maternity services were introduced, while the national estimate from the 2014 Kenya Demographic and Health Survey is only 61%. Second, within each village, the research team purposively sampled the poorest parts of the community in order to ensure that the interviewers surveyed an adequate number of women meeting the poverty criteria for participation in the voucher program. As a result, we are unable to accurately assess the impact of the program on equity in access to care, given that the sample predominantly includes women of similar socioeconomic status who were selected based on community leaders' subjective understanding of their poverty status. Lastly, within each household, the youngest woman was selected if more than one eligible woman was present, which may also have introduced some age-related biases into our analyses.

Another limitation of this study is that we assessed the impact of the voucher program at the community level, which is greatly affected by the penetration of the intervention. A previous study on the Kenya voucher program found that 15.4% of women in voucher counties reported using a safe motherhood voucher during the 2010/11 survey and 43.9% reported using the voucher in the 2012 survey [131]. This approach therefore likely underestimates the direct effects of the voucher program on voucher users. A fundamental assumption of the difference-in-differences approach is that we would expect to observe equal trends over time in key outcomes between the treatment and comparison groups were it not for the intervention [342]. However, due to the observational nature of this study, it is possible that this assumption may have been violated by the presence of other maternal health-related interventions or differential implementation of relevant policies in the study counties. For instance, the Kenyan government was decentralized in 2013, and since then, each county has semi-autonomously managed its own health system. Many counties have experienced challenges with this transfer of power that have contributed to reduced staff motivation,

health worker strikes, and lower quality of care; all of which may have affected the observed effects in our study [343–345].

In terms of data quality, a glitch in the programming of the tablet-based survey instrument resulted in a significant amount of missing data for the 2016 survey. This resulted in a reduced sample size and loss of statistical power in Periods 2 and 3, which may have affected our ability to detect differences by intervention group in women's background characteristics and use of services in Periods 2 and 3 (Tables 6.2 & 6.3) and in changes over time in maternal health service use (Table 6.4). Although the missing data are likely to have introduced bias in our descriptive estimates of service coverage, we avoid this concern in our inferential findings by accounting for clustering within counties and including marital status as a covariate in our models [346]. Complete case analysis is valid when the outcome of the model is not included in the missing data mechanism; this is the case in our study, as the data are missing at random when conditioned on the relevant covariates [333,347]. Multiple imputation techniques have been gaining popularity over the last years for recovering information from incomplete records, particularly covariates; however, in our setting, data are missing only in the outcome, and therefore multiple imputation would not be useful [347]. Additionally, among the cases that we did include in the analysis, fewer than 1% were missing data on whether they used the service of interest. For these cases, we assumed that the woman did not receive the service. As a result, we may have underestimated service use, as it is conceivable that some of these women did, indeed, receive the service of interest. Alternatively, we could have assumed that some or all of these cases received the service of interest. However, because the amount of data missing was negligible, these assumptions were unlikely to make any notable difference in our estimates of service coverage. Further, since the objective of this study was to estimate the effect of the voucher intervention on service coverage, our main interest was the change over time in service use, rather than the point estimate of service use.

Despite these limitations, our study has important implications for health policy and financing in Kenya. The particularly important role that private sector services played in helping poor women to access the recommended care package in voucher counties before and after the introduction of the free maternity services policy suggests that the private sector can help to expand timely access to the full continuum of care, even when services are provided for free in the public sector. However, additional research should be conducted to clarify the underlying mechanisms influencing when and where women seek maternal health services under the free maternity policy, as decreased quality of care in the public sector may

compel women who should benefit from free maternity services to seek care from facilities where they will incur out-of-pocket expenditures.

A large proportion of the health infrastructure in Kenya is operated by non-government for-profit, non-profit, and faith-based actors, and it is estimated that more than 40% of all health services are provided by the private sector [205,250]. Although these providers are often thought to serve the interests of higher income populations, our study demonstrates clear interest in using private sector services in lower income, remote areas. These findings therefore support the Kenyan government's recent decision to expand the free maternity services policy through the Linda Mama program. Through this program, the Kenya National Health Insurance Fund has started to enroll small, predominantly faith-based private facilities to provide free maternity services to all women who do not have health insurance coverage [222]. As this program is implemented, it will be critical for the Government of Kenya to develop strong systems for regulating the private sector and regularly monitoring the quality of care offered by participating providers.

Free maternity care in Kenya, like the voucher program, is an output-based approach in which facilities are reimbursed per individual claim submitted for services provided. In many countries in sub-Saharan Africa, approaches that involve direct payments to facilities have been stymied by challenges that facilities have experienced in receiving timely, predictable, and adequate reimbursements [37]. Facilities in Kenya have similarly reported delayed or insufficient reimbursements for services provided, as well as being overwhelmed with patients as a result of free maternity services [228,301,335,348,349]. Thus, if improvements in service use due to the provision and expansion of free maternity services are to be sustained at a high quality in the long-term, it is imperative that these operational challenges are resolved.

This study also highlights the importance of understanding access to care across the continuum of maternal health services rather than tracking progress towards access to each service individually. Although use of 4+ ANC, facility births, and PNC has increased over time in Kenya, fewer than 1 in 4 births in both voucher and comparison counties received all three services at the recommended timings. Ensuring that women receive timely care across the entire continuum of maternal health services is critical to achieving further reductions in maternal mortality.

In order to comprehensively understand the impact of the voucher program, free maternity services, and other health financing approaches in Kenya, future research needs to look into

the longer-term effects of these initiatives on quality and continuum of care, equity in access, and financial burden to women and their households. This information will help to identify key strategies for ensuring sustained improvements in maternal and child health outcomes in Kenya and other similar contexts.

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Student	Mardieh Dennis
Principal Supervisor	Oona Campbell
Thesis Title	Pragmatic pluralism for health: Understanding the role of public financing and public-private engagement on use, quality, and equity in access to maternal health services in Kenya

If the Research Paper has previously been published please complete Section B, if not please move to Section C

SECTION B – Paper already published

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Student Signature: _____ **Date:** 1 September, 2019

Supervisor Signature: _____ **Date:** 1 September, 2019

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7 INITIATION AND CONTINUITY OF MATERNAL HEALTH CARE: EXAMINING THE ROLE OF VOUCHERS AND USER-FEE REMOVAL ON MATERNAL HEALTH SERVICE USE IN KENYA

This chapter presents the third of three quantitative research papers (paper 5) seeking to answer the third research question of this thesis, examining the impacts of user fee removals and subsidized vouchers on use, quality, continuity, and equity of maternal care in Kenya. This paper explores the effects of introducing the maternal health voucher program and free maternity services policy on three primary outcomes: ANC initiation, use of continuous care, and completing the maternal health pathway as recommended. Additionally, this paper secondarily explores the relationships between various socio-demographic factors, pregnancy care, and health insurance enrollment on the outcomes of interest.

7.1 ABSTRACT

This study explores the relationship between two health financing initiatives on women's progression through the maternal health continuum in Kenya: a subsidized reproductive health voucher program (2006-2016) and the introduction of free maternity services in all government facilities (2013). Using cross-sectional survey data, we ran three multivariable logistic regression models examining the effects of the voucher program, free maternity policy, health insurance and other determinants on (1) early antenatal care (ANC) initiation (first visit within the first trimester of pregnancy), (2) receiving continuous care (1+ ANC, facility birth, 1+ postnatal care (PNC) check), and (3) completing the maternal health pathway as recommended (4+ ANC, facility birth, 1+ PNC, with first check occurring within 48 hours of delivery). Full implementation of the voucher program was positively associated with receiving continuous care among users of 1+ ANC (interaction term aOR: 1.33, p=0.014). Early ANC initiation (aOR: 1.32, p=0.001) and use of private sector ANC (aOR: 1.93, p<0.001) were also positively associated with use of continuous care among ANC users. Among continuous care users, early ANC was associated with increased odds of completing the maternal health pathway as recommended (aOR: 3.80, p<0.001). Higher parity was negatively associated with all three outcomes, while having health insurance was positively associated with each outcome. The impact of other sociodemographic factors such as maternal age, education, wealth quintile, urban residence, and employment varied by outcome; however, the findings generally suggest that marginalized women faced greater

barriers to early ANC initiation and continuity of care. Health financing and women's timing and source of ANC are strongly related to their subsequent progression through the maternal health pathway. To increase continuity of care and improve maternal health outcomes, policymakers must therefore focus on equitably reducing financial and other barriers to care seeking and improving quality of care throughout the continuum.

7.2 INTRODUCTION

From 1990 to 2015, the global maternal mortality ratio (MMR) decreased by 44% from an estimated 385 to 216 maternal deaths per 100,000 live births [14]. Over the same period, Kenya's MMR decreased by only 26% from 687 to 510; this is below both the average global decline and the country's Millennium Development Goal 5a target of a 75% reduction [10]. Kenya's comparatively slow reduction in maternal mortality is likely due to insufficient coverage of maternal health services; for instance, in 2014, an estimated 58% of women in Kenya attended at least four antenatal care (ANC) visits, 62% gave birth with the assistance of a skilled birth attendant, and 57% received a postnatal care (PNC) check [179]. As ability to pay remains an important determinant of women's access to healthcare, many countries have sought to improve coverage of maternal services by reducing financial barriers to service seeking [22,64]. Strategies implemented at the country level include national health insurance and user fee removals/exemptions, and at the sub-national level, community-based health insurance, health vouchers, and conditional cash transfers [70].

Global development organizations and policymakers argue that continuity of care throughout the antenatal, intrapartum, and postpartum periods is essential for improved maternal health outcomes [68,350,351]. Although it is recommended for women to receive all of these services for each pregnancy, efforts to monitor progress towards global development goals have tended to track coverage indicators in a cross-sectional nature by service type rather than tracking indicators of continuity of care longitudinally for each birth [351,352]. Similarly, the effects of maternal health financing strategies globally and in Kenya have been assessed by examining use of care at individual points along the maternal health continuum. While many of these studies suggest that vouchers, health insurance, and reducing or eliminating user fees increase coverage of antenatal care, facility delivery, and postnatal care individually, there has been no focus on how such financing mechanisms affect continuity of maternal care as measured from the perspective of women's pathways from pregnancy to the postpartum period [22,82,83,92,93,96,353].

With funding from the German Development Bank (KfW), the Kenyan Ministry of Health and partners implemented a reproductive health voucher program from 2006 to 2016, aimed at reducing inequitable access to maternal care [202]. Under this program, poor women could purchase subsidized vouchers for 200 Kenyan Shillings (≈$2.20) that covered the cost of four ANC visits, facility delivery (vaginal or caesarean), and postnatal care. In order to be accredited for participation in the program, health facilities were required to meet minimum quality standards based on national guidelines for the provision of maternal care. Women could redeem vouchers at any participating public or private sector facility, and the contracted facilities submitted claims to be reimbursed at standard rates for each service provided. In June 2013, seven years after the start of the voucher program, the Kenyan government announced the inception of the free maternity services policy, which called for all public health facilities to provide maternal health services at no cost to users. While some facilities interpreted the policy to include all services across the maternal health continuum, others offered delivery care for free and continued to charge for ANC and/or PNC [301]. Similar to the voucher program, public facilities were to be reimbursed for each client served under the free maternity services policy; however, many facilities reported challenges and delays in receiving these reimbursements [223,228].

Given that the voucher program and free maternity services policy in Kenya targeted key services in the maternal health continuum, they provide a unique setting in which to assess how these two different mechanisms of lowering financial barriers affected women's continuity of care. In a previous paper, we demonstrated that both the voucher program and free maternity services policy in Kenya increased women's use of facilities for childbirth in our study population; however, neither intervention appeared to impact use of 4+ ANC or PNC individually [354]. Additionally, we found that while coverage of each individual service was above 60% after the introduction of free maternity services, the use of the recommended maternal care package (defined as 4+ ANC visits initiated within the first trimester, facility delivery, and PNC within 48 hours of delivery) remained below 25% in both voucher and comparison counties. This paper aims to build upon these findings by describing women's progression through the maternal health continuum and examining the effects of the voucher program, free maternity services policy, health insurance, and other determinants of continuity of care. Specifically, we seek to answer the following questions: (1) what are the determinants of how early a woman initiates ANC during her pregnancy; (2) among women with at least one ANC visit, what are factors influencing subsequent use of both facility delivery and PNC; and (3) among women who receive ANC, facility delivery, and PNC, what

determines whether they receive all three services at the recommended ANC intensity and PNC timing?

7.3 METHODS

7.3.1 Sampling & data collection

As described previously, this study uses data from three cross-sectional household surveys completed in 2011, 2012, and 2016 [101,354]. Seven counties were surveyed: four participating in the voucher program (intervention counties: Kiambu, Kilifi, Kisumu, and Kitui) and three where vouchers were not provided (comparison counties: Makueni, Nyandarua, and Uasin Gishu). Comparison counties were matched to the intervention counties based on geographic location, population characteristics, and availability of similar health facilities. One intervention county (Kilifi) was not surveyed in 2016 and was therefore excluded from this analysis.

The target sample size within each county was 400 women and these participants were identified using a multi-stage sampling process. County sub-locations within 5km of a voucher program accredited facility or similar facility in a comparison county formed the sampling frame for this study. In stage one, 14 sub-locations within each county were randomly selected among those within a 5-km radius of an eligible facility. Three villages were randomly selected from each sub-location in the second sampling stage. Within each village, the poorest households were identified with assistance from local administrators and selected for inclusion in the study, based on their responses to a poverty assessment tool. This purposive sampling was done to ensure that the study sample was predominantly poor, as the voucher program intended to target poor women. Women aged 15-49 years who were pregnant or reported at least one birth in the past 12 months were invited to participate in the study. In households with more than one woman meeting the study inclusion criteria, the youngest eligible woman was selected for participation.

The interviews covered topics related to women's household characteristics, reproductive history, and use of family planning and reproductive health services. Participants' responses were recorded by trained interviewers into a tablet-based questionnaire.

7.3.2 Study population

Responses from all women aged 15-49 years who reported at least one live birth in the five years preceding the survey were included in this analysis. We conducted analyses among all

births reported in the past five years. Table 6.2 in Chapter 6 contains a table with background characteristics of the women included in the sample. Additionally, to better contextualize the wealth distribution of the women included in our sample relative to that of the total population, we described the distribution of selected household assets by wealth quintile in the 2014 Kenya Demographic Health Survey and in the voucher study surveys (Appendix 17).

7.3.3 Indicators and definitions

7.3.3.1 *Study periods*

Births were categorized into three periods according to when they occurred. Period 1 refers to the pre-intervention and rollout phase of the voucher program (May 2005 – December 2009). Period 2 refers to the phase during which the voucher program was fully implemented in all intervention counties and before the free maternity services program was introduced (January 2010 – May 2013). Finally, Period 3 refers to the phase after the free maternity services program was introduced in both intervention and comparison counties during which the voucher program was also fully implemented in all intervention counties (June 2013 – August 2016).

7.3.3.2 *Maternal health service coverage & sector of care*

We defined the maternal health service use indicators as described in Table 7.1. For antenatal care, we defined intensity of care in terms of the number of ANC visits received and the timing of ANC initiation (early vs. delayed). As both the voucher program and free maternity services policy aimed to encourage women to give birth in health facilities, we defined delivery care in terms of whether a woman delivered in a health facility. For postnatal care, we considered women who reported receiving a check on their health after delivery to have received PNC. Among those who received PNC, we examined the timing of the first check after birth (timely vs. delayed).

We also report on indicators related to use of all three health services across the maternal health continuum (Table 7.1). We examined women's progression through the continuum of care among 1+ ANC users grouped into three categories: (1) discontinuous, (2) continuous, sub-optimal care, and (3) continuous care, completed pathway; these categories are mutually exclusive (Table 7.2). As our interest was in women's continuity of care after they contact with the health system through their first ANC visit, these definitions do not

take into account ANC timing. Instead, we examined the timing of ANC initiation as a determinant of continuity of care.

Table 7.1 Definitions of use of care across the maternal health continuum

Indicator	Definition
Antenatal care (ANC)	
1+ ANC	Received one or more ANC visits; all other births were classified as receiving no ANC
4+ ANC	Received four or more ANC visits
Early ANC	Initiated ANC within the first three months (first trimester) of pregnancy
Delayed ANC	Initiated ANC in the fourth month of pregnancy or later
Delivery care	
Facility delivery	Birth that occurred in a health facility; all other births (e.g., those that occurred at home or in another non-facility location) were classified as not being a facility delivery
Postnatal care (PNC)	
Received PNC	Health worker checked on the mother's health after giving birth; births for which a health worker checked on the baby's health but not on the woman's health were classified as having not received PNC
Timely PNC	PNC users who received their first PNC check within 48 hours of delivery
Delayed PNC	PNC users who received their first PNC check more than 48 hours after delivery
Continuum of maternal care (among users of 1+ ANC)	
Discontinuous care	Received at least one service (ANC, facility delivery, or PNC) during the maternal period, but did not receive all three services
Continuous care, sub-optimal	Made contact with health services during each point of the maternal health continuum (received 1+ ANC visit, facility delivery, and PNC), but did not receive care at the recommended ANC intensity (4+ ANC) and /or PNC timing (within 48 hours of birth), irrespective of ANC initiation timing
Continuous care, completed pathway	Received 4+ ANC, facility delivery, and PNC within 48 hours of delivery were classified as having received continuous care and completed the continuum of maternal care pathway, irrespective ANC initiation timing
Sector of care (among continuous care users – both sub-optimal and completed pathway)	
Public sector	Received ANC, facility delivery, and PNC entirely in the public sector; a small proportion of continuous care users (<1%) who received either ANC and/or PNC at home, and facility delivery in the public sector, were also classified as having received public sector care
Private sector	Received ANC, facility delivery, and PNC entirely in the private sector (including for profit, not-for-profit, and faith-based)
Mixed, public and private sector	Received ANC, facility delivery, and PNC from at least one public sector source and at least one private sector source

Table 7.2 Continuity of care classifications

	1+ ANC	4+ ANC	Facility delivery	PNC	PNC within 48 hours
Discontinuous care					
1+ ANC only	yes	no	no	no	no
4+ ANC only	yes	yes	no	no	no
1+ ANC & facility delivery	yes	no	yes	no	no
4+ ANC & facility delivery	yes	yes	yes	no	no
1+ ANC & delayed PNC	yes	no	no	yes	no
4+ ANC & delayed PNC	yes	yes	no	yes	no
1+ ANC & timely PNC	yes	no	no	yes	yes
4+ ANC & timely PNC	yes	yes	no	yes	yes
Continuous, sub-optimal care					
1+ ANC & facility delivery & delayed PNC	yes	no	yes	yes	no
4+ ANC & facility delivery & delayed PNC	yes	yes	yes	yes	no
1+ ANC & facility delivery & timely PNC	yes	no	yes	yes	yes
Continuous, completed pathway					
4+ ANC & facility delivery & timely PNC	yes	yes	yes	yes	yes

7.3.4 Data analysis

All analyses were conducted at the population level; as such, the intervention groups in this study compared counties exposed to the voucher program (voucher counties) to those not exposed to the program (comparison counties) rather than voucher users to non-users.

We ran a series of three multivariable logistic regression models to explore the determinants of (1) early ANC initiation among all births, (2) receipt of continuous care among 1+ ANC users, and (3) completing the maternal health pathway among continuous care users (Figure 7.1). We examined drivers of early ANC initiation based on the assumption that ANC timing is a key determinant of completing the maternal health pathway as recommended. As use of 1+ ANC was nearly universal—above 95% across intervention groups and period—we did not explore determinants of using antenatal care. For each model, we examined changes over time and the relationship between women's background characteristics (maternal age at birth, education, wealth quintile, residence, marital status, employment, parity, and insurance coverage) and our outcomes of interest. We also explored the effects of ANC timing and source of care as determinants of continuity of care in models examining use of continuous care and completing the maternal health pathway as recommended. We included an interaction term between intervention group and period to assess the impact of the voucher program on our outcomes of interest. All regression models were adjusted for year of birth

and clustering at the county sub-location, village, and woman level, as some women reported multiple live births within the survey recall period.

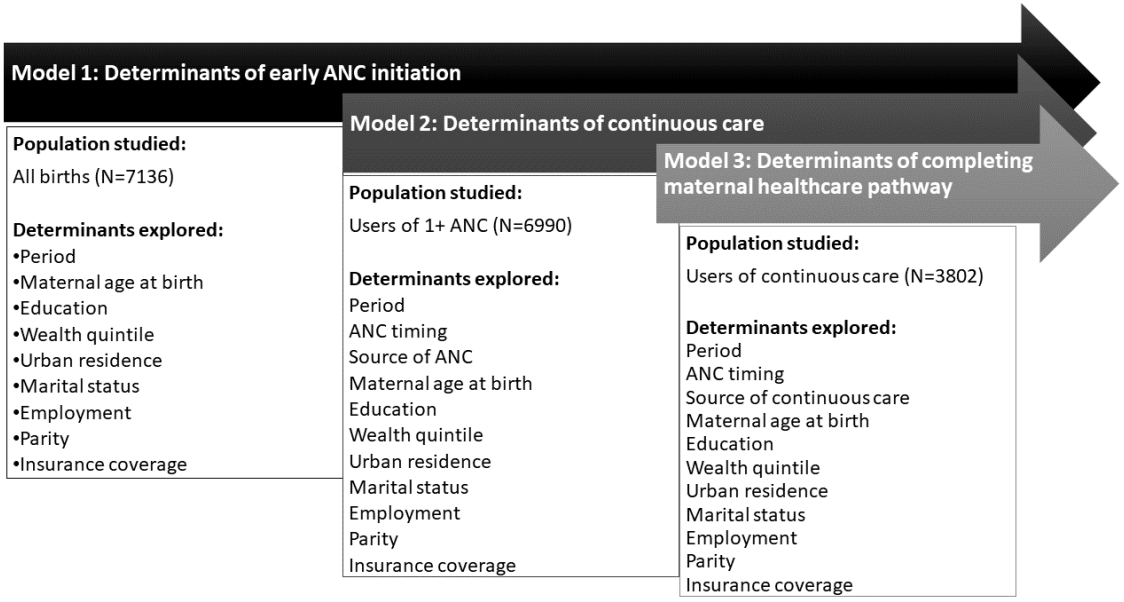

Figure 7.1 Diagram of three-step logistic regression model

Due to an error in the tablet-based questionnaire programming for the 2016 survey, 23% of women with one or more births had a missing response for the question on their number of births in the past five years. Women missing information on this variable were not asked questions related to maternal health service use; we are therefore missing information on the study outcomes for these women. Due to the nature of the missing data mechanism, we have assumed these data to be missing at random and conducted a complete case analysis. Our analysis of the missing data in the 2016 survey is described in more detail elsewhere [354]. Similarly, in the 2011 and 2012 surveys, a small sub-set of women have complete information for ANC but are missing information on delivery care and PNC due to an input error which caused the survey program to skip the delivery care and PNC modules. We have assumed these data to be missing at random given year of birth and conducted a complete case analysis, adjusting for year of birth in all inferential analyses. As the input errors resulted in missing data for less than 5% of all births reported in the 2011 and 2012 surveys, we believe that the impact of this loss of data on our analyses is likely to be negligible. All other variables in this analysis had less than 1% of responses missing.

All analyses were conducted using Stata IC version 15.1 (StataCorp LLC) [334].

7.4 RESULTS

7.4.1 Use and timing of antenatal care

In both voucher and comparison counties, more than 95% of births received 1+ ANC visits across all three periods; however, most ANC users had a delayed first visit, occurring after the first trimester of pregnancy (Table 7.3). While approximately 20% of births in Periods 1 & 2 used ANC and initiated ANC early in both study groups, by Period 3, nearly one third of women in voucher counties started ANC early compared to one fourth of women in comparison counties.

Table 7.3 Use of care across the maternal health continuum among all births

	Comparison counties			Voucher counties		
	Period 1	Period 2	Period 3	Period 1	Period 2	Period 3
Use & timing of ANC						
No ANC	1.4%	2.5%	2.3%	1.4%	3.3%	1.5%
1+ ANC: Delayed ANC	80.0%	78.4%	74.4%	79.5%	75.1%	64.8%
1+ ANC: Early ANC	18.6%	19.1%	23.3%	19.1%	21.6%	32.7%
Total no. births	**1489**	**1269**	**641**	**1672**	**1344**	**721**
Use of care across the continuum among all users of 1+ ANC						
Discontinuous care	52.2%	47.8%	30.3%	52.0%	38.9%	23.0%
Continuous care (sub-optimal)	17.2%	18.7%	22.9%	16.3%	22.4%	20.9%
Continuous care (completed pathway)	30.6%	33.5%	46.8%	31.7%	38.7%	56.1%
Total no. ANC users	**1382**	**1200**	**621**	**1558**	**1258**	**703**

Effect of health financing strategies

There did not appear to be general population-wide change over time in early ANC initiation after the voucher program was fully implemented in Period 2 (aOR=1.23; 95% CI: 0.51 to 2.97) or after free maternity services were introduced in Period 3 (aOR=1.08; 95% CI: 0.61 to 1.91) (Table 7.4). Neither the introduction of the voucher program nor introduction of the free maternity services policy appeared to have an effect on ANC timing.

Effect of other determinants

With regards to determinants of ANC timing, we found that higher parity was associated with reduced odds of early ANC initiation (Table 7.4). The odds of starting ANC within the first trimester were 44% lower (aOR=0.56; 95% confidence interval (CI): 0.43 to 0.73) among births to mothers with four or more children and 25% lower (aOR=0.75; 95% CI: 0.62 to 0.89) among births to mothers with two to three children compared to women pregnant with their first births. Urban residence (aOR=0.78; 95% CI: 0.62 to 0.98) also

appears to be associated with later ANC initiation. Women with health insurance coverage had 1.29 times greater adjusted odds of initiating ANC within the first trimester of their pregnancy (95% CI: 1.06 to 1.58). Belonging to the least poor wealth quintile (aOR=1.31; 95% CI: 1.03 to 1.67) and being currently married (aOR=1.22; 95% CI: 1.02 to 1.45) were also associated with early ANC initiation.

7.4.2 Use of maternal care across the continuum

The proportion of births with discontinuous care across the maternal health continuum decreased from approximately 52% of 1+ ANC users in both study groups in Period 1 to 23.0% and 30.3% of 1+ ANC users in Period 3 in voucher and comparison counties, respectively (Table 7.3). Over the same periods, the proportion of births that received continuous care and completed the maternal health continuum pathway as recommended increased from 31.7% to 56.1% in voucher counties and 30.6% to 46.8% in comparison counties. In both study groups, the use of continuous, sub-optimal care remained fairly constant over time, ranging from 16.3% in voucher counties in Period 1 to 22.9% in comparison counties in Period 3.

To understand the importance of early ANC initiation, Figure 7.2 illustrates the retention, or cumulative survival, of 1+ ANC users through the maternal health continuum over time, by intervention group and timing of first ANC visit. In both voucher and comparison counties, the percentage of early ANC users who completed the maternal health continuum as recommended (receiving 4+ ANC visits, facility delivery, and PNC within 48 hours) increased from nearly 50% in Period 1 to approximately 70% in Period 3, after free maternity services were introduced (Figure 7.2a & Figure 7.2b). Delayed ANC initiators appeared much less likely than early initiators to complete the maternal health pathway as recommended, with less than 30% of all births completing the pathway in Period 1, to 49% of births in voucher counties and 40% of births in comparison counties completing the pathway in Period 3 (Figure 7.2c & Figure 7.2d). Among delayed ANC users, the steepest drop-off in the continuum of care occurred between 1+ and 4+ ANC visits, while early ANC initiators experienced the steepest drop-off between 4+ ANC visits and facility delivery.

Table 7.4 Model 1: Determinants of early ANC among all births (n=7136)

	Unadjusted OR* [95% CI]	**Wald test p-value**	**Adjusted aOR** [95% CI]**	**Wald test p-value**
Intervention group				
Comparison county	reference		reference	
Voucher county	1.21 [1.02,1.42]	0.025	1.21 [0.95,1.54]	0.126
Period				
Period 2 (base=Period 1)	1.13 [0.99,1.29]	0.079	1.23 [0.51,2.97]	0.641
Period 3 (base=Period 2)	1.52 [1.27,1.82]	<0.001	1.08 [0.61,1.91]	0.775
Interaction terms				
Period 2 x Voucher county	1.14 [0.87,1.50]	0.345	1.12 [0.85,1.49]	0.408
Period 3 x Voucher county	1.35 [0.95,1.92]	0.097	1.35 [0.95,1.93]	0.097
Maternal age at birth				
<25 years	reference		reference	
25-34 years	0.83 [0.73,0.95]	0.008	0.96 [0.82,1.14]	0.656
≥35 years	0.55 [0.44,0.67]	<0.001	0.75 [0.56,1.00]	0.051
Highest level of education				
No education & incomplete primary	reference		reference	
Completed primary & incomplete secondary	0.99 [0.86,1.15]	0.939	0.86 [0.74,1.00]	0.057
Completed secondary/higher	1.40 [1.15,1.71]	0.001	0.99 [0.80,1.24]	0.958
Wealth quintile				
Poorest	reference		reference	
Poorer	0.97 [0.82,1.15]	0.761	0.95 [0.79,1.14]	0.573
Middle	1.02 [0.82,1.27]	0.848	0.96 [0.76,1.21]	0.724
Less poor	1.26 [1.01,1.56]	0.039	1.18 [0.94,1.48]	0.150
Least poor	1.46 [1.15,1.85]	0.002	1.31 [1.03,1.67]	0.026
Area of residence				
Rural	reference		reference	
Urban	0.90 [0.73,1.12]	0.337	0.78 [0.62,0.98]	0.030
Marital status				
Unmarried	reference		reference	
Currently married	1.09 [0.92,1.28]	0.327	1.22 [1.02,1.45]	0.027
Employment status				
Unemployed	reference		reference	
Informally employed	0.90 [0.78,1.04]	0.150	1.04 [0.90,1.20]	0.624
Formally employed	0.96 [0.80,1.16]	0.685	1.11 [0.93,1.32]	0.259
Parity				
1 child	reference		reference	
2-3 children	0.72 [0.62,0.84]	<0.001	0.75 [0.62,0.89]	0.002
≥4 children	0.48 [0.40,0.59]	<0.001	0.56 [0.43,0.73]	<0.001
Insurance coverage				
Uninsured	reference		reference	
Insured	1.47 [1.22,1.79]	<0.001	1.29 [1.06,1.58]	0.012

*Reported odds ratios (OR) compare the odds of receiving early ANC (first ANC visit in the first trimester of pregnancy) vs. receiving no or delayed ANC

**Adjusted odds ratio (aOR) is adjusted for child's year of birth and all other variables reported in the table

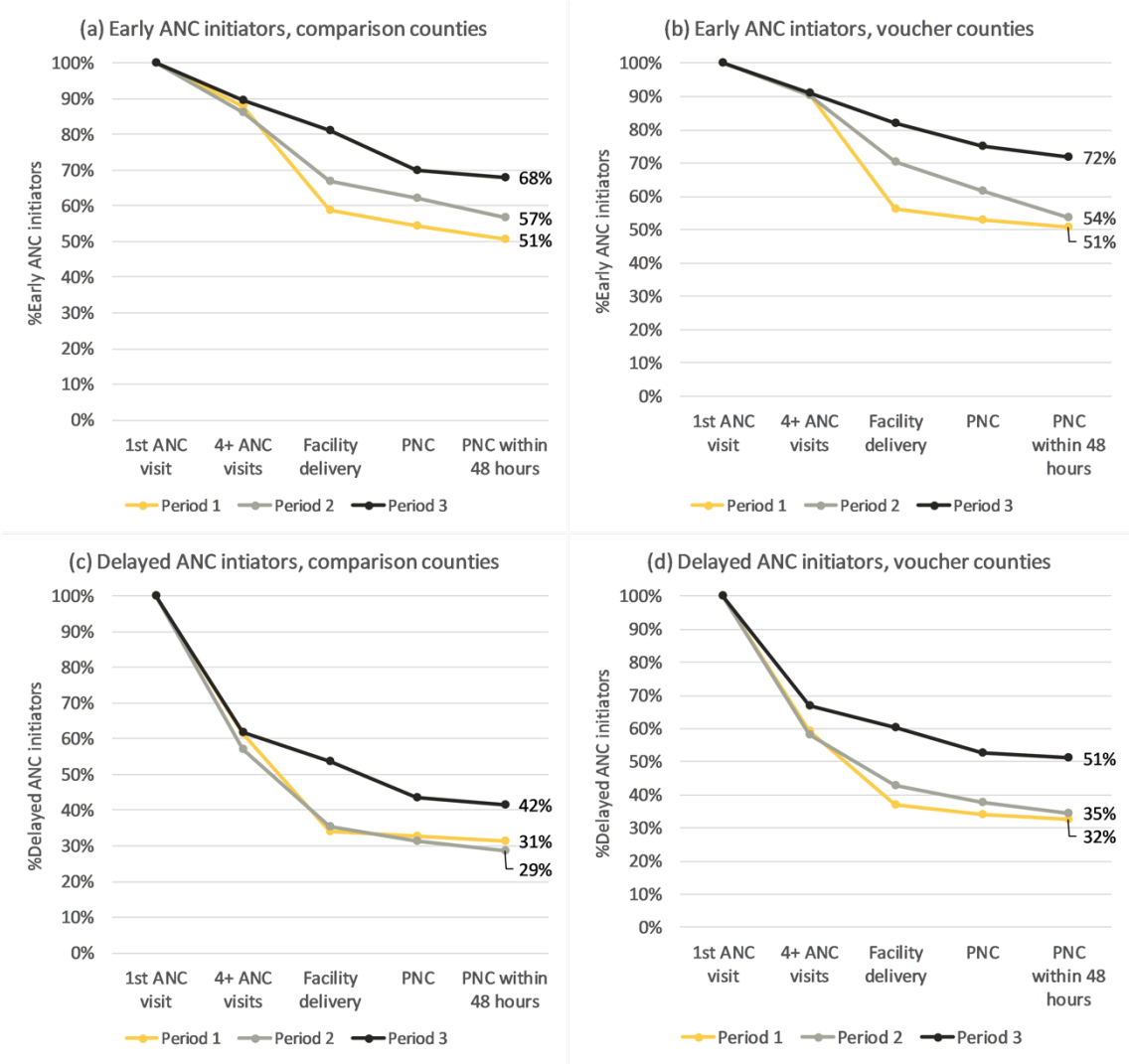

Figure 7.2 Cumulative survival in continuum of care pathway among ANC users over time

7.4.2.1 *Continuous care (sub-optimal + completed pathway) vs. discontinuous care*

Effect of health financing strategies

There was a four-fold increase in the odds of continuous care use among ANC users in both voucher and comparison counties between the pre-intervention/rollout phase of the voucher program in Period 1 to the full implementation phase in Period 2 (aOR=4.00; 95% CI: 1.89 to 8.44) (Table 7.5). Overall, the adjusted odds of continuous care use were 1.50 times higher in voucher counties than in comparison counties (95% CI: 1.08 to 2.11). In addition to the generally higher use of continuous care in voucher counties, there was a positive interaction between intervention group and Period 2. This suggests that the implementation of the voucher program resulted in a greater increase over time in the odds of continuous care use in voucher counties than that observed in comparison counties (aOR=1.33; 95% CI: 1.06 to 1.67).

Effect of other determinants

Both timing and source of ANC were associated with improved continuity of care among ANC users (Table 7.5). We found that women with early ANC initiation had 1.32 times higher adjusted odds of receiving continuous care, or contact with the health system at each point in the continuum from ANC to facility delivery to PNC, compared to women who started ANC after their first trimester (95% CI: 1.13 to 1.55). Additionally, women who obtained ANC in the private sector had nearly two times greater odds of receiving continuous care compared to those who received care in the public sector (aOR=1.93; 95% CI: 1.45 to 2.55).

Higher educational attainment appears to have a strong association with continuity of care; the adjusted odds of continuous care use were 1.54 times higher (95% CI: 1.33 to 1.78) among births to women who completed primary education and 2.67 times higher (95% CI: 2.17 to 3.28) among births to women with secondary or higher education compared to those educated below the primary level. Other socioeconomic factors such as higher maternal age, belonging to the less and least poor wealth quintiles, and being informally or formally employed were also associated with higher use of continuous care among ANC users. Additionally, health insurance coverage was associated with nearly two times greater odds of receiving continuous care (aOR=1.96; 95% CI: 1.58 to 2.44). Higher parity was the only factor negatively associated with continuity of care; ANC users with two to three children and four or more children had 33% (aOR=0.67; 95% CI: 0.56 to 0.82) and 69% (aOR=0.31; 95% CI: 0.24 to 0.31) lower odds of receiving continuous care compared to those with only one birth.

Table 7.5 Model 2: Determinants of receiving continuous care among ANC users (n=6990)

	Unadjusted OR* [95% CI]	Wald test p-value	Adjusted aOR** [95% CI]	Wald test p-value
Intervention group				
Comparison county	reference		reference	
Voucher county	1.22 [0.90,1.64]	0.198	1.50 [1.08,2.11]	0.018
Period				
Period 2 (base=Period 1)	1.43 [1.27,1.60]	<0.001	4.00 [1.89,8.44]	<0.001
Period 3 (base=Period 2)	2.14 [1.84,2.49]	<0.001	1.21 [0.71,2.07]	0.467
Interaction terms				
Period 2 x Voucher county	1.45 [1.17,1.79]	0.001	1.33 [1.06,1.67]	0.014
Period 3 x Voucher county	1.01 [0.75,1.36]	0.956	1.02 [0.75,1.41]	0.855
ANC timing				
Delayed ANC	reference		reference	
Early ANC	1.63 [1.41,1.90]	<0.001	1.32 [1.13,1.55]	0.001
Source of ANC				
Public sector or home/other	reference		reference	
Private sector	2.04 [1.48,2.82]	<0.001	1.93 [1.45,2.55]	<0.001
Maternal age at birth				
<25 years	reference		reference	
25-34 years	0.85 [0.74,0.97]	0.021	1.25 [1.09,1.43]	0.002
≥35 years	0.58 [0.49,0.68]	<0.001	1.35 [1.08,1.70]	0.011
Highest level of education				
No education & incomplete primary	reference		reference	
Completed primary & incomplete secondary	1.84 [1.57,2.15]	<0.001	1.54 [1.33,1.78]	<0.001
Completed secondary/higher	4.42 [3.56,5.49]	<0.001	2.67 [2.17,3.28]	<0.001
Wealth quintile				
Poorest	reference		reference	
Poorer	1.18 [0.95,1.47]	0.141	1.13 [0.90,1.41]	0.277
Middle	1.34 [1.06,1.71]	0.016	1.12 [0.88,1.42]	0.361
Less poor	1.96 [1.50,2.56]	<0.001	1.46 [1.10,1.92]	0.008
Least poor	2.26 [1.73,2.95]	<0.001	1.38 [1.07,1.79]	0.014
Area of residence				
Rural	reference		reference	
Urban	1.27 [0.90,1.80]	0.171	1.11 [0.83,1.56]	0.483
Marital status				
Unmarried	reference		reference	
Currently married	0.88 [0.77,1.01]	0.067	1.06 [0.91,1.25]	0.452
Employment status				
Unemployed	reference		reference	
Informally employed	1.03 [0.88,1.21]	0.735	1.32 [1.11,1.56]	0.002
Formally employed	1.05 [0.87,1.27]	0.629	1.37 [1.11,1.71]	0.005
Parity				
1 child	reference		reference	
2-3 children	0.64 [0.54,0.76]	<0.001	0.67 [0.56,0.82]	<0.001
≥4 children	0.28 [0.23,0.34]	<0.001	0.31 [0.24,0.40]	<0.001
Insurance coverage				
Uninsured	reference		reference	
Insured	2.96 [2.39,3.67]	<0.001	1.96 [1.58,2.44]	<0.001

*Reported odds ratios (OR) compare the odds of receiving continuous care (sub-optimal care & completed pathway) vs. discontinuous care

**Adjusted odds ratio (aOR) is adjusted for child's year of birth and all other variables reported in the table

7.4.2.2 *Continuous, completed pathway vs. continuous, sub-optimal care*

Effect of health financing strategies

There does not appear to be general change over time completion of the maternal health pathway as recommended among users of continuous care at the start of Period 2 (aOR=0.0.85; 95% CI: 0.25 to 0.85) or Period 3 (aOR=1.02; 95% CI: 0.56 to 1.87) (Table 7.6). Additionally, the voucher program did not appear to have any additional impact on completion of the maternal health care pathway as recommended after full implementation of the program in Period 2 (interaction term aOR: 0.82; 95% CI: 0.59 to 1.15) or introduction of the free maternity services policy in Period 3 (interaction term aOR: 1.02; 95% CI: 0.56 to 1.87).

Effect of other determinants

Among users of continuous care, the adjusted odds of completing the maternal health pathway as recommended (receiving 4+ ANC, facility delivery, and PNC within 48 hours of delivery) were 3.80 times greater (95% CI: 3.08 to 4.69) among early ANC initiators compared to late initiators (Table 7.6). Compared to continuous care users who received services exclusively in the public sector, users of all private services (aOR=1.02; 95% CI: 0.84 to 1.24) and a mix of public and private services (aOR=1.01; 95% CI: 0.80 to 1.26) appeared to have similar odds of completing the maternal health care pathway as recommended. Relative to continuous care users younger than 25 years, women aged 25-34 years and above 35 years had 1.37 (95% CI: 1.12 to 1.67) and 1.58 (95% CI: 1.18 to 2.11) times higher adjusted odds of completing the maternal health pathway as recommended, respectively. Other factors associated with higher completion of the maternal health continuum included completing secondary or higher education (aOR=1.42; 95% CI: 1.13 to 1.78), being currently married (aOR=1.30; 95% CI: 1.04 to 1.61), and having health insurance coverage (aOR=1.30; 95% CI: 1.03 to 1.64). Having higher parity was associated with lower odds of completing the pathway; births to women with two to three children had 24% lower odds (aOR=0.76; 95% CI: 0.60 to 0.95) of completing the pathway, and births to women with four or more children had 36% lower odds (aOR=0.64; 95% CI: 0.48 to 0.86) of completing the pathway as recommended.

Table 7.7 presents a summary of the results of the three regression models examining determinants of early ANC initiation, continuous care use, and completion of the maternal healthcare pathway as recommended.

Table 7.6 Model 3: Determinants of completing maternal health pathway among continuous care users (n=3802)

	Unadjusted OR* [95% CI]	Wald test p-value	Adjusted aOR** [95% CI]	Wald test p-value
Intervention group				
Comparison county	reference		reference	
Voucher county	1.09 [0.94,1.25]	0.247	1.02 [0.79,1.32]	0.880
Period				
Period 2 (base=Period 1)	0.95 [0.80,1.11]	0.489	0.85 [0.25,2.85]	0.785
Period 3 (base=Period 2)	1.35 [1.08,1.68]	0.008	1.02 [0.56,1.87]	0.944
Interaction terms				
Period 2 x Voucher county	0.88 [0.64,1.20]	0.408	0.82 [0.59,1.15]	0.254
Period 3 x Voucher county	1.38 [0.89,2.13]	0.143	1.19 [0.77,1.87]	0.419
ANC timing				
Delayed ANC	reference		reference	
Early ANC	3.89 [3.17,4.76]	<0.001	3.80 [3.08,4.69]	<0.001
Source of continuous care				
All services public sector	reference		reference	
All services private sector	1.09 [0.91, 1.30]	0.336	1.02 [0.84,1.24]	0.850
Mixed public & private sector	1.09 [0.88,1.34]	0.427	1.01 [0.80,1.26]	0.947
Maternal age at birth				
<25 years	reference		reference	
25-34 years	1.16 [0.98,1.37]	0.092	1.37 [1.12,1.67]	0.002
≥35 years	1.07 [0.86,1.35]	0.531	1.58 [1.18,2.11]	0.003
Highest level of education				
No education & incomplete primary	reference		reference	
Completed primary & incomplete secondary	1.05 [0.87,1.27]	0.580	1.05 [0.85,1.28]	0.674
Completed secondary/higher	1.65 [1.33, 2.03]	<0.001	1.42 [1.13,1.78]	0.003
Wealth quintile				
Poorest	reference		reference	
Poorer	0.87 [0.67,1.12]	0.267	0.87 [0.67,1.13]	0.288
Middle	1.02 [0.79,1.31]	0.893	1.00 [0.78,1.29]	0.985
Less poor	0.98 [0.78,1.23]	0.870	0.87 [0.70,1.08]	0.210
Least poor	1.18 [0.94,1.47]	0.154	0.96 [0.76,1.22]	0.757
Area of residence				
Rural	reference		reference	
Urban	1.00 [0.85,1.17]	0.982	1.00 [0.82,1.20]	0.967
Marital status				
Unmarried	reference		reference	
Currently married	1.24 [1.03,1.50]	0.026	1.30 [1.04,1.61]	0.021
Employment status				
Unemployed	reference		reference	
Informally employed	0.90 [0.78,1.05]	0.188	0.93 [0.60,1.11]	0.427
Formally employed	1.03 [0.84,1.26]	0.789	1.04 [0.83,1.30]	0.714
Parity				
1 child	reference		reference	
2-3 children	0.81 [0.68,0.97]	0.022	0.76 [0.60,0.95]	0.016
≥4 children	0.73 [0.59,0.89]	0.002	0.64 [0.48,0.86]	0.003
Insurance coverage				
Uninsured	reference		reference	
Insured	1.57 [1.29,1.91]	<0.001	1.30 [1.03,1.64]	0.028

Table 7.7 Summary of the effects of determinants on use of care across the maternal health continuum

	Model 1: Early ANC	Model 2: Continuous care	Model 3: Complete maternal healthcare pathway
Intervention group			
Voucher county (vs. comparison)	none	positive	none
Period			
Intro of voucher program (Period 2 vs. Period 1)	none	positive	none
Intro of free maternity services policy (Period 3 vs. 2)	none	none	none
Interaction terms			
Intro of voucher program x Voucher county	none	positive	none
Intro of free maternity services x Voucher county	none	none	none
Sociodemographic characteristics			
Higher maternal age at birth	none	positive	positive
Higher educational attainment	none	positive	positive
Higher wealth quintile	positive	positive	none
Urban residence	negative	none	none
Marriage	positive	none	positive
Formal or informal employment	none	positive	none
Higher parity	negative	negative	negative
Health insurance coverage			
Insured	positive	positive	positive
Pregnancy care			
Early ANC initiation	n/a	positive	positive
Use of private sector ANC	n/a	positive	n/a
Use of private/mixed continuous care	n/a	n/a	none

positive: increasing effect or trend, $p<0.05$

negative: decreasing effect or trend, $p<0.05$

none: no effect, $p>0.05$

n/a not applicable

7.5 Discussion

Previous research on health financing for maternal health services has focused on the effect of financing interventions or policy changes on the use of services at individual points along the continuum from a woman's pregnancy to the postpartum period, such as ANC, delivery care, or PNC. Our study is unique in that it examines the population-level effects of subsidized vouchers and user fee removal on continuity of maternal care from a birth-centered perspective. Our findings show that prior to the implementation of the maternal health voucher program and introduction of the free maternity services policy in Kenya,

nearly all reported births in our study counties received at least one ANC visit. Despite this high contact with the health system during pregnancy, we found that after their initial ANC visit, a substantial proportion of women did not subsequently access health services across the maternal health continuum as recommended, with 4+ ANC visits, facility delivery, and timely PNC. This research has important implications, particularly in light of results from a recent systematic review in LMICs suggesting that strengthening the linkages between ANC, delivery care, and PNC can lead to reductions in perinatal, neonatal, and maternal mortality, even when recommendations regarding frequency of ANC and timing of ANC and PNC are not met [69].

Overall, our findings suggest that before the free maternity services policy was introduced, full implementation of the voucher program improved use of continuous care among ANC users; however, it did not appear to impact early ANC initiation among all births or completion of the maternal health pathway as recommended among users of continuous care. In addition to this intervention effect, there was a general increase in use of continuous care among ANC users in both voucher and comparison counties that coincided with implementation of the voucher program. The findings further suggest that after the free maternity services policy was introduced, voucher counties may have experienced a significantly higher increase in early ANC initiation among all births than that observed in comparison counties. After controlling for all other variables in the model, there did not appear to be a general effect of the free maternity services policy on use of early ANC among all births or on either of the measured continuum of care outcomes. Additionally, across time and intervention groups, health insurance coverage was consistently independently associated with earlier ANC initiation among all births, greater use of continuous care among ANC users, and higher likelihood of completing the maternal health pathway as recommended among continuous care users.

To maximize the health impact of future maternal health financing efforts in Kenya, it is important to consider the underlying mechanisms by which the observed effects were achieved. A study of nationally representative health facility exit interview data with ANC clients in Kenya found that women who believed that they had enough money to pay for delivery care were four times as likely to intend to deliver under the supervision of a skilled birth attendant [355]. Another study on the continuum for maternal health care in Tanzania found that women who had to pay for ANC were less likely to deliver in a health facility [356]. As purchase of a maternal health voucher required women to pay an up-front subsidized fee for four ANC visits, delivery care, and PNC, we suspect that this may have

encouraged women to develop birth preparedness plans earlier in their pregnancies and reduced the risk of women having insufficient funds to seek facility-based care for childbirth. This, in turn, may have facilitated improved continuity of care and possibly earlier ANC initiation. Similarly, although health insurance schemes vary, women are often aware about which services are covered prior to seeking care. In contrast, uncertainty around which services were included under the free maternity services policy and reports of women being required to pay out-of-pocket for services, supplies, and laboratory tests may have contributed to delayed initiation of ANC and discontinuous maternal care among women without access to the voucher program or health insurance [228,301]. Another key difference between the financing mechanisms of the voucher program, free maternity services policy, and health insurance is that vouchers and insurance coverage both allowed women to seek care in public and private facilities, while the user fee removal policy only applied to public facilities. By making private sector services more accessible, the voucher program and health insurance coverage may have contributed to reducing women's barriers to timely maternal health service initiation and improving continuity of care. It is therefore important to understand the aspects of private sector maternal care that women value most. Neither the voucher program nor free maternity services were associated with improved completion of the maternal health pathway among users of continuous care, suggesting a need to better understand the barriers to receiving care as recommended among those who contact the health system for ANC, facility delivery, and PNC.

Our study corroborates research from other LMIC settings indicating that women's experiences during ANC are critical to their subsequent use of delivery and PNC services [302–309]. We found that starting ANC in the first trimester of pregnancy was associated with increased use of continuous care, or of contacting health services at each point along the continuum from ANC to PNC. Additionally, given that early ANC initiators were more likely to receive 4+ ANC visits, starting ANC within the first trimester was also associated with greater completion of the maternal health pathway as recommended, with 4+ ANC visits, facility delivery, and PNC within 48 hours of delivery. Despite these strong associations between the timing of ANC initiation and effective use of maternal health services, fewer than 33% of women in both voucher and comparison counties started ANC within the first trimester throughout the study recall period. To facilitate further improvements in coverage of care across the maternal health continuum, policymakers in Kenya must therefore consider how to alleviate barriers to earlier ANC initiation, particularly

focused on women who are older, poorer, unmarried, living in urban areas, and with higher parity.

This study also contributes to the body of literature attempting to move away from simple measures of coverage to indicators that take quality into consideration [357]. Rather than examining quality of care in the coverage cascade with the more standard approach of using service availability and process indicators [357,358], we examined quality in terms of women's continuity and timing of contact with health services from pregnancy to the postpartum period. Future research on the link between health financing interventions and women's continuum of maternal care research should also incorporate additional quality measures, such as facility readiness and adherence to service delivery protocols, into the definition of service continuity.

We also found that users of private sector ANC services in both voucher and comparison counties were nearly twice as likely to receive continuous care compared to those who received ANC in the public sector or at home. A recent analysis of data from 28 countries in sub-Saharan Africa found that women who received better content of ANC were more likely to have a skilled birth attendant [303]. Another study of 23 countries in sub-Saharan Africa found that ANC quality of care was higher in private not-for-profit facilities than in the public sector and lower in private commercial facilities [359]. Further, an analysis of exit interview data from a nationally representative health facility assessment in Kenya revealed that women who used private sector ANC reported higher client satisfaction scores compared to those who used public sector services [360]. Our findings therefore indicate a need to investigate how differences in the quality of care offered by different providers might help explain the greater use of facility delivery and PNC services among private sector ANC users in Kenya.

With regard to sociodemographic determinants of how women use care across the maternal health continuum, higher parity was the only factor negatively associated with all three outcomes (early ANC initiation, continuous care, and completing the maternal health pathway as recommended), meaning that it has a strong cumulative effect (Table 7). This finding is consistent with other studies on determinants of retention in the maternal care continuum, and suggests a need to consider how best to provide education on the importance of continuity of care and reduce barriers to seeking timely and continuous care in women's second pregnancies and beyond [302,303,305–307,309,356]. Although the effects and cumulative nature of socioeconomic indicators such as educational attainment,

wealth quintile, and employment status varied, our findings suggest that none of the health financing interventions studied were sufficient to completely eliminate socioeconomic disparities in timely initiation and continuity of maternal care.

This research has some limitations. The study sample was drawn from communities within 5km of a health facility. Within these communities, poor women were purposively selected for inclusion. Additionally, where more than one eligible woman lived within a household, the youngest woman was selected to participate. This approach may have introduced biases to the sample that over-represent the experiences of women who live within closer proximity to health services and are younger and poorer than the general population. This sampling strategy also necessitates careful interpretation of the findings on wealth-related inequities. Assuming the purposive sampling was successful in identifying the poorest households in each community, the results reflect differences in access to care among the poor rather than between the wealthy and the poor. While the use of local administrators to help identify the poorest households may have also biased sampling, our analysis comparing the household assets in the voucher study sample to the general population suggests that compared to the national distribution of wealth in Kenya, our sample is poorer and the gap between the poorest and least poor wealth quintiles in our study is smaller (Supplement 2). Though the missing data in the 2016 survey is unlikely to impact our inferential findings, as the data are missing at random and not depending on the value of the outcome variables, it contributed to a reduced sample size and likely introduced bias to the descriptive estimates of service coverage [346,354]. This may have impacted our ability to detect the effects of the free maternity services policy on our outcomes of interest.

Additionally, this study used an analytical approach in which each statistical model included a subset of the population from the previous model. As a result, models 2 and 3 have reduced sample sizes and cannot be generalized to the entire population of pregnant women that the voucher program and free maternity services policy targeted, but instead, to women who received 1+ ANC visits or continuous care. While this may be seen as a limitation, this design also has some advantages, particularly for targeting. For example, the interventions required to influence women who are inclined to use no or delayed ANC to initiate early ANC may be very different from the interventions required to influence women who make contact during ANC, delivery, and the postpartum period to complete the maternal health pathway as recommended. Thus, by focusing specifically on the factors that determine whether women reach each successive level of care continuity, these findings can help policymakers target interventions to meet the needs of different types of service users.

Another limitation of this quasi-experimental study design is that we are attributing observed changes over time to the voucher program and free maternity services policy; however, our findings may have also been affected by other programs, policies, and events in our study counties. For instance, since 2013, the Kenyan health system has experienced a number of challenges related to the decentralization of government and removal of user fees for maternal care, which are perceived to have contributed to reduced quality of care and unauthorized fees in some facilities [228,343–345,361]. Additionally, concerns about salary delays, inadequate staffing, and job insecurity led to multiple health worker strikes since the policy changes [343,345]. All of these factors may have influenced our study counties in ways that are poorly documented and difficult to assess.

7.6 CONCLUSIONS

Overall, our study illustrates the value of examining the way in which maternal health interventions affect how women use care across the continuum from pregnancy to the postpartum period and has important implications for maternal health financing in Kenya and similar settings. Although the reproductive health voucher program and free maternity services policy contributed to high use of facility delivery services, we found that continuity of care remained sub-par, with approximately one quarter to one third of ANC users receiving discontinuous or incomplete care [354]. To maximize the benefits of maternal health financing interventions and policies in Kenya, it is therefore critical to better understand and address the non-financial mechanisms driving use of care across the maternal health continuum. The strong effect of using private sector ANC on subsequent use of facility delivery and PNC within 48 hours suggests a need to further investigate the role of health providers and quality of care on ensuring linkages between the different stages of maternal care. Additionally, our findings that even within this population of poor women, those with lower parity and higher educational attainment, wealth, and employment status were more likely to use continuous care indicate that health financing alone is insufficient for reducing inequities in use of care across the maternal health continuum.

8 DISCUSSION

This thesis used a multiple method approach combining a systematic literature review; historical document review; key informant interviews; and quasi-experimental analysis of population survey data to explore the link between pluralistic health financing and service provision systems and progress towards achieving UHC for maternal health care in Kenya. Through five papers, I examined three main research questions:

Q1: How do researchers measure the contribution of the private sector to maternal health and family planning service provision and how much care does the private sector provide in sub-Saharan Africa (SSA)?

Q2: How did Kenya's pluralistic financing policies and public-private engagement strategies for health arise and evolve over time?

Q3: What are the impacts of user fee removals and subsidized vouchers on use, sector, quality, continuity, and equity of maternal care in Kenya?

This chapter is organized into two main sections. In section 8.1, I synthesize the main findings pertaining to my three broad research questions. These are also briefly summarized by thesis objective in Table 8.1. Next, in section 8.2, I discuss the implications of these findings and my recommendations for future research policies related to health financing, public-private partnerships, and maternal health.

8.1 SUMMARY OF FINDINGS

8.1.1 How do we measure the contribution of the private sector to maternal health service provision and how much care does the private sector provide in SSA?

There is great interest in engaging private providers to expand access to health services in SSA. However, our understanding of the share and nature of services provided in the private sector is somewhat limited. Through the systematic review in Chapter 2, I found that that the private sector has been defined heterogeneously. Additionally, blurred lines between public and faith-based or other charitable health facilities in practice can sometimes make it difficult to neatly distinguish between government and non-government providers, particularly when relying on self-reported data collected from health services users through household surveys. Additionally, depending on the question of interest, it may be more appropriate to categorize providers by their profit motive in some instances and by their ownership in others. In terms of quantifying the contribution of the private sector to service

provision, researchers have typically reported on two key measures: (1) private sector coverage, or the proportion of individuals in need of care who received services in the private sector, and (2) private sector market share, or the proportion of service users who received care in the private sector.

Using childbirth and family planning services as examples of maternal and reproductive care, I found that although use of the private sector for childbirth care in SSA appears to be growing over time in some countries [362,363], the studies included in the systematic review suggest that the private sector provides a small proportion of childbirth services in SSA and the public sector remains the predominant provider of childbirth care. This is consistent with findings from additional research on private provision of childbirth services in LMICs published after the review was conducted [363,364]. Within the region, there is great variability – private facility coverage of childbirth care ranged from 0.6% in Niger to 22.3% in Gabon in the period from 2008 to 2016 [363]. At 15.2%, private facility coverage of childbirth care in Kenya was towards the high end of that range [363]. The most recent and comprehensive paper with regional estimates reported that on average, 10% of women in sub-Saharan Africa received childbirth care in a private facility or with a private health provider for their most recent birth [159]. Private sector coverage of family planning service need in SSA was slightly higher, estimated at 14%, likely due to the increased number and types of outlets through which modern contraception can be accessed [119]. For both services, private sector market share was approximately two times greater than their respective coverage estimates [119,159]. Although the systematic review did not focus on ANC or PNC, available evidence suggests that the level of private provision of ANC in SSA is similar to that for childbirth care, with the public sector providing an overwhelming majority of care [359,364].

8.1.2 How did Kenya's pluralistic financing policies and public-private engagement strategies for health arise and evolve over time?

The Kenyan government's first major effort to engage the private sector to expand access to health services was as early as 1966, with the establishment of the NHIF three years after independence to provide those in formal employment with access to inpatient care in public and private health facilities [10,11]. As the country's economy grew and it sought to settle firmly into its status as a middle-income country, the intention to engage the private sector has become ubiquitous in Kenya's policy agenda, from broad development plans such as Kenya's Vision 2030 to more specific maternal health strategies, such as the National

Roadmap for Accelerating the Attainment of the MDGs Related to Maternal and Newborn Health in Kenya [259,269,365]. Despite the pervasiveness of the *concept* of engaging the private sector in Kenya's health policies, in Chapter 4 I argued that the proliferation of public-private partnerships for health is more the result of a confluence of economic constraints, pressures from external donors, health system weaknesses, and effective lobbying by local private actors than a cohesive government-led strategy to engage the private sector to expand access to essential health services.

Given Kenya's sizable poor and informally employed populations, the government also adopted a number of policies to expand access to services in public health facilities. Since independence, the Kenyan government has implemented a series of user fee introductions, reductions, and removals with the aim of finding a balance between ensuring universal coverage of essential health services through the public sector and developing a strategy that is affordable for the population and the country. Additionally, the government's reproductive health voucher program sold subsidized vouchers to poor women to increase financial access to maternal care in both public and private facilities.

The Kenyan government's experience with this multitude of health financing approaches, including NHIF, private health insurance, community-based health insurance, subsidized vouchers, and user fee removals offers a wealth of information that can be used to improve understanding of how these approaches work and develop a strong and cohesive health financing strategy. However, competing interests, particularly among influential private sector actors, have delayed the finalization and adoption of this plan. When the plan is ultimately adopted, it is essential that policymakers critically examine which elements of each approach have worked or not worked and why. Section 8.1.3 highlights some key findings from this thesis that could inform future health financing and public-private partnership approaches, particularly for maternal health, in Kenya and other similar settings.

8.1.3 What are the impacts of user fee removals and subsidized vouchers on use, sector, quality, continuity, and equity of maternal care in Kenya?

As achieving UHC entails universal and equitable coverage of good quality health services, it is important to not only explore the impact of these health financing and public-private partnership strategies on coverage of services, but also whether the approaches increase use of good quality care (including continuity of care) and if any improvements in coverage are equitable. The three quantitative chapters in this thesis therefore examined how use, timing, frequency, source, and quality of maternal health services were impacted by the introduction

of three health financing interventions in Kenya: (1) removal of user fees for care in public primary care facilities; (2) introduction of targeted subsidized vouchers for maternal care in public and private facilities; and (3) removal of user fees for maternity care in all public facilities, including hospitals.

8.1.3.1 *Impact of the 10/20 user fee removal policy*

Despite sustained high coverage of 1+ ANC over the past two decades in Kenya, the timing, intensity, and quality of ANC remains sub-optimal, particularly among poor women. Introduced in 2004, the 10/20 policy eliminated user fees in public primary care facilities and replaced them with nominal registration charges of 10 and 20 Kenyan Shillings. In Chapter 5, I found that for better-off women, the 10/20 policy was associated with increased use of 1+ ANC, 4+ ANC, early ANC initiation, and decreased use of ANC in public sector health facilities. For poorer women, the 10/20 policy was associated with increased use of 4+ ANC and good content of ANC; however, paradoxically, it was also associated with decreased use of the public primary care facilities that the policy targeted. These findings complement a similar study conducted by Obare and colleagues that examined the impact of the 10/20 policy on where women gave birth [81]. While this thesis found that the 10/20 policy was associated with decreased use of public primary care facilities for ANC among poorer women, Obare and colleagues found that the 10/20 policy was associated with an increased proportion of poor women delivering at home [81].

8.1.3.2 *Impact of the Reproductive Health Voucher Program*

Under the Reproductive Health Voucher Program, the Kenyan government sold heavily subsidized safe motherhood vouchers to poor women, which covered the cost of four ANC visits, facility delivery, and PNC in accredited public and private facilities. The program was piloted in four counties from 2006 to 2009 and later implemented at scale in a total of five counties until 2016. Using a quasi-experimental study design, in Chapter 6, I found that full implementation of the voucher program was associated with an increased use of facility-based delivery care among poor women and greater use of private facilities among poor users of ANC, facility delivery and PNC. Additionally, in Chapter 7, I found that full implementation of the voucher program increased women's use of continuous care (received 1+ ANC visit & facility delivery & and PNC for the mother) among poor users of 1+ ANC but had no impact on early ANC initiation or completing the maternal health pathway as recommended (4+ ANC, facility delivery, & PNC for the mother within 48 hours of delivery).

8.1.3.3 *Impact of the free maternity services policy*

In 2013, the Kenyan government announced the FMS policy, which made maternity services free in all public health facilities, including hospitals. The national FMS policy and the Reproductive Health Voucher Program in five counties were therefore implemented concurrently from 2013 to 2016. In Chapter 6, I found that while full implementation of the voucher program increased use of facility delivery, the introduction of FMS eliminated the disparity in coverage of facility delivery between women in voucher counties and comparison counties, suggesting that the policy led to substantial increases in use of facility delivery in counties that were not exposed to the voucher program. Additionally, private sector market share for all services decreased after FMS were introduced, though poor women in voucher counties continued to use the private sector with greater frequency than those in comparison counties. After the FMS policy was introduced, poor women in voucher counties experienced a greater improvement in use of recommended care (early ANC & 4+ ANC & facility delivery & PNC for the mother within 48 hours of birth), perhaps suggesting that solely eliminating user fees was unable to improve continuity of care among poor women who only had access to public sector services. Chapter 7 explored in more depth the determinants of early ANC initiation and continuity of care in more depth; however, after controlling for other relevant factors, introduction of the FMS policy alone did not seem to have any association with poor women's timing or continuity of care.

8.1.3.4 *Effects of other determinants on timing & continuity of care*

Chapter 7 also examined the effects of other relevant health financing, sociodemographic, and service-seeking factors on timing and continuity of maternal health services. Although these findings pertain to some of the thesis' secondary research questions, I highlight them here, as they have important implications for future strategies for achieving UHC. Health insurance coverage was the only determinant that had a consistently positive effect on all outcomes including early ANC initiation, use of continuous care among users of 1+ ANC, and completing the maternal health pathway as recommended (4+ ANC, facility delivery, PNC for the mother within 48 hours of birth) among users of continuous care. In contrast, higher parity was the only determinant that had a consistently negative effect on all three outcomes. While being among the least poor was associated with earlier ANC initiation and greater use of continuous care, there was no association between wealth quintile and completing the maternal health pathway as recommended, suggesting that non-financial barriers may prevent women from using maternal health services at the recommended timings and intensity. Early ANC initiation was associated with both greater use of

continuous care and completing the maternal health pathway as recommended. Finally, users of private sector ANC were more likely to receive continuous care compared to those who received ANC in a public facility or at home, raising questions about whether and how quality of care in the private sector may lead to improved use of services across the maternal health continuum.

Table 8.1a Summary of thesis findings by research question and objective

Research question	Research objective	Data source(s)	Key findings
Q1: How do we measure the contribution of the private sector to maternal health and family planning service provision and how much care does the private sector provide in sub-Saharan Africa?	**(1)** Systematically compare and critique quantitative measures of private sector family planning and childbirth service use in sub-Saharan Africa	Systematic literature search	• Inconsistency in how researchers define and measure the "private sector" • At ≈10%, private sector coverage of childbirth service need remains quite low for sub-Saharan Africa
Q2: How did Kenya's pluralistic financing policies and public-private engagement strategies for health arise and evolve over time?	**(2)** Describe the roles of the political environment, economy, internal and external actors, and societal values in shaping health financing reforms and policies concerning public-private engagement for health in Kenya	Historical document review & key informant interviews	• Kenya has used public financing and public-private partnership to expand access to healthcare since as early as 1966, with the establishment of its National Hospital Insurance Fund • Private actors have effectively formed coalitions to advocate for their interests in the health sector and solidify their participation in policymaking processes
Q3: What are the impacts of user fee removals and subsidized vouchers on use, quality, continuity, and equity of maternal care in Kenya?	**(3)** Assess the impact of the 10/20 user fee reduction policy on ANC service-seeking practices and quality of care in Kenya	Kenya Demographic and Health Surveys (2003, 2008/9, 2014)	• Use of 1+ ANC remained >90% over past 20 years • Among worse-off women, 10/20 policy was associated with increased use of 4+ ANC and good content of care, but decreased use of the public primary care facilities targeted by the policy • Among better-off women, policy was associated with increased use of 1+, 4+, and early ANC & decreased use of ANC in public sector facilities

Table 8.2b Summary of thesis findings by research question and objective

Research question	Research objective	Data source(s)	Key findings
Q3: What are the impacts of user fee removals and subsidized vouchers on use, quality, continuity, and equity of maternal care in Kenya?	**(4)** Evaluate the longer-term impact of the safe motherhood voucher program on use of maternal health services in Kenya before and after the introduction of the free maternity services (FMS) policy.	Reproductive Health Voucher Program evaluation study surveys (2011, 2012, 2016)	• Before FMS was introduced, the voucher program led to increased use of facility delivery & greater use of private sector ANC, delivery, and PNC • FMS policy resulted in a greater increase in use of all three services at the recommended timings (recommended care) in communities with the voucher program compared to communities without the program • Private sector market share for all services decreased after FMS were introduced, but use of the private sector remained significantly higher in voucher communities
	(5) Examine the impact of the safe motherhood voucher program, free maternity services policy, and health insurance on women's progression through the maternal health continuum of care	Reproductive Health Voucher Program evaluation study surveys (2011, 2012, 2016)	• The voucher program had a positive impact on use of continuous care, but not on early ANC initiation or completing the maternal health pathway as recommended • Health insurance coverage consistently had a positive effect on early ANC initiation, use of continuous care, and completing the pathway as recommended, while the FMS alone did not impact any of these indicators • Use of private sector ANC was associated with greater use of continuous care • Early ANC initiation was critical to both receiving continuous care and completing the pathway as recommended

8.2 STRENGTHS AND LIMITATIONS

The impact of user fee removals and vouchers on maternal health has been extensively studied in LMIC settings. The research on user fees has primarily focused on the childbirth care, with little investigation into their impact on ANC, PNC, or continuity of care [22,23]. The research on vouchers has generally examined the short-term effects of vouchers and has not explored their impact on continuity of maternal care [23]. This thesis makes an original and rigorous contribution to the health financing and public-private partnership for health literature by using quasi-experimental methods to (a) examine the impact of these interventions on continuity of care; (b) explore the effects of vouchers and user fee removal concurrently; and (c) look at the longer-term impacts of vouchers on service coverage. Additionally, by studying all of these concepts together in one setting, this thesis uniquely explores the junction of health financing, public-private partnership, service coverage, quality of care, and equity. This research also makes an important contribution to the literature on UHC for maternal health care by developing new approaches to analyzing continuity of care and highlighting the need to study use of services across the maternal health continuum using a woman-centered perspective. Finally, my time spent in Kenya working with colleagues in the Population Council Kenya office and conducting interviews with key informants provided me with important insights that helped me to contextualize the circumstances around various policy changes in Kenya and better interpret the results of my secondary analyses of the DHS and voucher study datasets.

The key limitations of this thesis relate to its retrospective nature, quasi-experimental design, and use of secondary data. In Chapter 5, for example, I used Kenya DHS data to examine the impact of the 10/20 user fee reduction policy on women's use of ANC. Because the policy was introduced over 15 years ago and documentation on specific details of the policy and how it was implemented in practice was limited and sometimes conflicting, it was difficult to explain some of the research findings, for example why poor women would shift towards seeking ANC at public hospitals after the fees for services were reduced in primary care facilities. Additionally, Chapters 6 & 7 used the Kenya Reproductive Health Vouchers Program evaluation data. During the course of my analyses, I identified some issues in data completeness related to an error in the data collection tool. This missing data reduced the study sample size and precision of my estimates. Also, as I was not involved in the design of the survey instruments or data collection methods for the DHS or voucher surveys, I was unable to use the datasets to answer all of my questions of interest. Further, as with most studies conducting secondary analyses of existing datasets (such as the DHS), the study's

research questions and design were, in part, determined by data availability. Additionally, because the voucher study purposively sampled women from poor communities only, it was not possible to assess whether the program successfully targeted poor women and reduced inequities in coverage and spending on maternal health. Finally, this thesis was also affected by the issues inherent to observational and quasi-experimental research. As the policies and interventions that I evaluated were not implemented under experimental conditions, it is difficult to assess if and how other contextual factors may have influenced the study outcomes. The interpretation and recommendations outlined in the following section must therefore be considered within the context of these methodological limitations.

8.3 IMPLICATIONS AND RECOMMENDATIONS

Both the process of completing my thesis and the resulting empirical findings have helped me to identify important issues related to the conduct of research; critical evidence gaps; and implications for policymakers developing strategies for achieving UHC in LMICs. Based on these reflections, I have outlined key recommendations for policy and programs in section 8.3.1 and for future research, monitoring, and evaluation in section 8.3.2.

8.3.1 Recommendations for policy

8.3.1.1 *Recommendations for national-level government policymakers*

(1) Complement health financing policies with interventions to address non-financial barriers to care

The findings from this thesis suggest that reducing user fees for maternal health services may increase coverage; however, eliminating fees at the point of care alone does not sufficiently address the barriers to care for the poor. For example, Chapter 5 showed that when the 10/20 policy was introduced, poorer women did not increase their use of the primary care facilities targeted by the policy. Chapter 6 demonstrated that although the FMS policy completely removed user fees for delivery care in all public facilities, poor women continued to purchase vouchers to seek care in private facilities. Further, while many studies conducted in Kenya and other LMICs have found that reducing user fees has a positive effect on maternal health service use at the population level, the evidence on whether such policies truly have an equitable or pro-poor effect is limited and the conclusions are mixed [22,23,73,81,366].

Taken together, it seems clear that just because health services are 'free' does not mean the poor *can* or *want* to use them. It is well documented that several issues beyond service fees at the point of care influence women's maternal health care seeking preferences and

experiences, including previous birth history; knowledge, beliefs, and traditional practices; distance and transportation; and quality of care [64,367]. Therefore, policies aimed at improving financial accessibility to care cannot be implemented in isolation. Rather, to improve equity and maximize gains in coverage, health financing policies must also be paired with interventions to address key non-financial barriers to care impacting the poor such as traditional beliefs around the appropriate timing to seek antenatal care; perceptions about service quality; and physical access to care.

(2) Engaging for-profit private providers to increase coverage is promising, but private non-profit, faith-based and public sector providers cannot be neglected

In Chapter 1, I described an ideological debate within the global health community concerning whether it is appropriate and feasible for governments to engage the private sector to achieve UHC. The findings from my thesis demonstrate that in a setting like Kenya, with resource constraints in the public sector, and a large formal private health sector, engaging private providers to expand access to essential care is a pragmatic choice. Further, results from the voucher studies imply that the private sector can be a useful vehicle for increasing access to essential health services, even among the poor. However, when developing public-private partnership strategies, the government must purposefully engage a broad range of actors. In Chapter 4, I found that the private for-profit sector in Kenya has effectively coalesced to advocate for their interests with the government, resulting in favorable policies and increased partnership. Though private non-profit and faith-based health providers have formed coalitions, they appear not to have the same platforms to access senior policymakers as the private for-profit sector. The government of Kenya therefore needs to ensure that local civil society and faith-based organizations have a sufficiently high-level platform to advocate for the communities that they serve, and that their voices are not overpowered by private for-profit insurers and providers. Additionally, any strategy for engaging private health providers must be paired with (a) public financing to ensure adequate financial protection for the poor and (b) strong oversight to ensure that the care being provided is of good quality.

As countries such as Kenya consider how to best engage private health providers, policymakers must also bear in mind that even with the large existing number of private providers, the public sector remains the predominant provider of maternal health services in Kenya and SSA more broadly [159,359]. When developing strategies to engage private providers, policymakers must therefore ensure continued investment into strengthening the

public health system. Further, it is essential that the strategies are designed to actually expand the number of service users rather than just shift existing users from public to private facilities.

(3) Multiple and incremental approaches are likely needed to sustainably achieve UHC

The process of developing an overarching health financing strategy has been a long and challenging one for the Kenyan government. Considering the diverse needs that exist within populations such as Kenya's, it is unlikely that one singular approach to achieving UHC and financial protection will be successful. Although I argued in Chapter 4 that Kenya's approach to health financing and public-private partnerships for health has been less of a coordinated effort and more a fragmented response to various constraints and pressures, I believe that resulting mix of approaches has provided Kenya with a valuable opportunity to learn from their experiences and strengthen the design and implementation of their future health strategy. For instance, during my key informant interviews, a Ministry of Health representative told me that while the voucher program successfully increased coverage of facility births and expanded poor women's choice of affordable health providers, certain elements of the program, such as targeting and verifying poor women, would have been too costly and labor-intensive for the government to sustainably implement. Thus, rather than scaling up the voucher program nationally, the government chose to introduce the Linda Mama program, which is managed by the NHIF and extends the FMS policy in public facilities to allow women who do not have health insurance coverage to receive free care at participating private and faith-based facilities [368]. In this case, the Kenyan government tried a strategy, identified elements that worked, and incorporated these elements into their health system in a manner that could be sustained more easily.

Policymakers in other settings could similarly make incremental steps towards achieving UHC by strategically implementing this sort of trial-and-error approach. The populations in LMICs are quite diverse, as are the interventions required to achieve UHC for each subgroup. Policymakers may therefore need to develop multiple strategies to address the unique needs of three key populations of concern: (a) poor & vulnerable, (b) non-poor in the informal employment sector, (b) non-poor in the formal employment sector [8]. By trying multiple approaches on a smaller scale and assessing their successes and failures, countries can hone in on and practice different elements of the ultimate strategy that they will develop and implement at scale.

8.3.1.2 *Recommendations for county-level policymakers, health facility in-charges, and health providers*

(1) Increasing demand and coverage must be met with good quality care

A key finding from my thesis is that even if removing user fees and introducing subsidized vouchers seem to increase coverage of key maternal health services, the care that women receive is of poor quality, both in terms of continuity and content. To accelerate progress towards increased coverage of *quality* health services, policymakers must consider how their health financing strategies affect entry into and subsequent retention in the maternal heath continuum. The literature on the impact of user fee removal on maternal health care has comparatively focused more on childbirth care and less on ANC and PNC [22]. My research in Kenya, however, implies that additional focus should be placed on ANC, as early ANC initiation is associated with improved continuity of maternal care. In particular, policymakers should consider how the mechanisms of different strategies of financial protection may influence service-seeking practices for ANC specifically, and continuity between ANC and childbirth care more generally. For example, my thesis did not find any impact of the free maternity services user fee removal policies on ANC timing or continuity of care for poor women; however, it did appear that the voucher program was associated with improved continuity of care and that health insurance coverage was associated with earlier ANC initiation and improved continuity of care. Once we have a better understanding of which elements of the different health financing approaches facilitate more optimal use of care along the maternal health continuum, as suggested in my recommendations for future research, policymakers need to incorporate them into future health financing strategies.

Additionally, increasing demand for care without also ensuring that women receive good quality services yields no health gains and could have detrimental effects on women's decisions to seek care in the future. A systematic review of the impact of demand-side interventions for maternal care, including vouchers, found that the interventions were associated with increased service coverage but often did not improve health outcomes [369]. Similarly, a recent study of surveillance data from Ghana found that higher use of facility births was not associated with reduced perinatal or maternal mortality, and perinatal mortality increased among facility births after the free health insurance policy was introduced [370]. Findings like these imply that the current practice of focusing on increasing coverage as an indicator of UHC without addressing the content and quality of care delivered in health facilities will result in persistently poor maternal outcomes in LMICs [371]. Policymakers must therefore put measures in place to ensure that health systems are prepared to absorb

increasing demand and deliver high quality services when policies to reduce financial barriers to service seeking are introduced.

8.3.2 **Recommendations for future research, monitoring, and evaluation**

8.3.2.1 *Recommendations related to thesis findings*

(1) Defining the private sector

The findings from Chapter 2 highlighted the many ways in which the private sector has been defined in studies examining use of childbirth and family planning services in sub-Saharan Africa. Generally, the public sector includes all health services operated by the government. Most broadly, the private sector encompasses all health providers and facilities that offer services outside of the government-owned health system. This includes everything from state-of-the-art private for-profit facilities, to long-serving faith-based or mission facilities, to drug sellers and other informal or underregulated healthcare outlets. Given the heterogeneity of the providers within the private sector when using its broadest definition, studying the private sector as one uniform group may be misleading and mask important differences between provider types. To disentangle these differences, researchers should ideally disaggregate the private sector according to two key characteristics: position within or outside of the formal medical sector and profit motive. First, the private sector can be divided according to whether it provides formal medical care (e.g. hospitals, health centers, clinics, and licensed doctors, nurses, and midwives) or informal care (e.g. drug sellers and unlicensed health providers). In terms of profit-motive, the private sector can be divided into three sub-categories: for-profit, non-governmental organizations, and faith-based. In some contexts, it could be appropriate to combine non-governmental and faith-based providers. However, given that their fundraising and cost recovery strategies could differ, it may be helpful to keep these two private non-profit groups separate. Recommendations on which of these groups should be included in a study depends on the research question of interest. Regardless of the research question, it is most critical that researchers clearly define which type of private providers they are studying, and these medicalization and privatization categories provide a useful framework for doing so. To facilitate this shift towards greater specificity when discussing the private health sector, researchers need to collect more detailed information on health provider types and validate methods for collecting this information through population surveys, as they are one of the most common sources of information on market share and service coverage. Additionally, researchers could attach metadata to surveys

explaining in detail how services are delineated between the public sector and various types of private providers.

(2) Gaps & future research topics related to health financing, private sector health provision, and the continuum of care

This thesis had important findings related to how public health financing and access to private sector providers might influence women's use and continuity of maternal care. To better understand these results and develop appropriate policy responses, a few key questions for further research should be prioritized.

First, in order to achieve UHC, governments must expand coverage of quality health services equitably and without causing financial hardship to service users. However, as discussed in section 8.2, this thesis could not investigate the impact of Kenya's free maternity services policy or vouchers on equity in service coverage or out-of-pocket expenditures for maternal health. Given the limited data availability, it will be challenging to study this retrospectively for the voucher program. However, moving forward, as Kenya continues to implement the free maternity services policy and finalizes its health financing and public-private partnership strategies, it will be important to ensure that the instruments for national surveys, such as the next Kenya DHS, and other sub-national surveys are designed to allow for the study of the impact of these approaches on equity and out-of-pocket expenditures.

Much of the research on the voucher program and user fee removal policies in Kenya has focused on their impact on service coverage, leaving a critical gap in information on whether the approaches are cost effective for the government, health facilities, and others involved in financing or implementing the strategies. A 2012 review of the Kenya voucher program reported a total expenditure of approximately $6.27 million (2011 $US 1= KSh 89) from October 2005 to March 2011, which included both administrative and service delivery costs for the safe motherhood, family planning, and gender-based violence vouchers [206,372]. The subset of these funds spent on the safe motherhood voucher translated to a cost of roughly $106 per client served [206,372]. Similar information on the total costs or costs per client for implementing the free maternity services policy is not currently available. A fully informed decision on which health financing strategy is best for Kenya will require a cost effectiveness analysis that comprehensively examines the relationships between expenditures and the outcomes achieved for each potential approach.

In terms of the costs to the health facilities implementing these approaches, under the voucher program, public and private sector health facilities were ultimately reimbursed a flat

rate of approximately $56 for the safe motherhood voucher with vaginal deliveries and $233 for the safe motherhood voucher with deliveries by cesarean section [206,372]. Under the free maternity services policy, government health centers, county hospitals, and tertiary hospitals were reimbursed approximately $25, $50, and $170, respectively, for each client, regardless of delivery method [228]. Although qualitative studies of both the voucher program and free maternity services policy indicate that many health facilities felt that the reimbursement was inadequate, a more detailed costing study is needed to better understand the true costs incurred by different types of health facilities to provide these services to ensure appropriate reimbursement rates in future [223,228,372].

In addition to investigating the effect of these strategies on women's expenditures and costs to the health system, we also need to understand more about private sector maternal health services in Kenya and other sub-Saharan African countries. The Africa region was estimated to have the fastest growing incidence of catastrophic spending for health in the world from 2000 to 2010 [7]. Yet, my thesis found that even when given the option to receive free services in the public sector, poor women in Kenya continued to purchase vouchers and seek care in the private sector. I also found that women who received ANC in a private sector facility had improved continuity of care compared to women who received ANC in a public facility or at home/another location. These findings warrant further investigation into the non-financial factors influencing if, when, and where women seek maternal care such as location, convenience, and quality. More research is also needed to compare the quality and content of maternal care between public and different types of private facilities, and how this might influence continuity of care. A study of 23 countries in sub-Saharan Africa, for example, found that private non-profit facilities had higher content of care scores (as measured by processes such as taking blood pressure measurements and giving iron tablets or syrup) compared to public facilities, while private for-profit facilities had lower scores [312]. Additional research could also explore the differences between public and private facilities in other domains of quality care such as privacy, convenience, patients' perceptions, and content of counseling, and the mechanisms through which these domains affect women's subsequent use of services in the maternal health continuum. A better grasp of these topics will help policymakers to develop more effective strategies on how to engage the private sector in a way that will lead to equitable expansion of service coverage and advance the goals of UHC.

Finally, although my findings related to the continuum of maternal care highlight the complex set of barriers that women face to using health services optimally along the maternal

health pathway, more work is needed to clarify the links between (a) the various health financing strategies and continuity of care (b) quality and continuity of care and (c) continuity of care and health outcomes such as maternal morbidity and mortality. Additionally, my thesis categorized different types of users of maternal care across the continuum (e.g. discontinuous; continuous, sub-optimal; completed the maternal health pathway as recommended). It would be useful to complement this type of analysis with qualitative research to validate whether these groupings make sense in practice and to explore why different types of women enter and drop out of the continuum at certain points in time.

8.3.2.2 *Recommendations related to thesis methods*

(1) Improve the rigor of future research on health financing and private sector health provision

Similar to many studies evaluating health policies, this thesis relied on secondary analysis of population survey data using quasi-experimental methods. Quasi-experimental approaches are frequently used for practical reasons—namely that (a) it can be challenging operationally, ethically, and financially to implement and evaluate health policies under experimental conditions and (b) policy changes are often announced with limited notice, making it difficult to collect data in time to establish a baseline for the policy's key outcomes unless they are measured routinely. Given these challenges, secondary analysis and quasi-experimental methods can provide useful insights into the effects of health financing policies and public-private engagement interventions. However, due to the observational nature of these study designs, it is harder to establish a causal link between a policy or intervention and the outcomes of interest. Observational studies using secondary data have an additional challenge with adjusting for confounders, as data on all of the relevant covariates may not be available.

Experimental methods such as a stepped wedge cluster randomized trial would help to improve the rigor of the policy and program evaluations and strengthen causal inference. More traditional (parallel) cluster randomized trials require policymakers to implement a policy or program in a random selection of regions while others do not receive the intervention, often raising concerns about equity [373]. A stepped wedge trial, on the other hand, allows for phased rollout, with the number of regions implementing a policy or intervention gradually increasing over time according to a randomized schedule until all regions are covered [373]. With proper planning, stepped wedge trials have many advantages including that they allow for the collection of baseline information; everyone is able to benefit from the policy or intervention; and the intervention is implemented in a randomized

manner. For policy evaluations in particular, the benefits of a stepped wedge trials offer a rigorous and more practical alternative to parallel cluster randomized trials.

When using a stepped wedge design to evaluate a national policy or program such as the free maternity services policy in Kenya, the data sources and scale of the study would depend on the research questions and availability of routine data. For example, if the main outcomes of interest were the maternity client volumes at government health facilities or other information regularly collected in health facilities, researchers could consider using health management information system (HMIS) data. As HMIS data are routine and readily available, this would allow for a rigorous and affordable national-level evaluation of a policy. If, on the other hand, the HMIS does not contain information on the key evaluation outcomes, researchers would need to collect primary data. Since primary data collection requires substantial financial commitment, the scale and source of data collection would be dependent on the specific research question, financial resources available, and the minimum sample size required to answer the research questions.

(2) *Reduce some of the methodological challenges commonly faced in quasi-experimental research by increasing availability of routine data and documentation of policy processes*

As policymakers globally, and particularly in LMICs, have to make tough decisions about how to allocate limited resources for maximum benefit, it is critical that they have a clear understanding of the impact of past and current policies. It is therefore important for decision-makers in these settings to allocate sufficient funds towards the collection of routine data that can be used for future retrospective evaluations. However, even when routine datasets are available, a challenge for researchers helping to assess the impact of these policies is that it can be quite difficult to retrospectively reconstruct the factors driving certain decisions and the ways in which policy implementation in practice differed from the policy on paper. One potential solution to this issue is to engage researchers during the policy development and implementation stages so that they can conduct prospective policy analysis, involving real-time systematic documentation of decisions, processes, and successes and challenges during implementation [374]. This will not only improve policymakers' and researchers' ability to later evaluate the longer-term impact of the program, but also provide valuable information for immediate feedback and course-correction.

(3) *Improve challenges with research quality and validity by increasing transparency in research and evaluation reporting*

One of the key methodological critiques that I raised in the systematic review of methods to measure the contribution of the private sector to family planning and childbirth service provision (Chapter 2) was that very few studies reported on whether their datasets were missing any data and, if so, how they handled it. As discussed in Chapters 6 & 7 and again in section 8.2, my analysis of the Reproductive Health Voucher Program datasets revealed issues with missing data, which were investigated and attributed to an error in the software for the data collection instrument. Transparently reporting on these issues can be risky for researchers, as it may lead others to discredit their research or compromise relationships with funding agencies.

These challenges relate to a very topical discussion in the broader global health research and evaluation field: *in which ways do the pressures of demonstrating success interfere with researchers' ability to honestly and transparently report results?* In a *BMJ Global Health* editorial, Yogesh Rajkotia argued that the close link between demonstrating success and receiving continued funding makes it challenging for organizations involved in implementing development interventions to report unbiased results or failures [375]. Similarly, in a recently published viewpoint in the *Lancet*, Katerini Storeng and Jennifer Palmer shared their account of an experience with a donor and two international non-governmental organizations (NGOs) both trying to prevent their research team from publishing certain results from their evaluation of a program financed by the donor and implemented by the NGOs [376]. Storeng and Palmer further called on universities to develop better policies for protecting the independence of researchers and ensuring that they are not pressured to misrepresent or omit negative or null research findings [376].

While these two examples focus on the reporting of *results*, the same pressures exist to emphasize the strength and rigor of research methods without appropriate acknowledgement of weaknesses in study design, fieldwork challenges, and issues in data quality. Researchers commonly encounter issues that could potentially affect their findings or interpretation. For instance, financial constraints often cause researchers to make compromises in their study design. Unforeseen fieldwork challenges also frequently lead to unplanned changes in the research protocol; issues in data completeness and quality; and post-hoc changes to the study outcomes of interest or analysis plan. Although these types of experiences occur fairly regularly during the design, implementation, and analysis of field research projects, it is less common to see them clearly documented and acknowledged in research publications. Transparently reporting on these issues gives readers the opportunity to fully understand the limitations of the study and alerts them to potential issues to consider

when designing new and follow-up research. Considering that the findings from global health research projects are often used to decide whether an intervention or policy is effective, it is critical that research institutions, funders, and academic journals work to create an environment in which researchers can transparently report on these issues without fear of losing support or the ability to publish the findings.

(4) Improve the study of service coverage by applying the person-centered care approach to maternal health research, monitoring, and evaluation

Since the introduction of the MDGs in 2000 and SDGs in 2016, the global health community has prioritized reducing maternal mortality as a strategy for achieving broader development goals, particularly in LMICs. In order to monitor progress towards maternal mortality reduction, there has been widespread tracking of key indicators of maternal health care: namely, coverage of 4+ ANC, skilled attendant at birth, facility delivery, and attendance at a postnatal visit [10,377]. Despite observed improvements in these indicators, maternal mortality decline has been slower than expected [362,370,378].

In a recent editorial, Madhukar Pai and colleagues argued that global health researchers need to give more careful thought to the indicators we use for monitoring progress, as often these 'surrogate endpoints' do not reliably predict key outcomes of interest [379]. Similarly, I believe that a large part of the reason why maternal mortality declines have been slower than expected is because the service coverage indicators that we use to monitor progress towards this goal do not adequately capture the complex set of factors influencing whether the care that a woman receives successfully prevents poor outcomes. In recent years, the concept of person-centered care, or focusing on the needs of the individual and involving them in their healthcare decision-making, has gained traction in the global health community [312,380,381]. A frequently discussed topic within person-centered care is that of coordinated care, or making sure that individuals receive the care that they need across different service areas, providers, and settings [380]. Research on the 'quality cascade' for maternal health also emphasizes the importance of considering multiple domains of quality care when estimating the effective coverage of maternal health services [382]. Applying these person-centered care, coordinated care, and quality cascade concepts to maternal health research, monitoring, and evaluation may help us to better understand why some women continue to have poor outcomes despite high coverage of certain maternal health services. By investigating the levels and drivers of early ANC initiation, receipt of continuous care, and completing the maternal health pathway as recommended, my thesis demonstrated that

despite high or improving coverage of individual maternal health services, women used services at sub-optimal timings and frequencies across the maternal health continuum. Further work is needed to gain consensus on the best ways to complement existing monitoring of service provision indicators with research and monitoring focused on women's experiences in seeking and receiving care.

8.4 CONCLUSION

The Sustainable Development Goals aim to achieve universal access to affordable, high-quality health services globally by 2030 [5]. Achieving UHC for maternal health in LMICs will require strong efforts by governments to reduce the financial barriers to care seeking and ensure adequate supply of quality health services. Using Kenya as a case study, this thesis explored the impact of multiple systems of health financing and service provision on women's use of maternal health services. The findings indicate that there is demand for private sector services among poor women and that governments can successfully engage the private sector to expand service coverage. Additionally, while the results showed that user fees removals and vouchers increased coverage of key maternal health services, the care that women received was of poor quality, both in terms of continuity of care and the actual interventions provided at the health facilities. Substantially reducing the vast disparities in maternal mortality between low-, middle-, and high-income countries will therefore require the global health community to shift away from conceptualizing progress towards UHC simply in terms of service coverage and instead towards a more comprehensive approach incorporating measures of access to quality health care.

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APPENDICES

APPENDIX 1: KEYWORDS AND MESH TERMS USED FOR SYSTEMATIC REVIEW (CH.2)

Medline Search Strategy

Search 1: Sub-Saharan Africa Terms

exp Africa South of the Sahara/ or
Sub-Saharan Africa* or
Benin or Burkina Faso or Burundi or "Central African Republic" or Chad or Comoros or Eritrea or Ethiopia or Gambia or Gabon or Guinea-Bissau or Liberia or Madagascar or
Guinea not (New Guinea or Guinea Pig* or Guinea Fowl) or
Congo adj2 (Democratic or Republic or Brazzaville or Kinshasa) or Zaire or
Malawi or Mali or Mozambique or Namibia or Rwanda or Sierra Leone or Somalia or South Sudan or Tanzania or Togo or Uganda or Zimbabwe or Cape Verde or Cabo Verde or Cameroon or Cameroun or Cote d'Ivoire or Ivory Coast or Djibouti or Ghana or Kenya or Lesotho or Nigeria or Sao Tome or Senegal or Sudan or Swaziland or Zambia or
Niger not (Aspergillus or Aspergilus or Peptococcus or Schizothorax or Cruciferae or Gobius or Lasius or Agelastes or Melanosuchus or radish or Parastromateus or Orius or Apergillus or Parastromateus or Stomoxys or Hyoscyamus or Cephalophus or Pterostichus) or
(multi#country or countries or multi#country or multi#level or ecological).m_titl.

Search 2: Family Planning Terms

exp Family Planning Services/ or
exp Contraceptive Agents/ or
exp Contraception/ or
exp Reproductive Health/ or
family planning or birth control or contracepti* or
sterili#ation or vasectomy or tubal ligation or
IUD or IUCD or intrauterine adj2 (device or system) or
injectable* adj2 (hormon* or estrogen or oestrogen or progestogen) or Depoprovera or Depo-Provera or Depo Provera or Noristerat or
implant* adj2 (hormon* or contracepti*) or Implanon or Norplant or
exp Condoms/ or condom* or
pill adj3 (morning after or emergency or Levonorgestrel or hormon* or estrogen or oestrogen or progestogen) or
lactational adj2 (amenorrhea or amenorhoea) or
"Standard Days Method" or cycle beads or
unmet need or
met need

Search 3: Delivery Care Terms

exp Delivery, Obstetric/ or

exp Maternal Health Services/ or
exp Cesarean Section/ or
exp Parturition/ or
delivery adj2 (child or obstetric) or
caesarean or cesarean or c-section or csection or
birth* adj2 (home or facility or child) or childbirth*
or
maternal or maternity servic*

Search 4: Private Sector Terms

exp Private Sector/ or
private adj2 (sector or for-profit or facilit* or provider* or clinic* or hospital* or pharmac* or drug seller*) or privati#ed or privati#ation or public-private or private or NGO or non-government* or nonprofit or not#for#profit or non#profit or non#for#profit or
informal adj2 (sector or provider*) or traditional adj2 (healer* or doctor* or provider*)
or
exp Hospitals, Religious/ or
exp Religious Missions/ or
charit* or FBO or mission or faith#based or religious or faith-inspired or Christian or Catholic or muslim or Islam* or
exp Social Marketing/ or
social* market* or
franchis* or
exp Contract Services/ or
out or service* adj2 (contracting or contracted or contract)

Search 5: Final Search

1 AND (2 or 3) AND 4

Global Health Search Strategy

Search 1: Sub-Saharan Africa Terms

exp "Africa South of Sahara"/ or
Sub-Saharan Africa* or
Benin or Burkina Faso or Burundi or "Central African Republic" or Chad or Comoros or Eritrea or Ethiopia or Gambia or Gabon or Guinea-Bissau or Liberia or Madagascar or
Guinea not (New Guinea or Guinea Pig* or Guinea Fowl) or
Congo adj2 (Democratic or Republic or Brazzaville or Kinshasa) or Zaire or
Malawi or Mali or Mozambique or Namibia or Rwanda or Sierra Leone or Somalia or South Sudan or Tanzania or Togo or Uganda or Zimbabwe or Cape Verde or Cabo Verde or Cameroon or Cameroun or Cote d'Ivoire or Ivory Coast or Djibouti or Ghana or Kenya or Lesotho or Nigeria or Sao Tome or Senegal or Sudan or Swaziland or Zambia or
Niger not (Aspergillus or Aspergilus or Peptococcus or Schizothorax or Cruciferae or Gobius or Lasius or Agelastes or Melanosuchus or radish or Parastromateus or Orius

or Apergillus or Parastromateus or Stomoxys or Hyoscyamus or Cephalophus or Pterostichus) or
(multi#country or countries or multi#country or multi#level or ecological).m_titl.

Search 2: Family Planning Terms

exp family planning/ or
exp contraceptives/ or
exp contraception/ or
exp reproductive health/ or
family planning or birth control or contracepti* or
sterili#ation or vasectomy or tubal ligation or
IUD or IUCD or intrauterine adj2 (device or system) or
injectable* adj2 (hormon* or estrogen or oestrogen or progestogen) or Depoprovera or Depo-Provera or Depo Provera or Noristerat or
implant* adj2 (hormon* or contracepti*) or Implanon or Norplant or
exp Condoms/ or condom* or
pill adj3 (morning after or emergency or Levonorgestrel or hormon* or estrogen or oestrogen or progestogen) or
lactational adj2 (amenorrhea or amenorhoea) or
"Standard Days Method" or cycle beads or
unmet need or
met need

Search 3: Delivery Care Terms

exp childbirth/ or
exp maternity services/ or
exp caesarean section/ or
exp parturition/ or
delivery adj2 (child or obstetric) or
caesarean or cesarean or c-section or csection or
birth* adj2 (home or facility or child) or childbirth*
or
maternal or maternity servic*

Search 4: Private Sector Terms

exp private sector/ or

private adj2 (sector or for-profit or facilit* or provider* or clinic* or hospital* or pharmac* or drug seller*) or privati#ed or privati#ation or public-private or private or

NGO or non-government* or nonprofit or not#for#profit or non#profit or non#for#profit or

informal adj2 (sector or provider*) or traditional adj2 (healer* or doctor* or provider*) or

charit* or FBO or mission or faith#based or religious or faith-inspired or Christian or Catholic or muslim or Islam* or

social* market* or

franchis* or

exp private firms/ or

out or service* adj2 (contracting or contracted or contract)

Search 5: Final Search

1 AND (2 or 3) AND 4

Popline Search Strategy

Search 1: Sub-Saharan Africa Terms

AFRICA, SUB SAHARAN

Search 2: Family Planning Terms

CONTRACEPTION or
CONTRACEPTIVE USAGE or
CONTRACEPTIVE AVAILABILITY or
CONTRACEPTIVE PREVALENCE or
FAMILY PLANNING or
FAMILY PLANNING PROGRAMS or
"family planning" or "birth control" or contracepti*
or
unmet need or
met need

Search 3: Delivery Care Terms

MATERNAL-CHILD HEALTH SERVICES or
CESAREAN SECTION or
CHILDBIRTH or
"delivery service*" or "obstetric delivery" or "child delivery" or
"home birth*" or "child birth*" or "childbirth*" or "home birth*" or "facility birth*"
maternal or "maternity service*" or
caesarean or cesarean or c-section or csection

Search 4: Private Sector Terms

PRIVATE SECTOR or

COMMERCIAL SECTOR or
PRIVATELY SPONSORED PROGRAMS or
BAREFOOT DOCTORS or
TRADITIONAL BIRTH ATTENDANTS or
NGO or non-government* or nonprofit or not-for-profit or non-profit or
"informal sector" or "informal provider*" or "traditional healer*" or "traditional doctor*" or "traditional provider" or
charity or FBO or mission or faith-based or faith based or religious or
social* market* or
franchis* or
"contract* out" or "contract* service*"

Search 5: Final Search

1 AND (2 or 3) AND 4

APPENDIX 2: DESCRIPTIVE SUMMARY OF STUDIES INCLUDED IN REVIEW (CH.2)

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Adogu et al. (2014)	Nigeria	Household survey	Not stated	2 local government areas in 1 state	Cross-sectional	Women with a child aged 0-59 months	(1) **Private hospital:** not defined (2) **Public health facility**: not defined (3) **Maternity homes:** not defined (4) **TBA:** not defined (5) **Others home**: not defined
Agha & Do (2008)	Ghana, Kenya	DHS	**Kenya**: 1989, 1993, 1998, 2003 **Ghana:** 1988, 1993, 1998, 2003	Nationally representative	Repeated cross-sectional	Women 15-49 years, currently married or in union	(1) **Private:** private commercial hospitals/clinics, private doctors, pharmacies, shops/stores (2) **Public:** government hospitals/clinics, government health centers (3) **NGO & others:** NGOs & friends/relatives
Amin (1998)	Sierra Leone	Household survey	1993	2 districts	Cross-sectional	Women with at least one live birth in past 5 years	(1) **Planned Parenthood clinics:** not defined (2) **Hospitals and public health units:** not defined (3) **MCH AID:** not defined

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Aremu (2013)	Nigeria	DHS	2008	Nationally representative	Cross-sectional	Women 15-49 years, ever married, current users of modern contraception	(1) **Private:** private clinics and hospitals owned by an individual, non-government or religious organization, pharmacy stores, patent medicine sellers, hawkers (2) **Public:** any healthcare facility maintained by government at local, state, and national levels (3) **Informal:** friends, family, and other sources
Ayad et al. (1994)	11 SSA countries	DHS	1986-1990	Nationally representative	Cross-sectional	Women 15-49 years, currently married or in union	(1) **Private pharmacy:** privately owned pharmacies (2) **Other private:** private organizations run by NGOs as well as private doctors, clinics, and other medical providers (3) **Government stationary**: any government-run facility at a fixed location (4) **Government mobile:** government outreach workers or mobile units (5) **Other source:** family, friends, and inconsistent responses

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Bazant et al. (2009)	Kenya	Nairobi Urban Health and Demographic Surveillance System	2006	2 urban informal settlements	Cross-sectional	Women 15-49 years with a birth within two years prior to survey	(2) **Private:** Religiously affiliated/mission, for-profit, or nonprofit (1) Woman's home/TBA's home: locations with no skilled care (3) **Government:** facilities administered by Nairobi City Council & Ministry of Health
Bell et al. (2003)	Ghana, Malawi	DHS	**Ghana:** 1988, 1993, 1998 **Malawi**: 1992, 2000	Nationally representative	Cross-sectional	All women aged 15-49 years with live birth in the past 3 years	(1) **Private hospital/health center:** not defined (2) **Government hospital:** not defined (3) **Government health center:** not defined (4) **Other health facility:** government health posts, maternity facilities, private health centers (5) **Domiciliary:** home
Benova et al. (2015)	30 countries representing 83% of SSA population	DHS	2000-2013	Nationally representative	Cross-sectional	Women 15-49 years with a birth in survey recall period	(1) **Private:** All births occurring in a facility outside of the public sector or with a private health professional (2) **Public sector:** public, government, or social security facilities (3) **Unclassifiable sector:** births occurring in a location that could not be classified as public or private

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Berman & Rose (1996)	Botswana, Kenya, Sudan, Uganda	DHS	1988-1990	Nationally representative	Cross-sectional	Ever married women aged 15-49 years	(1) **Private:** Not defined (2) **Public:** Not defined (3) **Other:** Includes traditional providers, schools, churches, family, and friends
Brugha et al. (2003)	Kenya	DHS	1998	Nationally representative	Cross-sectional	Not stated	(1) **Private facility**: not defined (2) **Public facility**: not defined (3) **Home**: not defined
Campbell et al. (2015)	30 countries representing 83% of SSA population	DHS	2000-2013	Nationally representative	Cross-sectional	Women 15-49 years, in need of or currently using modern contraception	(1) **Private sector**: all private providers, including private medical, private specialized drug sellers, private retailers, FBOs, and NGOs (2) **Public sector:** all government/public service locations, including public medical and non-medical sources (3) **Not classifiable**: reported missing source location or from husband, friend, relatives, other providers, or providers abroad

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Campbell et al. (2016)	30 SSA countries	DHS	2004-2012	Nationally representative	Cross-sectional	Women aged 15-49 years	(1) **Private sector**: all private providers, including private medical, private FBOs, NGOs, shops, pharmacies, drug sellers, and nightclubs (2) **Public sector:** all government/public service locations, including hospitals, polyclinics, doctors' offices, women's health centers, etc... (3) **Not classifiable**: reported missing source location or from husband, friend, relatives, other providers, or providers abroad
Chakraborty et al. (2016)	Kenya	Household survey	2013	Not stated	Cross-sectional	Women aged 15-49 years who are sexually active	(1) **Franchise clinic:** facility that belongs to a network and is operated by a private sector actor (2) **Other private**: not defined (3) **Public facility:** public sector dispensary, health center, medical clinic, or sub-district hospital
Chapman et al. (2012)	11 SSA countries	DHS	1998-2008	Nationally representative	Repeated cross-sectional	Women and men with non-marital, non-cohabiting partner	(1) **Private:** private hospital, doctor, other private, mission facility, other retail (2) **Pharmacy:** not defined (3) **Shop:** gas station or general shop (4) **Friends or family**: not defined (5) **Other**: bars, clubs, church

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Delamou et al.(2014)	Guinea	DHS	1999, 2005	Nationally representative	Repeated cross-sectional	Not stated	(1) **Private medical sector:** clinics, pharmacies, NGOs/specialized associations (2) **Private not medical sector**: shops, kiosks bars (3) **Public facility**: not defined (4) **Other/unspecified:** not defined
Echoka et al. (2013)	Kenya	Facility data	2010	1 district	Cross-sectional	All births	(1) **Private facility:** not defined (2) **Voluntary facility:** not defined (3) **Government facility:** not defined
Egede et al. (2015)	Nigeria	Survey with respondents recruited from a market	Not stated	1 city/2 local government areas	Cross-sectional	Women aged 14-49 currently using any method of contraception, sexually active, and pre-menopausal	(1) **Private hospital:** not defined(2) **Patent medicine dealer:** not defined(3) **Open market:** not defined(4) **Family planning clinic:** not defined(5) **Public hospital:** not defined
Fotso et al. (2013)	Kenya	DHS	1993, 1998, 2003, 2008/9	Nationally representative	Repeated cross-sectional	Women currently married	(1) **Private/other**: includes NGOs and FBOs (2) **Public:** not defined
Ganle et al. (2014)	Ghana	Ghana Maternal Health Survey	2007	Nationally representative	Cross-sectional	Women 15-49 years	(1) **Private health facility:** not defined (2) **Public health facility**: not defined (3) **Home**: not defined (4) **Other**: not defined (5) **Missing**: not defined

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Hodgkin (1996)	Kenya	Household survey	1989	1 district	Cross-sectional	All households with at least 1 delivery in the past year	(1) **Private hospital or health center:** not defined (2) **Missionary hospital or health center:** not defined (3) **Government hospital or health center:** not defined (4) **Informal setting:** TBA's place, at home with TBA, at home without TBA, or other location
Hopstock et al. (1997)	26 SSA countries	DHS	1986-1996	Nationally representative	Cross-sectional	Married women of reproductive age	(1) **Commercial:** for-profit providers, including pharmacies, doctors, nurses/midwives, shops/markets, traditional providers, and workplaces (2) **Nonprofit:** non-government owned providers that receive external funding, including clinics, mission facilities, non-governmental organizations, community-based distributors, and churches (3) **Public:** government-owned providers, institutions, fieldworkers, and schools (4) **Other:** friends and acquaintances, relatives, spouses, other, don't know/missing

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Hotchkiss et al. (2011)	Nigeria, Uganda	DHS	**Nigeria:** 1999, 2003, 2008 **Uganda**: 1988, 1995, 2001, 2006	Nationally representative	Repeated cross-sectional	Women 15-49 years, currently married or in union	(1) **Private commercial sector**: commercial outlets that sell contraceptive supplies and services, including chemists, shops, pharmacies, traditional healer/doctor, midwife, and private health facilities and workers (2) **Government sector**: not defined (3) **Other sources:** NGOs, FBOs, relatives, friends, others
Ikeako et al. (2006)	Nigeria	Household survey	2004	1 city	Cross-sectional	Women who had a delivery in the last 3 months	(1) **Private-obstetrician-run hospitals:** hospitals managed by qualified obstetricians (2) **Teaching hospital/state specialist hospital:** hospital managed by qualified obstetricians, resident doctors, or medical officers with facilities for blood transfusion (3) **General hospital/private hospitals/mission hospitals:** hospital with general duty medical officer (but no specialist obstetrician) and facilities for operative deliveries (4) **Maternity homes/primary health centers:** homes/centers operated by state registered nurses/midwives without the assistance of doctors

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
							(5) **Traditional birth attendants:** as defined by WHO, 1992; not trained to handle complications and not registered or licensed to practice (6) **Spiritual houses:** churches, prayer houses, healing homes (7) **Home delivery:** conducted in a woman's home
Iyaniwura & Yussuf (2009)	Nigeria	Household survey	2005	1 town	Cross-sectional	Women of reproductive age who carried at least 1 pregnancy to term in the past 5 years	(1) **Private hospital:** Not defined (2) **Government facility:** Not defined (3) **Home:** Not defined (4) **Spiritual home:** Not defined (5) **Traditional/herbal home:** Not defined
Johnson et al. (2009)	Ghana	DHS	1998, 2003	Nationally representative	Repeated cross-sectional	Women who had a birth in the past 5 years	(1) **Private institution:** not defined (2) **Public institution**: not defined (3) **Home**: occurred under the supervision of untrained birth attendants, including SBAs
Khan et al. (2007)	18 SSA countries	DHS	1987-2004	Nationally representative	Repeated cross-sectional	Women aged 15-49 years, currently married or in union	(1) **Private medical sector:** not defined (2) **NGOs:** not defined (3) **Public sector**: not defined (4) **Other sources:** not clearly defined, but includes shops, churches, and friends. NGOs included as "other" in time trend analysis

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Kruk et al. (2009)	Tanzania	Household survey	2007	1 district (excluding main town)	Cross-sectional	Women aged 18 years or above who delivered in the past 5 years	(1) **Mission health facility:** mission dispensary, health center, or hospital (2) **Government dispensary:** not defined (3) **Government health center:** not defined (4) **Government hospital:** not defined (5) **Home:** not defined (6) **On the way to a health facility:** not defined
Lafort et al. (2016)	Mozambique	Respondent-driven sampling survey	2013-2014	1 city	Cross-sectional	Female sex workers	(1) **Private clinic:** Not defined (2) **Night clinic (NGO):** a sexual and reproductive health clinic targeting most-at-risk populations open during the evenings and operated by a non-governmental organization (3) **Informal health sector:** Not defined (4) **Public health facilities:** Not defined (5) **Community outreach:** Not defined (6) **Outside catchment area:** Not defined

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Lewis & Kenney (1988)	Kenya, Liberia, Senegal, Zaire, Zimbabwe	Contraceptive Prevalence Surveys, DHS, other household survey	1984-1986	Nationally representative (?)	Cross-sectional	Not stated	(1) **Commercial:** for-profit hospitals, clinics, dispensaries, pharmacies, shops, traditional healers (2) **NGO:** nonprofit, non-governmental providers including religious groups and other charitable organizations (3) **Government:** government-owned facilities (4) **Other:** unspecified source, possibly including NGOs or other private sources when not included as a response option on the survey
Limwattananon et al. (2011)	19 SSA countries	DHS	1995-2006	Nationally representative	Repeated cross-sectional	Women with at least one delivery in survey recall period	(1) **Private institution:** private for-profit hospitals, clinics, maternity homes; NGO & not-for-profit hospitals/clinics; mission hospitals/clinics, and other private facilities (2) **Public institution:** government hospital, health center/post, maternity home, or dispensary; community health center, primary health center, or other public facility (3) **Non-institutional:** home of TBA, midwife, relative, or pregnant woman; other non-facility

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Matshidze et al. (1998)	South Africa	Facility data	1990	1 metropolitan area	Cross-sectional	All births that occurred in a health facility during study data collection period	(1) **Private facilities:** not defined (2) **Public facilities:** not defined
Measurement, Learning & Evaluation project et al. (2011)	Kenya	Household survey	2010	5 cities/urban centers	Cross-sectional	All women aged 15-49 years	(1) **Private facilities:** private hospitals, clinics, and doctors, including NGOs and FBOs (2) **Pharmacists/chemists:** not defined (3) **Public facilities:** not defined (4) **Other:** shops, kiosks, worksite clinics, voluntary counseling & testing centers
Nguyen et al. (2011)	Ethiopia, Kenya, Malawi, Rwanda, Tanzania, Uganda	DHS	1999-2006	Nationally representative	Cross-sectional & repeated cross-sectional	Women 15-49 years using modern contraceptives	(1) **Private (facilities):** for-profit hospitals and clinics (2) **Private (informal):** for-profit pharmacies and drug vendors (3) **Private not for profit:** non-governmental and faith-based providers (4) **Public:** not defined (5) **Other:** not defined
Nketiah-Amponsah and Arthur (2013)	Ghana	DHS	2008	Nationally representative	Cross-sectional	Women 15-49 years, "expectant mothers"	(1) **Private facility:** not defined (2) **Public facility:** delivered in public sector allopathic facility (3) **Home:** delivered at home without professional assistance

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
O'Meara et al. (2015)	Kenya	Household survey	2011-2012	4 districts	Cross-sectional	Women aged 18 years or above who delivered in the past 5 years	(1) **Private clinic:** not defined (2) **Hospital/Nursing home:** not defined (3) **Health center/dispensary:** not defined (4) **Home:** not defined
Obare et al. (2014)	Kenya	Household survey	2010-2012	7 districts	Repeated cross-sectional	Women aged 15-49 years who gave birth in the past 12 months or pregnant	(1) **Private facility:** not defined (2) **Public facility:** not defined (3) **Home:** not defined (4) **Other:** includes births on the way to health facility
Obare et al. (2015)	Kenya	Household survey	2010-2012	7 districts	Repeated cross-sectional	Women aged 15-49 years who gave birth in the past 12 months or pregnant	(1) **Private facility:** not defined (2) **Public facility:** not defined (3) **Home/Other/Missing (delivery care only):** not defined (4) **Other/Missing (FP only):** not defined
Olusanya et al. (2010)	Nigeria	Community survey recruited at health facility	2005-2008	Participants recruited from BCG clinics at four health centers in Lagos	Cross-sectional	Women who delivered in a hospital	(1) **Private hospital:** not defined (2) **Public hospital:** not defined
Onwujekwe et al. (2013)	Nigeria	Household survey	2010	6 states purposively selected from the 6 geopolitical zones	Cross-sectional	Female primary caregiver of childbearing age OR other woman of childbearing age OR male head of household	(1) **Private hospitals:** not defined (2) **Patent medical vendors:** not defined (3) **Pharmacy shops:** not defined (4) **Public hospitals:** not defined (5) **PHC:** not defined (6) **Others:** not defined

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Osubor et al. (2006)	Nigeria	Household survey	1999	1 rural community	Cross-sectional	Women aged 15-49 years who delivered in the past 1 year	(1) **Private clinic:** private maternity center, often owned by retired midwives (2) **Government clinic:** government-owned primary health care facility (3) **Traditional birth attendants:** members of the community who provided health services to pregnant women, informally trained
Oye-Adeniran et al. (2005)	Nigeria	Household survey	Not stated	8 local government areas in 4 randomly selected states	Cross-sectional	Women aged 15-49	(1) **Private clinic/hospital:** not defined (2) **Chemist/patent medicine shop:** not defined (3) **Market**: not defined (4) **Roadside vendor/kiosk**: not defined (5) **Drug peddler**: not defined (6) **Pharmacy**: not defined (7) **General hospital**: not defined (8) **Health center**: not defined (9) **Nursing/maternity homes**: not defined (10) **Others**: not defined
Oye-Adeniran et al. (2006)	Nigeria	Household survey	2002	4 states	Cross-sectional	Women aged 15-49 years	(1) **Chemists/patent medicine shops**: not defined (2) **Health centers:** not defined (3) **Family planning centers:** not defined (4) **General hospitals:** not defined

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Rosen and Conly (1999)	28 SSA countries	DHS	1987-1998	Nationally representative	Cross-sectional	Women 15-49 years, currently married or in union	(1) **Private commercial sector:** for-profit clinics, practitioners, and retail outlets (2) **Private non-profit sector:** not defined (3) **Public sector:** not defined
Ross et al. (2005)	31 SSA countries	DHS	1986-2003	Nationally representative	Cross-sectional	Not stated	(1) **Private medical:** not defined (2) **Other private:** not defined (3) **Public:** not defined (4) **Other:** not defined
Sidze et al. (2014)	Senegal	Household survey	2011	6 cities	Cross-sectional	Women aged 15-29 years	(1) **Private sector:** private hospitals, clinics, and other private sources (2) **Private hospital/clinic:** not defined (3) **Other private:** includes workplace clinics, youth centers, voluntary counseling and testing centers, shops, markets, and peer educators (4) **NGO/other:** not defined (5) **Public sector:** public hospitals, health centers, health posts, other public

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Tabatabai et al. (2014)	Tanzania	Facility data	2008	All 16 hospitals in 12 purposively selected districts	Cross-sectional	All normal deliveries and c-sections that were recorded in districts with access to public and FBO hospitals from January - December 2008	(1) **Faith-based organization hospitals**: faith-based not-for-profit private sector hospitals (2) **Public hospitals:** not defined
Ugaz et al. (2015)	18 SSA countries	DHS & RHS	1992-2012	Nationally representative	Repeated cross-sectional	Women 15-49 years, currently married or in union	(1) **Private sector:** private clinics, private hospitals, private doctors, private pharmacies, and non-governmental organization facilities (2) **Public sector**: government clinics, government hospitals, government health centers, public family planning clinics, social security programs, public field workers (3) **Other sources**: shops, churches, friends, others

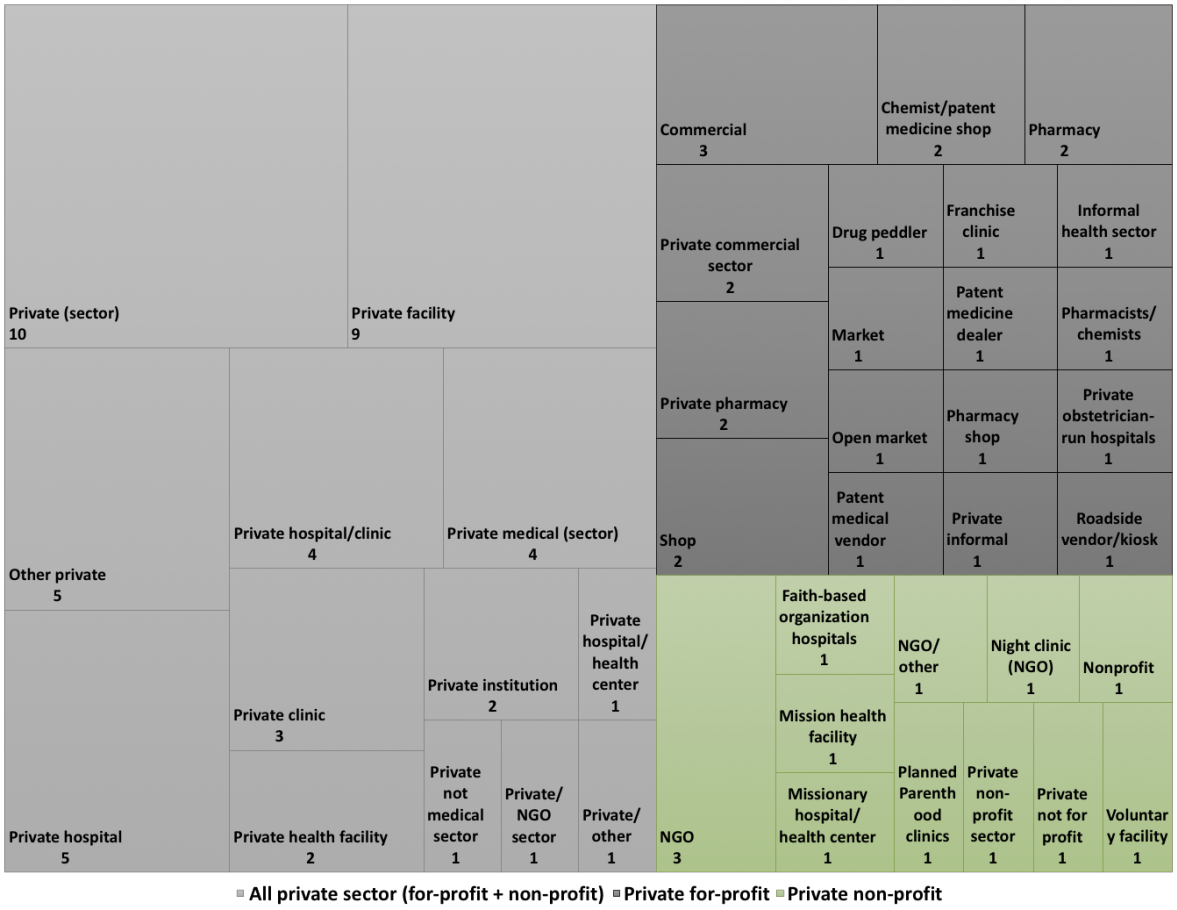
Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Waiswa et al. (2015)	Uganda	DSS	Baseline: 2007 Endline: 2011	2 districts	Cross-sectional	Baseline: Women with infants aged 1-4 months Endline: Women of childbearing age with live birth in past 12 months	(1) **Private facilities:** not defined (2) **Public facilities:** not defined
Wang et al. (2012)	Kenya, Rwanda, Tanzania, Uganda	DHS	2003-2010	Nationally representative	Cross-sectional & repeated cross-sectional	All women aged 15-49 years	(1) **Private hospital/clinic:** not defined (2) **Private pharmacy:** not defined (3) **Other private:** not defined (4) **Shop:** not defined (5) **Friends/church:** not defined (6) **Public hospital:** not defined (7) **Public health center:** not defined (8) **Public clinic/dispensary:** not defined (9) **Other or missing:** not defined
White & Corker	Mali, Uganda	Household survey	2013-2014	Nationally representative	Cross-sectional	Not stated	(1) **Private/NGO sector:** not defined (2) **Public sector:** not defined (3) **Other sector/missing:** not defined

Reference	SSA countries included in analysis	Data source	Data collection date	Survey coverage	Study design	Sample inclusion criteria	Sector categories
Winfrey et al. (2000)	17-21 SSA countries	DHS	1988-1994	Nationally representative	Cross-sectional	Not stated	(1) **Commercial:** private sector pharmacies, shops, doctors, midwives, hospitals, clinics (2) **NGO:** subsidized private sector providers (3) **Public:** not defined (4) **Social Security:** government-organized insurance schemes (5) **Other:** not defined
Wodon et al. (2012)	36 SSA countries	DHS	1987-2008/9	Nationally representative	Cross-sectional	Family planning: current users of any family planning method Delivery care: Not stated	(1) **Private medical:** private secular and faith-inspired hospitals, clinics, pharmacies, doctors, mobile clinics, fieldworkers, other clinics, maternity homes, and other private medical care (2) **Public:** government hospitals, clinics, health posts, mobile clinics, fieldworkers, and other public providers (3) **Other:** Shops, markets, traditional practitioners, drug peddlers
Yoong et al. (2010)	34 SSA countries	DHS	1995-2008	Nationally representative	Cross-sectional	All live births	(1) **Private health facility:** for-profit or non-profit/mission hospitals, clinics, health centers (2) **Public health facility**: public hospitals, clinics, health centers

APPENDIX 3: NUMBER OF STUDIES REPORTING RESULTS BY COUNTRY (CH.2)

*Two studies excluded because authors omitted the dates of data collection.

APPENDIX 4: UNIQUE TERMS TO DESCRIBE PRIVATE SECTOR SOURCES OF FAMILY PLANNING AND CHILDBIRTH SERVICES (CH.2)



APPENDIX 5: FAMILY PLANNING AND CHILDBIRTH SERVICE MARKET SHARE AND COVERAGE ESTIMATES (CH.2)

Family planning market share

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Agha & Do (2008)	Most recent FP supply	Private commercial sector market share for modern methods	**Kenya** 9.2% (1989) - 32.2% (2003) **Ghana** 24.5% (1988) - 42.4% (2003)	Number of women who most recently received their FP method from private source	Current users of modern contraception aged 15-49 years, married or in union	Not stated
Amin (1998)	Not stated	Planned parenthood market share for contraceptive users	20.8%	Number of women who obtained method from Planned Parenthood	Current users of any FP aged 12-49 years	Not stated
Aremu (2013)	Not stated	Private sector market share for modern methods	55.30%	Number of women who received their FP method from private source	Current users of modern contraception aged 15-49 years, ever married (?)	Not stated

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Ayad et al. (1994)	Most recent FP supply	Private sector market share for: (a) all modern methods; (b) clinical vs. supply methods; (c) individual methods	2% (Burundi) - 63% (Liberia)	Number of women who most recently received their FP method by source	Current users of modern contraception aged 15-49 years, married or in union	"Don't know" and missing responses excluded from analysis
Berman & Rose (1996)	Not stated	Private market share for contraceptive users	**Botswana** 7.3% **Kenya** 27.8% **Sudan** 35.9% **Uganda** 44.1%	Number of women who obtained method from private sector source	"Reported use"	Not stated
Campbell et al. (2015)	Most recent FP supply	Private sector market share for modern methods among (a) all users, (b) users with classifiable source	(a) 35% (b) 38%	Number of women who most recently obtained their modern FP method from a private sector source	All women aged 15-49 years who are currently using modern FP from a source with a classifiable sector	Provided estimates including and excluding women with missing information on sector of care

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Campbell et al. (2016)	Not stated	Private market share for: (a) Users of modern methods (b) Users of appropriate delivery care	(a) Overall: 38%; Range (6% - 80%) (b) Overall: 22%; Range (0% - 77%)	(a) Number of women who obtained method from private sector source (b) Number of women who delivered their most recent child in the private sector	(a) All women aged 15-49 years who are currently using modern FP from a source with a classifiable sector (b) All women 15-49 years who used appropriate care from a classifiable sector	Women with source of care whose sector or location of care could not be classified were excluded from analysis
Chakraborty et al. (2016)	Not stated	(a) Franchised clinic market share for current FP users (b) Other private market share for current FP users	(a) 1.58% - 16.78% (b) 20.12% - 27.89%	Number of women who obtained their method from a private source	Current users of any FP, aged 15-49 years and sexually active	Not stated

Chapman et al. (2012)	Most recent condom supply	(a) Private market share for condoms (b) Pharmacy market share for condoms (c) Shop market share for condoms	**MEN** **(a)** T1: 0.1% (Cameroon, 1998) - 17.6% (Malawi, 2000) T2: 0.7% (Guinea, 2005) - 11.6% (Uganda, 2006) **(b)** T1: 0.1% (Malawi, 2000) - 36.9% (Guinea, 1999) T2: 0.1% (Malawi, 2004) - 13.6% (Mali, 2006) **(c)** T1: 9.3% (Namibia, 2000) - 83.3% (Benin, 2001) T2: 40.4% (Zambia, 2007) - 70.7% (Kenya, 2003) **WOMEN** **(a)** T1: 0.7% (Cameroon, 1998) - 16.0% (Malawi, 2000) T2: 0.9% (Namibia, 2000) - 15.8% (Uganda, 2006) **(b)** T1: 0.0% (Malawi, 2000) - 26.5% (Cameroon, 1998) T2: 0.1% (Malawi, 2004) - 26.0% (Mali, 2006) **(c)** T1: 20.6% (Namibia, 2000) - 72.9% (Benin, 2001) T2: 31.3% (Zambia, 2007) - 67.4% (Cameroon, 2004)	Number of wo(men) who obtained their condom from a private source	Wo(men) who used a condom at last intercourse with non-marital, non-cohabiting partner	Not stated

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Delamou et al.(2014)	Not stated	Private sector market share for (a) oral contraceptives, (b) injectables, (c) condoms	1999 - 2005 (a) 43.6% - 46.6% (b) 17.6% - 10.1% (c) 83.1% - 46.6%	Number of women who obtained method from a private medical or not medical sector source	not stated	Included in other/unspecified category
Egede et al. (2015)	Not stated	(a) Private hospital market share for modern FP (b) Patent medicine dealer market share for modern FP (c) Open market market share for modern FP	(a) 13% (b) 51% (c) 5%	Number of women who received FP from a private sector source	Current users of modern FP	Not stated
Fotso et al. (2013)	Not stated	Private/other sector market share for modern methods	1993: 43.5% 1998: 47.4% 2003: 55.1%	Number of women who received modern FP from private/other source	Current users of modern contraception, currently married	Not stated
Hopstock et al. (1997)	Most recent FP supply	n/a	n/a	n/a	n/a	n/a

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Hotchkiss et al. (2011)	Most recent FP supply	Private commercial share for modern methods	**Nigeria** 1999: ~35% 2008: ~59% **Uganda** 1989: ~10% 2006: ~55%	Number of women who most recently obtained method from a private commercial source	Current users of modern contraception aged 15-49 years, married or in union	Not stated
Khan et al. (2007)	Most recent FP supply	(a) Private medical market share for modern methods (b) NGO market share for modern methods	(a) Lowest: 8%, Burkina Faso, 2003 Highest: 57%, Nigeria, 2003 (b) Lowest: 0%, many countries Highest: 12%, Malawi, 2000 How to show changes over time for multple countries?	Number of women who most recently obtained method from a private medical or NGO source	Current users of modern contraception aged 15-49 years, married or in union	Not stated
Lafort et al. (2016)	Most recent FP supply	(a) Private clinic market share for FP (b) Night clinic/NGO market share for FP (c) Informal health sector market share for FP	(a) 0.8% (b) 30.1% (c) 15.1%	Number of women who received FP from a private sector source	Current users of any FP	Not stated

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Lewis & Kenney (1988)	Not stated	(a) Commercial market share for all (modern & traditional) FP methods (b) NGO market share for all (modern & traditional) FP methods	**Kenya** (a) 8.4% (b) 32.2% **Liberia** (a) 18.3% (b) 48.2% **Senegal** (a) 50.0% (b) -- **Zaire** (a) 28.7% (b) 3.6% **Zimbabwe** (a) 9.2% (b) 46.2%	Number of women who received FP from a private sector source	Current users of any FP	Not stated

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Measurement, Learning & Evaluation project et al. (2011)	Most recent FP supply	(a) Private facility market share for modern methods (b) Pharmacy/chemist market share for modern methods	(a) ~10% (Kakamega) - 44% (Mombasa) (b) 11% Kakamega - 25% (Nairobi)	Number of women who most recently obtained method from a private sector source	Current users of modern contraception, aged 15-49 years	Not stated
Nguyen et al. (2011)	Not stated	(a) Private for profit (facilities) market share for modern methods (b) Private for profit (pharmacies) market share for modern methods (c) Private not for profit market share for modern methods	Exact figures not given -- displayed in bar chart; also gives private market share for pills, IUDs, and condoms separately	Number of women who obtained method from private sector source	Current users of modern contraception aged 15-49 years	Not stated
Obare et al. (2015)	Most recent FP supply	Private facility market share for any FP	2010/11: 14.4% - 15.6% 2012: 70.7% - 71.4%	Number of women who received FP from private facility	All women who used FP in the past 12 months	Including in other sector/missing category

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Onwujekwe et al. (2013)	Not stated	Market share for individual methods	Oddly defined/calculated	Number of individuals that received method from private hospital, pharmacy, or patent medical vendor	Not clear	Not stated
Oye-Adeniran et al. (2005)	Not stated	(a) Private clinic/hospital market share for all FP methods (b) Chemist/patent medicine shop (c) Market vendor market share for all FP methods (d) Roadside vendor/kiosk market share for all FP methods (e) Drug peddler market share for all FP methods	(a) 10.2% (b) 19.7% (c) 4.5% (d) 0.8% (e) 0.4%	Number of women who procured their method from sources (a)-(e)	Current users of any FP, 15-49 years	Not stated

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Oye-Adeniran et al. (2006)	First FP supply	Chemists/patent medicine shop market share for FP	16.40%	Number of women who received FP from a chemist/patent medicine shop	Women who had ever used contraception (?)	Women without information on first source of care were excluded from analysis
Rosen and Conly (1999)	Not stated	Private commercial share for modern methods	27% 0.3% (Rwanda, 1992) - 68% (Cote d'Ivoire, 1994)	Number of women using modern contraception from a private commercial source	Current users of modern contraception aged 15-49 years, married or in union	Not stated
Ross et al. (2005)	Not stated	(a) Private medical market share for modern methods (b) Other private market share for modern methods	(a) 1.2% (Burundi, 1987) - 53.9% (Liberia, 1986) (2) 0.0% (Eritrea, 2002) - 35.8% (Togo, 1998)	Number of women using modern contraception from a private medical or other private source	Current users of modern contraception	Included in the denominator

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Sidze et al. (2014)	Most recent FP supply	(a) Private (commercial) sector market share for modern methods (b) Private hospital/clinic market share for modern methods (c) Other private market share for modern methods (d) NGO/other market share for modern methods	(a) 26.1% (b) 8.2% (c) 17.9% (d) 7.4%	Number of women who received FP from a private sector source	Current users of modern contraception, aged 15-29 years	Not stated
Ugaz et al. (2015)	Not stated	(a) Private medical sector market share for modern methods (b) Private medical sector market share for long acting/permanent methods (c) Private medical sector market share for short-acting methods	**1992-2000** (a) Overall: 27% (b) Overall: 1.2%; Range: **1998-2006** Overall: 30% Range: **2005-2012** Overall: 28% Range:	Number of women using modern contraception from a private sector source	Current users of modern contraception aged 15-49 years, married or in union	Not stated

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Wang et al. (2012)	Most recent FP supply	(a) Private hospital/clinic (excl. condoms) (b) Private pharmacy market share for modern methods (excl. condoms) (c) Other private market share for modern methods (excl. condoms) (d) Shop market share for modern methods (excl. condoms)	**Kenya (2003 & 2008/09)** (a) 27.1% (2008/09) - 36.6% (2003) (b) 5.3% (2003) - 9.2% (2008/09) (c) 0.6% (2008/09) - 1.9% (2003) (d) 0.1% (2008/09) - 0.2% (2003) **Rwanda (2007/08)** (a) 3.0% (b) 0.5% (c) 2.2% (d) 0.0% **Tanzania (2004/05)** (a) 9.6% (b) 5.9% (c) 4.0% (d) 0.4% **Uganda (2006)** (a) 47.8% (b) 5.8% (c) 0.8% (d) 0.0%	Number of women who most recently obtained method from a private sector source	Current users of modern contraception (excl condoms) aged 15-49 years, married or in union	Included in other/missing category

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
White & Corker	Not stated	Private/NGO market share for IUDs	**Mali:** 21.7% **Uganda:** 50.4%	Not stated	Not stated	Including in other sector/missing category
Winfrey et al. (2000)	Most recent FP supply	(a) Commercial market share for modern methods (b) NGO market share for modern methods	(a) ~5% (Niger) - 50% (Cameroon) (b) ~0.0% (Niger) - 50% (Liberia)	Number of women who obtained method from private sector source	Current users of modern contraception, married or in union	Not stated
Wodon et al. (2012)	Not stated	(a) Private medical sector market share for modern FP (b) Private medical sector market share for non-modern FP	(a) Simple average: 27.98% 1.78% (Sao Tome & Principe, 2008/9) - 61.16% (Nigeria, 2008) (b) Simple average: 9.24% 0.63% (Mozambique, 2003) - 33.45 (DRC, 2007)	Number of women who received FP from a private sector source	(a) Modern family planning users (b) Non-modern family planning users	Not stated

Childbirth service market share

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Benova et al. (2015)	Most recent birth	Private sector market share for delivery care among: (a) all women who used appropriate care (in facility or with SBA), (b) women who used appropriate care in classifiable sector	(a) 20% (b) 22%	Number of women who deliverd in a private sector source	(a) All women who used appropriate care (b) Women who used appropriate care from a classifiable sector	Provided estimates including and excluding women with missing information on sector of care
Campbell et al. (2016)	Most recent birth	Private market share for users of appropriate delivery care	Overall: 22%; Range (0% - 77%)	Number of women who delivered their most recent child in the private sector	All women 15-49 years who used appropriate care from a classifiable sector	Women with source of care whose sector or location of care could not be classified were excluded from analysis
Echoka et al. (2013)	All births captured in facility records during study period	(a) Private market share for facility births (b) Voluntary market share for facility births	(a) 10.0% (b) 2.8%	Number of births that occurred in a private or voluntary facility	All births recorded in facility records	Not stated
Matshidze et al. (1998)	All births captured in facility records during study period	Private market share for facility births	15%	Number of women who delivered in private facility	All women who delivered in a facility	Not stated

Reference	Unit of analysis	Outcome	Private sector market share estimate(s)	Numerator	Denominator	Treatment of missing information (source of care)
Olusanya et al. (2010)	Not stated	Private market share for hospital births	50.3%	Number of women who delivered in a private hospital	Women who sought care at selected BCG clinics and gave birth in a hospital	Not stated
Tabatabai et al. (2014)	All births captured in facility records during study period	(a) NGO market share for normal deliveries in hospitals (b) NGO market share for c-sections in hospitals	(a) 27.6% (b) 47.9%	Number of normal deliveries or c-sections that occurred in an FBO hospital	All births recorded in hospital records as belonging to women who delivered at a hospital in their home district	Not stated
Waiswa et al. (2015)	Not stated	Private sector market share for facility deliveries at endline	Baseline: 36% Endline: 22%	Number of women who delivered in a private facility	All women of childbearing age who delivered in a health facility	Not stated

Family planning coverage

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
Campbell et al. (2015)	Most recent FP supply	Private sector coverage of modern FP need	Overall: 14% 2.1% (Chad, 2004) - 29.5% (Swaziland, 2006/7)	(a) Using a modern method OR (b) Did not desire birth in next 2 years & married or have had sex in past 30 days AND (c) Not infecund or menopausal	Number of women who most recently obtained their modern FP method from a private sector source	All women aged 15-49 years in need of family planning	Women with missing information on FP need considered to not have FP need; no missing information on delivery need; women who sought care from unclassifiable source not included in private sector
Campbell et al. (2016)	Not stated	Private sector coverage of: (a) modern family planning need (b) delivery care need	(a) Overall: 14% (b) Overall: 10%	(a) see Campbell et al (2015) (b) All women with birth in survey recall period	(a) Number of women who obtained a modern method from a private sector source (b) Number of women who received appropriate delivery care in the private sector	(a) All women in need of FP (b) All women who gave birth in survey recall period	Women with missing information on FP need considered to not have FP need; no missing information on delivery need; women who sought care

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
							from unclassifiable source not included in private sector
Hopstock et al. (1997)	Most recent FP supply	Proportion of married women using a modern method from: (a) Commercial source (b) Nonprofit source	(a) 0.0% (Burundi, 1987) - 4.9% (Ghana, 1993) (b) 0.0% (Burundi, 1987; Niger, 1992; Rwanda, 1992) - 6.7% (Kenya, 1993)	All women aged 15-49 years, married or in union	Number of women using modern FP from a private source	All women aged 15-49 years, married or in union	Included in "other" category
Ugaz et al. (2015)	Not stated	Proportion of married women using: (a) long acting/permanent modern FP from private sector source (b) short acting modern FP from private sector source	1992-2000: (a) 0.8%, (b) 2.4% 1998-2006: (a) 0.9%, (b)3.9% 2005-2012: (a) 1.1%, (b) 4.6%	All women aged 15-49 years, married or in union	Number of women using modern FP from a private sector source	All women aged 15-49 years, married or in union	Not stated

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
Winfrey et al. (2000)	Most recent FP supply	Proportion of married women using a modern method from the commercial sector	0.02% (Mali, 1987) - 5.36% (Zimbabwe,1994)	All women married or in union	Number of women using modern FP from a commercial source	All women married or in union	Not stated

Childbirth service coverage

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
Adogu et al. (2014)	Most recent birth	Private facility coverage of delivery care	18.9% (rural) - 50.5% (urban)	All women with birth in past 5 years	Number of women who delivered in a private hospital	All women who gave birth in the past 5 years	Included in "no response" category
Bazant et al. (2009)	Not stated	Private sector coverage of delivery care	45%	All women with birth in study recall period	Number of women who delivered in a private sector facility	All women aged 15-49 years who gave birth in recall period	Not stated
Bell et al. (2003)	All live births in study recall period	Private facility coverage of delivery care	**Ghana** 1988: unknown 1993: 5.1% 1998: 5.4% **Malawi** 1992: 10.5% 2000: 10.5%	All live births that occurred within 3 years prior to survey	Number of births delivered in a private sector hospital or health center	All live births that occurred in the 3 years before the survey (multiples only counted once)	Not stated
Benova et al. (2015)	Most recent birth	Private sector coverage of delivery care	10%	All women with birth in study recall period	Number of women who delivered in a private sector facility	All women aged 15-49 years who gave birth in recall period	Women whose source of care was missing or could not be classified were included in an "unclassifiable" category

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
Brugha et al. (2003)	Not stated	Private sector coverage of delivery care	11.20%	Not stated	Number of women who delivered in a private sector facility	Not stated	Not stated
Campbell et al. (2016)	Most recent birth	Private sector coverage of delivery care need	Overall: 10%	All women with birth in survey recall period	Number of women who received appropriate delivery care in the private sector	All women who gave birth in survey recall period	Women with missing information on FP need considered to not have FP need; no missing information on delivery need; women who sought care from unclassifiable source not included in private sector
Echoka et al. (2013)	All births captured in facility records during study period	n/a	n/a	n/a	n/a	n/a	n/a
Ganle et al. (2014)	Most recent live birth or stillbirth	Private facility coverage of delivery care	11%	All women with a live birth or stillbirth in the study recall period	Number of women who delivered in a private sector facility	All women aged 15-49 years with live birth or still birth in study recall period	Women whose source of care was missing were included in a "missing" category

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
Hodgkin (1996)	Most recent birth that occurred in a household	(a) Missionary hospital/health center coverage of delivery care (b) Private hospital/health center coverage of delivery care	(a) 16.7% (b) 2.0%	All births that occurred within 1 year prior to the survey	Number of births that occurred in a private facility	All women who gave birth in the past 1 year	Only described for the covariates, not the outcome
Ikeako et al. (2006)	Most recent birth	Private obstetrician-run hospital coverage of delivery care	17.7%	All births that occurred within 3 months prior to survey	Number of births delivered in private obstetrician-run hospital	All births that occurred in the 3 months before the survey	Not stated
Iyaniwura & Yussuf (2009)	Most recent birth	Private hospital coverage of delivery care	24.5%	All births that occurred within 5 years prior to survey	Number of births delivered in a private hospital	All births that occurred within 5 years prior to survey	Not stated
Johnson et al. (2009)	Most recent birth	Private institution coverage of delivery care	1998: 11.4% 2003: 8.6%	All women with a birth in the study recall period	Number of women who delivered in a private institution	All women with a birth in study recall period	Not stated
Kruk et al. (2009)	Most recent birth	Mission health facility coverage of delivery care	17.0%	All women with birth in past 5 years	Number of births that occurred in a mission facility	All women who gave birth in the past 5 years	Not stated

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
Limwattananon et al. (2011)	Woman-based definition, all births pooled and source of care determined by algorithm: Public: At least one delivery in a public institution, regardless of where the other births occurred Private (only): At least one delivery in a private institution, with no deliveries in a public institution Non-institutional:	Private institutional (only) coverage	Estimates difficult to ascertain from included figure	Women with at least one delivery in survey recall period	Number of women who fulfill criteria for "private institutional" category	All women with at least one delivery in survey recall period	Not stated

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
	All births occured in a non-institutional setting						
Matshidze et al. (1998)	All births captured in facility records during study period	n/a	n/a	n/a	n/a	n/a	n/a
Measurement, Learning & Evaluation project et al. (2011)	Most recent birth	Private facility coverage of delivery care	17% (Kakamega) - 44% (Nairobi)	All women with birth in study recall period	Number of women who delivered in a private sector facility	All women aged 15-49 years who gave birth in recall period	Not stated
Nketiah-Amponsah and Arthur (2013)	Not stated	Proportion of expectant mothers who delivered in a private facility	No overall estimate given; only given for sub-groups	Not stated	Number of women who delivered in a private sector facility	All women aged 15-49 who are expectant mothers	Not stated
O'Meara et al. (2015)	Most recent birth	Private clinic coverage of delivery care	0.5% - 5.2%	All women who gave birth within 5 years prior to survey	Number of births that occurred in a private clinic	All births that occurred in the 5 years before the survey	Not stated

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
Obare et al. (2014)	All births that occured in 2 years before survey	Private facility coverage of delivery care	2010/11: 6.5% - 21.1% 2012: 13.2% - 29.9%	All births that occurred within 2 years prior to data collection	Number of births that occurred in a private facility	All births that occurred in the 2 years before the survey	Not stated
Obare et al. (2015)	Most recent live birth in 2 years before the survey	Private facility coverage of delivery care	2010/11: 12.7% - 14.1% 2012: 13.0% - 21.9%	All women who gave birth within 2 years prior to data collection	Number of births that occurred in a private facility	All women with at least one delivery in 2 years before the survey	Included in home/missing/other category
Olusanya et al. (2010)	Not stated	n/a	n/a	n/a	n/a	n/a	n/a
Osubor et al. (2006)	Not stated	Private clinic coverage of delivery care	49.4%	All women with birth in the past 1 year	Number of women who delivered in a private clinic	All women aged 15-49 who delivered in the past 1 year	Not stated
Tabatabai et al. (2014)	All births captured in facility records during study period	n/a	n/a	n/a	n/a	n/a	n/a

Reference	Unit of analysis	Outcome	Estimate	Need definition	Numerator	Denominator	Treatment of missing information
Waiswa et al. (2015)	Not stated	Private facility coverage of delivery care	Baseline: 25.1% Endline: 17.4%	Baseline: All women who have a child 1-4 months Endline: All women of childbearing age with live birth in past 12 months	Number of women who delivered in a private sector facility	Baseline: All women who have a child 1-4 months Endline: All women of childbearing age with live birth in past 12 months	Women whose source of care was missing were included in a "missing" category
Wodon et al. (2012)	Most recent birth	Private medical sector coverage of delivery care	Simple average: 6.78% 0.11% (Comoros, 1996) - 21.81% (DRC, 2007)	Most recent birth	Number of women who delivered in the private sector for their last birth	All women who gave birth (unspecified period)	Not stated
Yoong et al. (2010)	All live births in study recall period	Private facility coverage of delivery care	Simple average: 7.7%	All live births that occurred within 3 years prior to survey	Number of births delivered in a private sector facility	All live births that occurred in the 3 years before the survey	Not stated

APPENDIX 6: GENERAL DISCUSSION GUIDE FOR QUALITATIVE INTERVIEWS (CH.4)

Ice breaker	Probes and follow up questions
Q1: First I would like to know more about your role with regards to health and development in Kenya.	- Please describe the type of work you do in your current position
Topic I: Policy development & strategies for engaging with the private sector for health	
Q2: I would like us to discuss the policies and programs aimed at engaging the private sector for health in Kenya.	-Could you please describe any government policies or programs that you are aware of that pertain to engaging with the private sector for health? **For each policy/program, probe for:** - **content of the policy/program** - **intended beneficiaries** - **who developed them** - **how & why they were developed** - **challenges to implementation** - **what impact they have had** - How well do you think these different policies and programs are aligned or coordinated? Please explain why.
Q3: Now I would like us to discuss existing strategies for engaging the private sector specifically for the provision of maternal and reproductive health services.	-Could you please describe any additional government policies or programs that you are aware of that pertain specifically to engaging with the private sector to provide maternal and reproductive health services? **For each policy/program, probe for:** - **content of the policy/program** - **intended beneficiaries** - **who developed them** - **how & why they were developed** - **challenges to implementation** - **what impact they have had** - How well do you think these different policies and programs are aligned or coordinated? Please explain why.
Topic II: Private sector & the path to universal health coverage	
Q4: The Kenyan government is currently making efforts to expand coverage of NHIF and ensure universal access to healthcare.	- In which ways do you think the private sector could help the government to achieve these goals? -Please describe any reservations you have about private sector involvement in efforts to expand access to healthcare.

Q5: Looking specifically at maternal health, the government began providing free maternity services in June 2013.	- How important you think it is for the government to engage with the private sector to expand access to services, such as maternity care, that are provided for free in all government health facilities? Please explain why.
Topic III: Reflections & recommendations	
Q6: We have discussed the various ways in which the Kenyan government has worked with the private sector in efforts to improve access to health services. For the next few questions, I would like you to reflect on Kenya's experiences think about what recommendations you would give to a policymaker considering whether or not to engage with the private sector to expand access to health services in their country.	-In general, to what extent do you think that the private sector should be involved in helping governments to achieve their developmental goals? Please explain why.
Q7	-What have been the top strengths and weaknesses of the Kenyan government's approach to engaging with the private sector to expand access to health services?
Q8	- In which ways have the political, social, and/or economic conditions in Kenya contributed to the success or failure of efforts to engage private sector health actors?
Q9: We have now come to the end of the interview.	- Is there anything else you would like to add to our discussion that we have not yet covered?

APPENDIX 7: LIST OF GOVERNMENT POLICY DOCUMENTS REVIEWED (CH. 4)

Policy document	Year
Sessional Paper 10	1965
Kenya's Health Policy Framework	1994
The National Implementation Plan: Kenya Family Planning Program (1995-2000)	1995
National Hospital Insurance Fund Act	1998
Adolescent Reproductive Health Development Policy	2003
Economic Recovery Strategy for Wealth and Employment Creation 2003-2007	2003
Adolescent Reproductive Health and Development Policy Plan of Action (2005–2015)	2005
Reversing the trends: the second national health sector strategic plan of Kenya, NHSSP II 2005-2010	2005
National Reproductive Health Policy: Enhancing Reproductive Health Status for All Kenyans	2007
Kenya Vision 2030	2007
Ministry of Public Health and Sanitation Strategic Plan 2008-2012	2008
National Human Resources for Health Strategic Plan 2009–2012	2009
National Reproductive Health Strategy 2009-2015	2009
Reproductive Health Communication Strategy Implementation Guide (2010-2012)	2010
National Roadmap for accelerating the attainment of the MDGs related to Maternal and Newborn Health in Kenya	2010
Policy Statement on Public Private Partnerships	2011
Comprehensive National Health Framework Policy (draft**)	2011
Public Health Act	2012
Sessional Paper No. 7 of 2012 on the Policy on Universal Health Care Coverage in Kenya	2012
Public Private Partnership Act	2013

Health Sector Strategic and Investment Plan (KHSSP): July 2013-June 2017	2014
Kenya Health Policy 2014-2030	2014
Human Resources for Health Norms and Standards Guidelines for the Health Sector	2014
Health Sector Human Resources Strategy 2014-2018	2014
Kenya Health Sector Referral Strategy	2014
Kenya Reproductive, Maternal, Newborn, Child, and Adolescent Health Investment Framework	2016
Health Bill	2016

APPENDIX 8: CONFIRMATION OF ETHICS APPROVAL FROM LSHTM (CH. 4-7)

London School of Hygiene & Tropical Medicine
Keppel Street, London WC1E 7HT
United Kingdom
Switchboard: +44 (0)20 7636 8636

www.lshtm.ac.uk

Observational / Interventions Research Ethics Committee

Ms. Mardieh Dennis
LSHTM

12 May 2017

Dear Mardieh

Study Title: Access, Equity, and Use of Private Sector Family Planning and Childbirth Services in Sub-Saharan Africa

LSHTM Ethics Ref: 12237

Thank you for responding to the Observational Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation as revised, subject to the conditions specified below.

Conditions of the favourable opinion

Approval is dependent on local ethical approval having been received, where relevant.

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document Type	File Name	Date	Version
Protocol / Proposal	DHS7_Household_QRE_EN_24Apr2015_DHSQ7	24/04/2015	7
Protocol / Proposal	DHS7_Womans_QRE_EN_20May2015_DHSQ7	20/05/2015	7
Protocol / Proposal	Kenya_HHQuestionnaire_2010	22/02/2017	1
Protocol / Proposal	Kenya_WomensQuestionnaire_2010	22/02/2017	1
Protocol / Proposal	Kenya_HHQuestionnaire_2012	22/02/2017	1
Protocol / Proposal	Kenya_WomensQuestionnaire_2012	22/02/2017	1
Protocol / Proposal	Kenya_HHQuestionnaire_2016	22/02/2017	1
Protocol / Proposal	Kenya_WomensQuestionnaire_2016	22/02/2017	1
Investigator CV	MardiehDennisCV_Feb2017	22/02/2017	1
Investigator CV	CV_OonaCampbell_Feb2017	22/02/2017	1
Investigator CV	CVformal_Lenka_Benova_Feb_2017_1	22/02/2017	1
Local Approval	Approval letter_P222-2016	22/02/2017	1
Information Sheet	ConsentForm	24/02/2017	1
Protocol / Proposal	PhD_Protocol_2017-02-28	28/02/2017	2
Information Sheet	InformationSheet	28/02/2017	2
Information Sheet	InformationSheet_v3	05/05/2017	3
Information Sheet	ConsentFormv2	05/05/2017	2
Covering Letter	coverletter_ethics_2017_May_05	05/05/2017	1

After ethical review

The Chief Investigator (CI) or delegate is responsible for informing the ethics committee of any subsequent changes to the application. These must be submitted to the Committee for review using an Amendment form. Amendments must not be initiated before receipt of written favourable opinion from the committee.

The CI or delegate is also required to notify the ethics committee of any protocol violations and/or Suspected Unexpected Serious Adverse Reactions (SUSARs) which

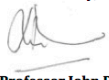
occur during the project by submitting a Serious Adverse Event form.

At the end of the study, the CI or delegate must notify the committee using an End of Study form.

All aforementioned forms are available on the ethics online applications website and can only be submitted to the committee via the website at: http://leo.lshtm.ac.uk

Additional information is available at: www.lshtm.ac.uk/ethics

Yours sincerely,



Professor John DH Porter
Chair

ethics@lshtm.ac.uk
http://www.lshtm.ac.uk/ethics/

APPENDIX 9: CONFIRMATION OF ETHICS APPROVAL FROM AMREF HEALTH AFRICA (CH.4,6,7)

amref health africa

Amref Health Africa in Kenya

REF: AMREF – ESRC P222/2016 March 23, 2016

Timothy Abuya
Population Council
Phone: +254 20 2713480
Email: tabuya@popcouncil.org

Dear Dr. Abuya,

RESEARCH PROTOCOL: EVALUATION OF THE IMPACT OF REMOVAL OF USER FEES FOR MATERNAL HEALTH SERVICES ON UNIVERSAL HEALTH COVERAGE IN KENYA

Thank you for submitting your research protocol to the AMREF Ethics and Scientific Review Committee (ESRC).

This is to inform you that the ESRC has approved your protocol. The approval period is from March 23, 2016 to March 23, 2017 and is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.

b) All changes (amendments, deviations, violations etc) are submitted for review and approval by AMREF ESRC before implementation.

c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the ESRC immediately.

d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to AMREF ESRC immediately.

e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period (attach a comprehensive progress report to support the renewal).

f) Clearance for export of biological specimen or any form of data must be obtained from AMREF ESRC, NACOSTI and Ministry of Health for each batch of shipment/export

g) Submission of an executive summary report within 90 days upon completion of the study. This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

Please do not hesitate to contact the ESRC Secretariat (esrc.kenya@amref.org) for any clarification or query.

Yours sincerely,

Prof. Mohamed Karama
Chair, AMREF ESRC

CC: Dr. George Kimathi, WASH Programme Manager, AMREF Kenya and Vice Chair AMREF ESRC
Samuel Muhula, Monitoring & Evaluation and Research Manager, AMREF Kenya

APPENDIX 10: SAMPLE SIZES FOR TIME SERIES ANALYSIS (CH.5)

	TOTAL SAMPLE				NON-WEALTHY SAMPLE				WEALTHY SAMPLE			
Half-year	All most recent births, weighted (N=14,901)	1+ ANC users, weighted (N=13,962)	Public facility ANC users, weighted (N=11,183)	Public primary care facility ANC users, weighted (N=7,239)	All most recent births, weighted (N=8,793)	1+ ANC users, weighted (N=8,065)	Public facility ANC users, weighted (N=6,771)	Public primary care facility ANC users, weighted (N=4,986)	All most recent births, weighted (N=6,108)	1+ ANC users, weighted (N=5,897)	Public facility ANC users, weighted (N=4412)	Public primary care facility ANC users, weighted (N=2,253)
1997h2	90	83	53	34	46	40	29	23	44	42	24	11
1998h1	178	161	113	70	98	82	58	35	79	79	54	36
1998h2	227	213	163	105	121	109	92	62	106	103	71	43
1999h1	259	230	153	89	145	126	84	53	114	105	69	36
1999h2	317	291	214	143	181	159	116	74	137	132	98	69
2000h1	362	336	216	146	222	201	122	91	141	135	93	56
2000h2	468	427	303	204	296	266	196	143	171	160	108	61
2001h1	578	518	376	261	367	316	227	178	210	201	148	83
2001h2	664	598	422	304	430	378	275	218	234	220	147	86
2002h1	642	561	390	275	410	353	236	186	232	208	154	89
2002h2	267	239	181	125	159	136	102	76	108	103	78	49
2003h1	65	59	51	21	22	19	15	8	43	40	35	12
2003h2	176	160	136	73	74	69	60	42	101	92	77	32
2004h1	216	198	167	121	108	99	84	69	108	100	83	52
2004h2	251	231	186	123	130	114	100	71	121	117	86	52
2005h1	301	287	236	157	158	147	128	96	143	140	108	61
2005h2	456	421	351	247	290	271	239	180	166	150	112	68
2006h1	448	424	336	226	270	251	215	165	178	173	122	60
2006h2	547	506	414	266	324	295	244	190	222	211	170	76
2007h1	575	534	443	263	360	324	283	197	215	210	160	67
2007h2	613	562	473	322	400	363	318	237	213	199	154	85
2008h1	326	298	251	175	212	187	163	123	115	110	88	52
2008h2	118	116	108	52	61	59	58	35	57	57	50	17
2009h1	365	341	290	153	164	151	135	85	201	190	155	69
2009h2	467	457	363	210	219	212	193	131	248	245	170	79
2010h1	507	492	401	239	269	257	222	165	238	235	178	74
2010h2	620	600	486	302	331	315	281	205	289	285	205	97
2011h1	664	645	533	342	373	357	319	225	291	288	214	117
2011h2	802	774	625	406	465	443	402	302	336	332	223	104
2012h1	848	826	695	449	507	486	435	327	341	340	260	122
2012h2	981	944	801	519	607	575	519	382	373	369	282	136

APPENDIX 11: RESULTS FROM TIME SERIES ANALYSIS STRATIFIED BY RESIDENCE (CH.5)

Table A11.1: Use of 4+ ANC among most recent births

	4+ ANC (all women)		4+ ANC (rural)		4+ ANC (urban)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	63.3% [57.5%,67.1%]		56.1% [50.1%,62.1%]		84.0% [78.8%,89.1%]	
Pre-policy half-yearly trend	-1.2% [-2.2%,-0.3%]	0.009	-0.9% [-1.9%,0.2%]	0.095	-2.3% [-3.1%,-1.6%]	<0.001
Immediate change in level	+1.2% [-10.8%,13.2%]	0.842	-1.6% [-13.7%,10.6%]	0.796	+12.5% [3.3%,21.7%]	0.010
Immediate change in slope	+2.2% [1.1%,3.4%]	0.001	+1.7% [0.4%,3.0%]	0.012	+2.7% [1.9%,3.6%]	<0.001
Post-policy half-yearly trend	+1.0% [0.3%,1.6%]	0.004	+0.8% [0.2%,1.4%]	0.012	+0.4% [-0.1%,0.9%]	0.095

Table A11.2: Early ANC initiation among users of 1+ ANC

	Early ANC (all women)		Early ANC (rural)		Early ANC (urban)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	14.0% [10.2%,17.9%]		10.7% [6.9%,14.5%]		23.0% [18.4%,27.6%]	
Pre-policy half-yearly trend	-0.3% [-0.9%,0.3%]	0.353	0.0% [-0.5%,0.6%]	0.899	-1.0% [-1.8%,-0.2%]	0.018
Immediate change in level	+3.1% [-1.9%,8.1%]	0.209	+0.2% [-4.5%,4.9%]	0.937	+7.3% [-1.8%,16.5%]	0.111
Immediate change in slope	+0.9% [0.2%,1.5%]	0.014	+0.4% [-0.2%,1.0%]	0.213	+1.8% [0.7%,2.9%]	0.002
Post-policy half-yearly trend	+0.6% [0.6%,0.8%]	<0.001	+0.4% [0.2%,0.6%]	<0.001	+0.8% [0.3%,1.4%]	0.006

Table A11.3: Use of ANC from a public sector health facility among users of 1+ ANC

	Any public facility (all women)		Any public facility (rural)		Any public facility (urban)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	66.0% [59.7%,72.3%]		65.1% [56.6%,73.6%]		64.8% [58.4%,71.2%]	
Pre-policy half-yearly trend	+1.0% [0.0%,2.0%]	0.044	+1.2% [0.0%,2.4%]	0.049	+1.2% [0.1%,2.4%]	0.031
Immediate change in level	+2.6% [-6.4%,11.6%]	0.554	-2.1% [-8.5%,12.7%]	0.686	-4.2% [-16.4%,8.1%]	0.492
Immediate change in slope	-0.9% [-1.9%,0.0%]	0.060	-0.9% [-2.1%,0.4%]	0.166	-1.4% [-2.6%,-0.3%]	0.019
Post-policy half-yearly trend	+0.1% [-0.1%,0.3%]	0.404	+0.4% [0.2%,0.6%]	0.002	-0.2% [-0.6%,0.3%]	0.404

Table A11.4: Use of primary care facility among users of public facility-based ANC

	Primary care facility (all women)		Primary care facility (rural)		Primary care facility (urban)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	64.5% [59.2%,69.8%]		69.4% [63.7%,75.1%]		49.0% [49.4%,66.6%]	
Pre-policy half-yearly trend	+0.4% [-0.5%,1.3%]	0.355	+0.4% [-0.5%,1.2%]	0.386	-0.1% [-2.2%,2.44%]	0.917
Immediate change in level	-5.2% [-15.2%, 4.7%]	0.290	-3.6% [-10.7,3.6%]	0.311	-12.5% [-35.2%,10.2%]	0.269
Immediate change in slope	-0.6% [-1.6%,0.4%]	0.246	-0.1% [-0.9%,0.7%]	0.797	+0.2% [-2.3%,2.8%]	0.847
Post-policy half-yearly trend	-0.2% [-0.5%,0.2%]	0.401	+0.2% [0.1%,0.4%]	0.009	+0.4% [-0.6%,1.4%]	0.471

Table A11.5: Received good content of care among users of public facility-based ANC

	Received all 6 routine ANC components (all women)		Received all 6 routine ANC components (rural)		Received all 6 routine ANC components (urban)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	9.4% [4.7%,14.2%]		7.5% [3.0%,12.0%]		13.4% [6.4%,20.3%]	
Pre-policy half-yearly trend	+0.4% [-0.6%,1.4%]	0.401	+0.4% [-0.5%,1.3%]	0.351	+0.7% [-0.8%,2.2%]	0.320
Immediate change in level	+5.5% [-4.2%,15.2%]	0.254	4.3% [-4.2%,12.8%]	0.307	+9.1% [-8.3%,26.5%]	0.293
Immediate change in slope	+0.9% [-0.2%,2.1%]	0.117	+0.7% [-0.4%,1.8%]	0.177	+0.5% [-0.9%,2.0%]	0.471
Post-policy half-yearly trend	+1.3% [0.9%,1.8%]	<0.001	+1.1% [0.7%,1.6%]	<0.001	+1.3% [+0.7%,1.8%]	<0.001

Table A11.6: Summary of the impact of the 10/20 policy on ANC

	Immediate change in level	Immediate change in slope
(1) 4+ ANC (most recent births)		
All women	none	increased
Rural	none	increased
Urban	increased	increased
(2) Early ANC (users of 1+ ANC)		
All women	none	increased
Rural	none	none
Urban	none	increased
(3) Public facility-based ANC (users of 1+ ANC)		
All women	none	none
Rural	none	none
Urban	none	decreased
(4) Primary care (users of any public facility-based care)		
All women	none	none
Rural	none	none
Urban	none	none
(5) Received good content of ANC (users of any public facility-based care)		
All women	none	none
Rural	none	none
Urban	none	none

increased: increasing effect or trend, $p<0.05$

decreased: decreasing effect or trend, $p<0.05$

none: no effect, $p>0.05$

APPENDIX 12: MEAN GESTATIONAL AGE CALCULATIONS (CH.5)

(1)%Births that are pre-term in sub-Saharan Africa*

12.30%

(2) Distribution of pre-term births by gestational age in sub-Saharan Africa*

		Gestational age		
	All preterm births	**<28 weeks**	**28 to <32 weeks**	**32 to <37 weeks**
No. births	3,933,200	204,700	409,500	3,319,000
%pre-term births	100.0%	5.2%	10.4%	84.4%

(3) Calculating median gestational age in sub-Sahararan Africa

	Gestational age range	**(A) %births occuring during gestational age range**	**(B) Median gestational age**	**(A * B) weight X median**
full-term 87.7% of all births	37 to <42 weeks	87.7%	39	34.2
pre-term 12.3% of all births	32 to <37 weeks	10.4%	34	3.5
	28 to <32 weeks	1.3%	29.5	0.4
	22 to <28 weeks	0.6%	24.5	0.2
			weighted median gestational age	**38.3**

**Estimates from: Blencowe H, Cousens S, Chou D, et al. Born Too Soon: The global epidemiology of 15 million preterm births. Reprod Health 2013;10:1–14. doi:10.1186/1742-4755-10-S1-S2*

APPENDIX 13: STUDY OUTCOMES USING UNWEIGHTED NEWEY ESTIMATOR WITH LAG=2 (CH.5)

Table A13.1: Use of 4+ ANC among most recent births

	4+ ANC (all women)		4+ ANC (worse-off women)		4+ ANC (better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	59.7% [55.4%,64.0%]		49.7% [43.3%,56.1%]		74.7% [69.4%,80.0%]	
Pre-policy half-yearly trend	-0.7% [-1.4%,0.1%]	0.080	-0.6% [-1.4%,0.2%]	0.162	-1.2% [-2.2%,-0.3%]	0.011
Immediate change in level	-2.6% [-12.0%,6.7%]	0.570	-3.8% [-13.6%,5.9%]	0.430	+4.6% [-5.6%,14.7%]	0.363
Immediate change in slope	+1.6% [0.6%,2.5%]	0.002	+1.6% [0.6%,2.6%]	0.002	+1.9% [0.7%,3.1%]	0.002
Post-policy half-yearly trend	+0.9% [0.4%,1.4%]	0.002	+1.0% [0.5%,1.6%]	<0.001	+0.7% [0.1%,1.3%]	0.030

Table A13.2: Early ANC initiation among users of 1+ ANC

	Early ANC (all women)		Early ANC (worse-off women)		Early ANC (better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	11.6% [7.8%,15.4%]		9.5% [3.1%,15.8%]		15.0% [8.3%,21.6%]	
Pre-policy half-yearly trend	+0.4% [-0.4%,1.1%]	0.303	0.0% [-0.8%,0.8%]	0.985	+0.5% [-0.9%,1.9%]	0.464
Immediate change in level	-2.0% [-9.1%,5.1%]	0.568	+1.8% [-4.4%,7.9%]	0.566	-2.6% [-16.3%,11.1%]	0.696
Immediate change in slope	+0.1% [-0.8%,1.0%]	0.745	+0.4% [-0.4%,1.2%]	0.307	+0.2% [-1.4%,1.8%]	0.819
Post-policy half-yearly trend	+0.5% [0.2%,0.8%]	<0.001	+0.4% [0.2%,0.6%]	<0.001	+0.7% [0.1%,1.2%]	0.016

Table A13.3: Use of ANC from a public sector health facility among users of 1+ ANC

	Any public facility (all women)		Any public facility (worse-off women)		Any public facility (better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	65.4% [60.2%,70.6%]		68.9% [61.2%,76.7%]		62.0% [58.3%,65.6%]	
Pre-policy half-yearly trend	+1.3% [0.5%,2.0%]	0.002	+0.8% [-0.2%,1.9%]	0.106	+1.6% [1.1%,2.2%]	<0.001
Immediate change in level	-0.6% [-8.2%,6.9%]	0.865	+5.9% [-3.4%,15.3%]	0.206	-8.0% [-14.7%,-1.4%]	0.020
Immediate change in slope	-1.2% [-1.9%,-0.4%]	0.003	-0.6% [-1.7%,0.5%]	0.269	-1.8% [-2.4,-1.1%]	<0.001
Post-policy half-yearly trend	0.1% [-0.1%,0.3%]	0.392	+0.3% [0.1%,0.4%]	0.006	-0.1% [-0.5%,0.3%]	0.505

Table A13.4: Use of primary care among users of public facility-based ANC

	Primary care facility (all women)		Primary care facility (worse-off women)		Primary care facility (better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	65.4% [60.0%,70.7%]		68.5% [60.9%,76.1%]		59.4% [51.0%,67.8%]	
Pre-policy half-yearly trend	-0.2% [-1.3%,1.0%]	0.754	+0.4% [-0.7%,1.5%]	0.468	-0.5% [-1.8%,0.7%]	0.394
Immediate change in level	+2.4% [-10.8%,15.7%]	0.710	-1.2% [-12.8%,10.5%]	0.840	+2.1% [-10.2%,14.5%]	0.727
Immediate change in slope	-0.1% [-1.4%,1.2%]	0.865	-0.5% [-1.7%,0.7%]	0.394	-0.1% [-1.6%,1.4%]	0.918
Post-policy half-yearly trend	-0.3% [-0.8%,0.2%]	0.253	-0.1% [-0.5%,0.3%]	0.621	-0.6% [-1.3%,0.1%]	0.074

Table A13.5: Received good content of care among users of public facility-based ANC

	Received all 6 routine ANC components (all women)		Received all 6 routine ANC components (worse-off women)		Received all 6 routine ANC components (better-off women)	
	Estimate [95% CI]	**p-value**	**Estimate [95% CI]**	**p-value**	**Estimate [95% CI]**	**p-value**
Pre-policy starting level	7.8% [0.7%,14.8%]		9.3% [2.9%,15.7%]		7.1% [0.3%,13.9%]	
Pre-policy half-yearly trend	+1.4% [0.1%,2.7%]	0.034	+0.7% [-0.4%,1.7%]	0.188	+2.0% [0.6%,3.4%]	0.006
Immediate change in level	-5.2% [-19.5%,-9.1%]	0.463	-1.9% [-13.1%,9.4%]	0.736	-4.6% [-19.2%,10.0%]	0.525
Immediate change in slope	-0.2% [-1.6%,1.2%]	0.816	+0.5% [-0.7%,1.7%]	0.520	-0.6% [-2.1%,0.9%]	0.429
Post-policy half-yearly trend	+1.3% [0.8%,1.8%]	<0.001	+1.2% [0.6%,1.7%]	<0.001	+1.5% [1.1%,1.8%]	<0.001

Table A13.6: Summary of the impact of the 10/20 policy on ANC

	Immediate change in level	Immediate change in slope
(1) 4+ ANC (most recent births)		
All women	none	increased
Worse-off women	none	increased
Better-off women	none	increased
(2) Early ANC (users of 1+ ANC)		
All women	none	none
Worse-off women	none	none
Better-off women	none	none
(3) Public facility-based ANC (users of 1+ ANC)		
All women	none	decreased
Worse-off women	none	none
Better-off women	decreased	decreased
(4) Primary care (users of any public facility-based care)		
All women	none	none
Worse-off women	none	none
Better-off women	none	none
(5) Received good content of ANC (users of any public facility-based care)		
All women	none	none
Worse-off women	none	none
Better-off women	none	none

increased: increasing effect or trend, $p<0.05$

decreased: decreasing effect or trend, $p<0.05$

none: no effect, $p>0.05$

APPENDIX 14: RECEIPT OF INDIVIDUAL ANC COMPONENTS (CH.5)

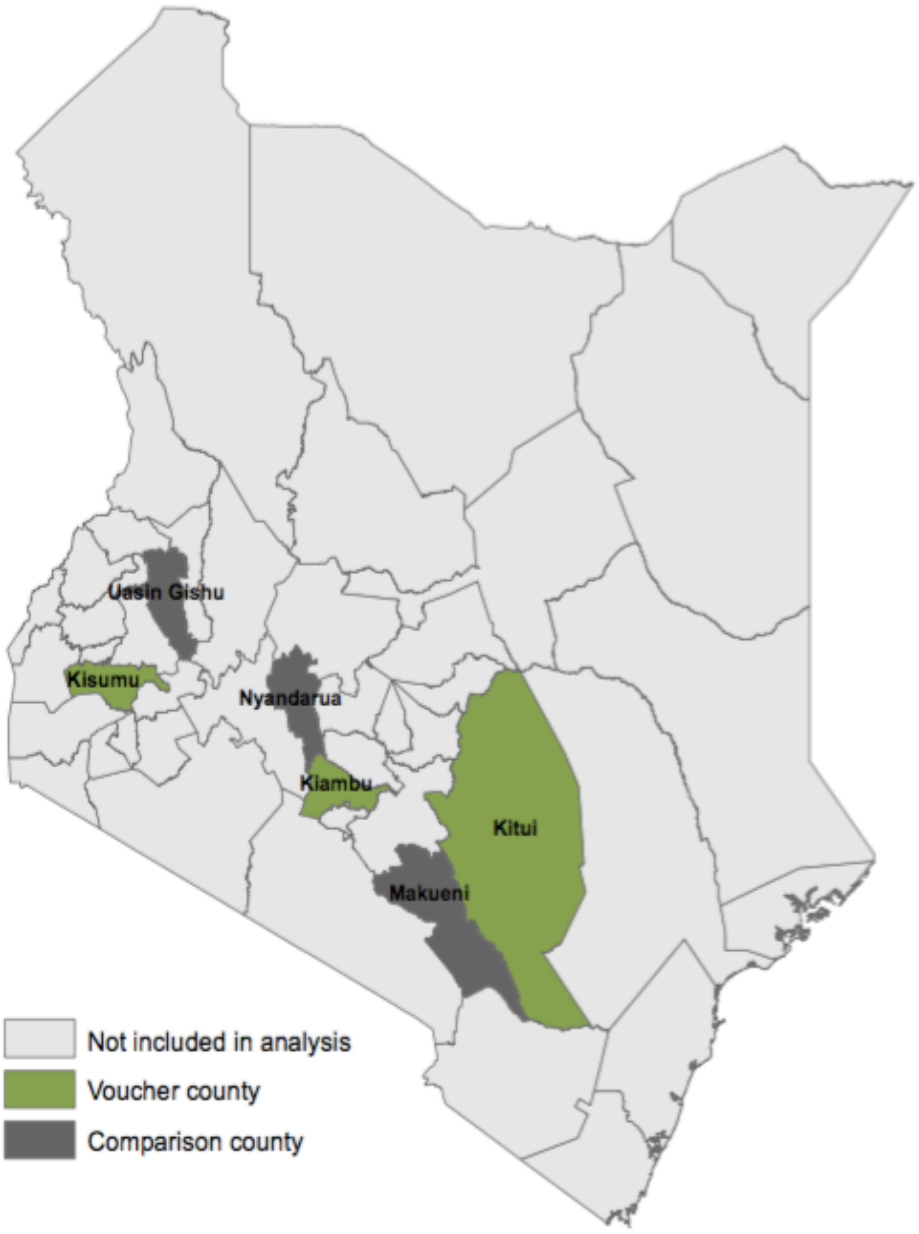
Table A14.1: Receipt of six routine ANC components by facility type before and after introduction of the 10/20 policy

	Blood pressure measured	Urine sample taken	Blood sample taken	Received tetanus injection	Given iron supplements	Told about pregnancy complications	Received all six components
Public hospital							
Before 10/20	91.0%	71.6%	80.5%	96.7%	50.2%	45.9%	21.5%
After 10/20	94.5%	88.4%	94.7%	95.3%	74.1%	57.4%	40.1%
Public health center							
Before 10/20	80.6%	46.6%	56.7%	96.1%	48.2%	36.1%	11.6%
After 10/20	88.4%	80.0%	91.6%	94.2%	73.1%	52.2%	34.8%
Public dispensary							
Before 10/20	76.6%	37.6%	44.7%	95.0%	54.2%	27.6%	9.7%
After 10/20	86.3%	70.9%	86.3%	94.5%	71.2%	44.8%	26.3%
Private facility							
Before 10/20	89.9%	54.1%	58.9%	94.0%	57.3%	39.2%	13.4%
After 10/20	95.5%	86.4%	92.4%	94.7%	74.0%	58.4%	41.5%
Home/other location							
Before 10/20	32.4%	22.2%	25.9%	41.3%	22.7%	33.3%	7.5%
After 10/20	60.4%	33.6%	49.5%	68.4%	48.9%	26.6%	11.4%

Table A14.2: Receipt of ANC components by number of visits before and after the introduction of the 10/20 policy

	Blood pressure measured	Urine sample taken	Blood sample taken	Received tetanus injection	Given iron supplements	Told about pregnancy complications	Received all six components
1-3 visits							
Before 10/20	77.1%	42.5%	49.5%	92.3%	48.9%	31.2%	9.6%
After 10/20	85.8%	71.3%	86.1%	92.5%	67.6%	42.5%	25.1%
4-7 visits							
Before 10/20	86.9%	56.3%	64.8%	95.8%	52.6%	39.8%	14.9%
After 10/20	93.7%	86.4%	94.0%	95.7%	76.2%	58.9%	41.2%
8+ visits							
Before 10/20	93.0%	68.8%	76.8%	94.0%	58.5%	51.9%	24.9%
After 10/20	95.2%	95.7%	96.5%	95.1%	75.8%	65.5%	49.7%

APPENDIX 15: MAP AND DESCRIPTION OF COUNTIES INCLUDED IN ANALYSIS (CH.6,7)



Characteristics of intervention and comparison counties

County	Population[1] 2010*	Area km sq[1] 2014	Number of primary care facilities (levels 2 & 3)[2] 2019	Number of hospitals (levels 4-6)[2] 2019	Number of public sector facilities[2] 2019	Number of private for-profit facilities[2] 2019	Number of faith-based facilities[2] 2019	Number of private non-profit facilities[2] 2019
Pair 1								
Kitui	1,035,831	30,497	428	20	336	83	29	0
Makueni	904,725	6,857	326	18	240	74	26	4
Pair 2								
Kiambu	881,982‡	2,544	592	55	117	456	60	14
Nyandarua	610,017	3,245	185	4	81	90	17	1
Pair 3								
Kisumu	989,514	2,086	242	43	134	111	19	21
Uasin Gishu	913,027	3,345	216	23	135	74	26	4

[1] Kenya National Bureau of Statistics. County Statistical Abstracts [Internet]. 2017 [cited 2019 Dec 16]. Available from: https://www.knbs.or.ke/?page_id=3142

[2] Ministry of Health. Kenya Master Health Facility List [Internet]. 2019 [cited 2019 Dec 12]. Available from: http://kmhfl.health.go.ke/#/home

*These population estimates are projections based on the 2009 census, which was conducted prior to the establishment of counties as an administrative unit. Counties were created as an administrative unit in 2010.

‡The population projection or Kiambu is from 2013 rather than 2010.

APPENDIX 16: DESCRIPTION OF MISSING VOUCHER STUDY DATA (CH.6,7)

In the 2016 dataset, 23% of women (N=621) who reported one or more births in their lifetime are missing data on the number of children they gave birth to in the past five years due to a glitch in the survey programming software (Figure A16.1). As the number of births in the past five years served as a filter question for the subsequent survey module on maternal health service use for each birth in the past five years, this error resulted in unit nonresponse, with women with missing information on this item lacking responses for all service use outcomes.

The error was identified during the course of fieldwork and corrected. As a result, the proportion of missing data declines towards the end of the survey, and relates to the respondent's county (Table A16.1). We examined the relationship between intervention group and likelihood of having missing data on the number of births in the past five years and found evidence of an effect in the adjusted model (Table A16.2). We also explored differences in the odds of having missing data by key sociodemographic factors. After adjusting for differences in background characteristics, we found that both marital status and county had strong effects on the odds of having missing data.

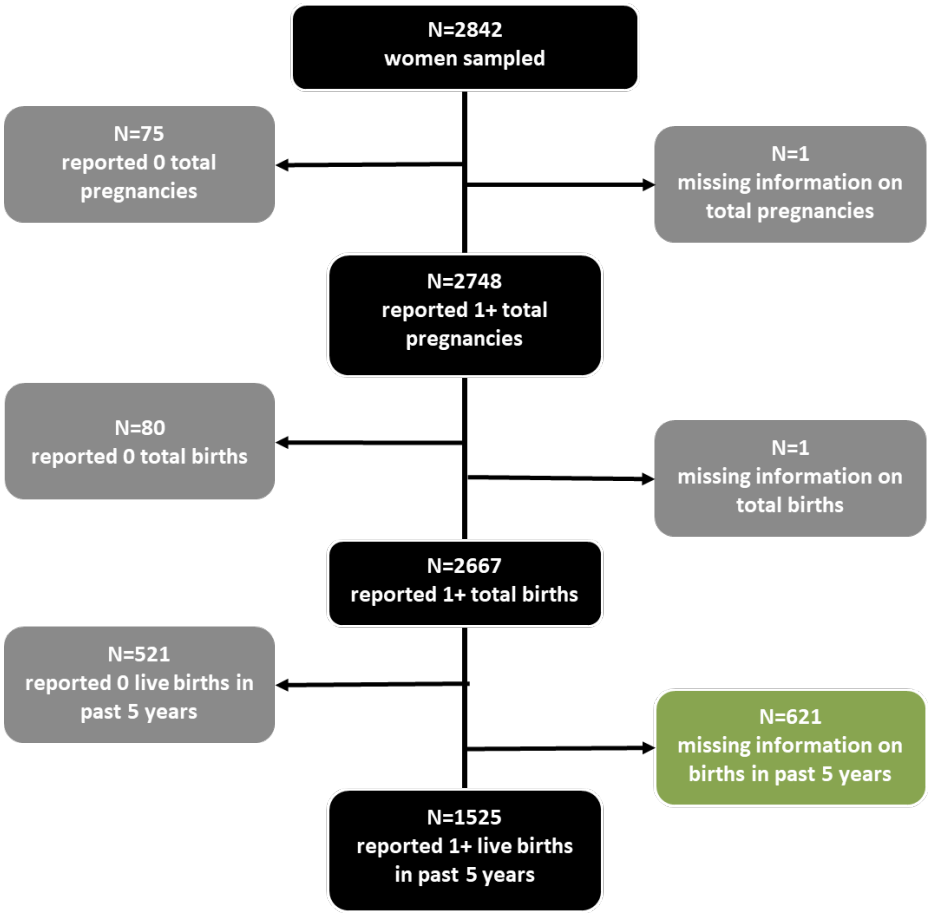


Figure A16.1: Flow chart of number of participants with missing data, 2016 survey

Table A16.1: Missing data among women with 1+ total births by county, 2016 survey

	Survey dates	Proportion missing (%)
County		
Kisumu (voucher)	7 July 2016 – 23 July 2016	43.9
Makueni (comparison)	7 July 2016 – 23 July 2016	32.4
Nyandarua (comparison)	7 July 2016 – 23 July 2016	25.5
Uasin Gishu(comparison)	26 July 2016 – 12 Aug 2016	27.3
Kiambu (voucher)	26 July 2016 – 12 Aug 2016	5.4
Kitui (voucher)	26 July 2016 – 12 Aug 2016	8.4

Table A16.2: Missing data among women with 1+ total births by intervention group, 2016 survey

	Comparison sites N=1385	Voucher sites N=1282	Unadjusted p-value	Adjusted* p-value
Proportion of respondents:			p=0.095	p<0.001
No missing data	71.7	82.1		
With missing data	28.3	17.9		

*Logistic regression adjusted for age, education, wealth quintile, residence, marital status, employment, and parity, accounting for multi-stage sampling at county sub-location & village levels

APPENDIX 17: COMPARING WEALTH-RELATED CHARACTERISTICS OF VOUCHER STUDY SAMPLE TO KDHS 2014 (CH.6,7)

Table A17.1: Comparison of select household assets by wealth quintile in voucher surveys vs. 2014 Kenya DHS

We compared the voucher study questionnaires to the indicators comprising the EquityTool[1], a resource for comparing the wealth of survey respondents to the wealth of the national population. The voucher surveys only collected information on 8 of the 13 household assets required to use the EquityTool; although we could not run the tool, we compared the distribution of these 8 assets between the 2014 Kenya DHS sample and the voucher survey sample.

	Q1 (Poorest)		Q2		Q3		Q4		Q5 (Least poor)	
	KDHS 2014	Voucher surveys	KDHS 2014	Voucher surveys	KDHS 2014	Voucher surveys	KDHS 2014	Voucher surveys	KDHS 2014	Voucher surveys
%Households with:										
electricity	0.2%	1.3%	0.9%	5.1%	7.5%	10.7%	45.7%	25.3%	95.3%	49.9%
television	0.6%	1.6%	2.2%	7.6%	12.4%	17.5%	50.4%	28.1%	96.1%	49.4%
radio	32.9%	51.3%	58.2%	63.6%	74.6%	70.2%	79.7%	75.8%	87.0%	79.8%
floor type:										
cement	1.8%	0.6%	8.0%	11.1%	34.8%	23.6%	76.6%	52.7%	75.1%	90.2%
earth or sand	72.5%	99.0%	51.4%	88.3%	33.1%	75.1%	11.7%	45.6%	0.4%	7.5%
other	25.7%	0.5%	40.6%	0.6%	32.0%	1.2%	11.7%	1.7%	24.5%	2.4%
external wall type:										
dung, mud, sod	58.4%	73.1%	63.7%	51.1%	44.3%	36.8%	13.5%	24.6%	0.6%	7.7%
other	41.6%	26.9%	36.3%	48.9%	55.7%	63.2%	86.5%	75.4%	99.4%	92.4%
roof type:										
thatch, grass	53.5%	32.7%	9.3%	4.2%	1.6%	0.9%	0.2%	0.5%	0.2%	0.5%
other	46.5%	67.4%	90.7%	95.8%	98.4%	99.2%	99.8%	99.5%	99.9%	99.5%
main cooking fuel:										
wood	95.6%	59.8%	90.2%	58.6%	79.3%	52.5%	47.2%	36.1%	9.5%	22.6%
natural gas	0.0%	0.0%	0.0%	0.2%	0.2%	0.3%	3.0%	0.8%	42.7%	4.3%
other	4.4%	40.2%	9.8%	41.2%	20.6%	47.3%	49.8%	63.1%	47.8%	73.1%
toilet type:										
no facility, bush, field	50.8%	20.5%	7.3%	9.0%	1.8%	3.6%	0.4%	1.1%	0.0%	0.9%
other	49.2%	79.5%	92.7%	91.0%	98.2%	96.4%	99.6%	98.9%	100.0%	99.1%