Hazardous alcohol consumption in the former Soviet Union:

Do community factors play a role?

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I, Adrianna Katherine Murphy, 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.

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ABSTRACT

Background

There is strong evidence implicating hazardous alcohol consumption in the high rates of mortality and morbidity in countries of the former Soviet Union (fSU). Less is known about the social determinants of this behaviour in the region. The aim of this thesis was to investigate the role of community-level factors in hazardous alcohol consumption in the fSU and to generate a new conceptual framework that could explain the associations observed.

Methods

This thesis comprises four studies: i) a systematic review of the literature on social factors associated with alcohol consumption in the fSU; ii) an exploration of the association between community-level physical characteristics, such as alcohol advertising and availability, with hazardous alcohol consumption, using a population average model of multilevel data from nine fSU countries; iii) an analysis of the association between community-level social capital and drinking in these countries using the same data and modelling approach; and iv) a qualitative study using semi-structured interviews and focus group discussions in Ukraine to help interpret the quantitative findings.

Results

The systematic review uncovered limited research on the role of community factors in hazardous alcohol consumption in the fSU. The analysis of community-level physical characteristics showed that seven characteristics had one latent factor underlying them, and this factor was associated with an increased risk of hazardous alcohol consumption, suggesting that community-level physical characteristics may work together to create an 'alcogenic' environment. In the analysis of social capital, community-level social isolation and membership of civic organisations both increased the odds of hazardous drinking, while community-level interpersonal trust decreased these odds. The association with membership

of civic organisations was driven mostly by trade union membership. This finding informed the sampling strategy for the qualitative study of trade union members in Ukraine. The data from that study suggested that co-workers of the same trade union experience a strong sense of 'social solidarity' with their co-workers, and that drinking together may act as means of expressing this solidarity. Engagement in sports and family activities may mitigate the role of co-worker solidarity in alcohol consumption.

Conclusions

There is evidence that certain physical and social aspects of the community, namely alcohol advertising, alcohol outlet density and some elements of social capital, are associated with hazardous alcohol consumption in the fSU. These factors should be included in future research on alcohol consumption in the region in order to inform policy recommendations.

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ABBREVIATIONS

CAGE	*The CAGE 4-item questionnaire used to assess alcohol dependence*
CIS	*Commonwealth of Independent States*
COF	*Community Observation Form*
CVD	*Cardiovascular disease*
DALYs	*Disability-adjusted Life Years*
ECOHOST	*European Centre on Health of Societies in Transition*
EHD	*Episodic Heavy Drinking*
EPOCH	*Environmental Profile of a Community's Health*
fSU	*former Soviet Union*
HITT	*Health in Times of Transition study*
LSHTM	*London School of Hygiene and Tropical Medicine*
PSU	*Primary Sampling Unit*
PURE	*Prospective Urban Rural Epidemiology study*
WHO	*World Health Organization*

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1 BACKGROUND

This thesis seeks to understand the social determinants of alcohol consumption in the former Soviet Union (fSU), focusing specifically on community-level physical and social characteristics and their association with drinking by individuals in this region. The following chapter will introduce the problem of alcohol consumption in the fSU.

1.1 History of alcohol consumption in countries of the fSU

Alcohol plays a significant role in social life in the fSU and heavy drinking has a long tradition in the region, particularly in Russia. One need not look far into Russian literature to find characters who exemplify Russians' penchant for vodka, who 'love to rage and storm in taverns and to tear out the beards of (their) drunken drinking companions'(1). However, this view is not entirely supported by the historical record in the region that today makes up the fSU. As Alexander Nemtsov argues in his detailed research on the subject (2, 3), a Russian predilection for heavy drinking has long been mythologized, based on inaccurate or unrepresentative reports. An early source of these myths was an account of the Christianization of Kievan Rus' by Prince Vladimir in 867, in which the author, the monk Nestor, implies that the Prince's motivation for choosing Christianity over other religions is that it would allow his people to continue drinking. The monk attributes the following quote to Prince Vladimir: "Russians know the joy of drinking and cannot live without it"(2). Nemtsov calls attention to the fact that this account was produced over 100 years after the event actually occurred, and has since been contradicted by historians. Later accounts of drinking habits in tsarist Russia were based on observations confined to certain segments of the population, such as the urban elite and the 'tavern-dwellers' of Moscow and, in fact, the average levels of consumption in Russia in the 1700s and 1800s were not significantly higher than the rest of Europe (4). In fact, it was only in the 16th century that distillation became widely used in Russia, prior to which fermented products such as mead, from honey, were commonly drunk (5). Subsequently, however, the ability to distil spirits from grain

meant that, among those who did drink, nearly 90% of alcohol consumed was in the form of spirits (i.e. vodka) and that drinking was done in binges, as opposed to the pattern of daily drinking with meals observed in Mediterranean countries (5). The high level of consumption was driven, at least in part, by the role played by the Imperial family in the alcohol trade, with Ivan IV establishing *kabaks*, or spirits shops, in the 1540s. These gained monopoly status in 1649 and, by the time of the revolution, alcohol accounted for up to a third of all government revenue. However, at least as gauged by data on deaths from alcohol poisoning, very heavy drinking was much more common in European Russia until the years before the revolution, increasing rapidly thereafter in the Baltic States, Ukraine and Belarus (6). It is, however, important to recall that, until relatively recently, in historical terms, the writ of the Imperial government was limited largely to European Russia, with military expansion into parts of central Asia (e.g. the Emirate of Bukhara) and the Caucasus, taking place only in the mid or late 19th century and, even before this, much of Siberia was essentially lawless.

Precise data from the Soviet era are difficult to obtain, as statistics were collected and analyzed by various separate government agencies and sharing or publication of data was prohibited (7). However, recent research has begun to clear the ambiguity surrounding the history of alcohol consumption in the region during this period. The Soviet Union had, in fact, 'dry beginnings'(4). The first Bolshevik government, in 1917, extended an existing ban on alcohol that had been implemented at the beginning of World War I by Nicholas II, but subsequently repealed it, in 1921-22 (vodka was banned until 1925), motivated by a desire to raise money. Annual sales of alcohol from state outlets increased quickly to pre-World War I levels (3.7 litres per capita) but fell again in the interwar period (2.3 litres) in response to an anti-alcohol propaganda campaign. It wasn't until the late 1950s, coinciding with Khrushchev's policy of boosting consumer goods in general, that annual state sales of alcohol in the Soviet Union began to climb and by 1980 had, according to World Health Organization (WHO) statistics (8), reached almost eight litres in Russia and Ukraine, and over 13 litres in Belarus (nearing the levels seen, for example, in Sweden (approx. 8 litres)

and the United Kingdom (approx. 11 litres) , but yet not as high as France (approx. 19 litres). Estimates of annual per capita consumption in Russia in 1980 made by other independent researchers include unrecorded consumption (illegal homemade alcohol, or 'samogon'), resulting in much higher total estimates ranging from 11 litres (9) and 12.6 litres (10) to up to 15.2 litres (11), and 70% of this consumption was comprised of spirits (compared, for example, to 43% in Sweden) (2). Nemtsov estimates that by 1985 actual consumption had reached 14.2 litres (4). The reasons for this increase are not fully understood but are thought to include increased demand from a population experiencing the effects of relative economic decline, as the USSR lagged ever further behind the west, and greater supply, as alcohol was one of the few consumer goods that the regime could supply in large amounts, with sales also contributing to the circulation of roubles in the economy.

With the steady increase observed into the 1980s, Russia had become a leading consumer of alcohol in Europe. Although consumption levels were also high in other fSU countries for which there are data from the early 1980s (namely Ukraine and Belarus), evidence of variation in consumption among fSU countries today (described in Section 1.2 below) suggests that data from this period are not necessarily generalisable across the whole region. Coupled with a rise in volume consumed, the pattern of drinking was changing in the 1980s, as previously socially unacceptable drinking (i.e. on work days, among women and the young) became more common (4). It is estimated that, during this time, the average consumption among working adults was one bottle of vodka per day (approximately 750 ml) (5, 12). It is in this context that, in 1985, Gorbachev's anti-alcohol campaign was introduced. (Although this campaign is commonly attributed to Gorbachev, there is now evidence that it was largely influenced by two Politburo members, Yegor Ligachev and Michael Solomentsev, and perhaps to some degree by Gorbachev's wife, whose family had a history of alcoholism, and his daughter, a medical doctor (5)). The objectives of the campaign were to reduce State production and sale of alcohol and to suppress illegal production of samogon. Several measures, such as bans on consumption in workplaces, fines for public drunkenness

and restrictions on time and place of sale, combined with an increase in alcohol prices of 25% in 1985 and 20% the following year (13) helped to achieve the first objective, and State alcohol sales fell by 63% between 1984 and 1987 (14). The second objective proved more difficult to achieve and, despite a mass propaganda campaign and toughened legal sanctions on samogon production, evidence of increased sales of sugar, which was used to make samogon, and increased incidence of alcohol-related harm between 1987 and 1989 (14) suggests that illicit production of alcohol increased during Gorbachev's campaign (5, 12, 15). As a result, actual consumption declined by only 25% (14).

Declines in consumption from the anti-alcohol campaign were fleeting. Largely due to the loss of government revenue and the decline of Ligachev and Solomontsev's power, the campaign was abandoned in 1988 (5) and consumption levels returned to pre-campaign levels by 1991 (14, 16). (The rebound was not immediate as time was required to increase State production of vodka (pre-campaign production levels were not reached until 1993 (12)), prices for alcohol remained high (75% higher in 1989 than at the start of the campaign (16)) and some restrictions on sale (e.g. no sale of vodka on Sundays (12)) were maintained). The next few years saw a period of remarkable social and economic transformation in the region – with 'Glastnost' and 'Perestroika', Gorbachev's reforms sought to improve transparency of the work of government (glasnost) and reconstruction of the economy (perestroika) but also led to a loosening of sanctions on illegal production of alcohol, the introduction of various imported alcoholic beverages, and a drop in the relative price of alcohol compared to other household goods.

1.2 Alcohol consumption in the post-Soviet era

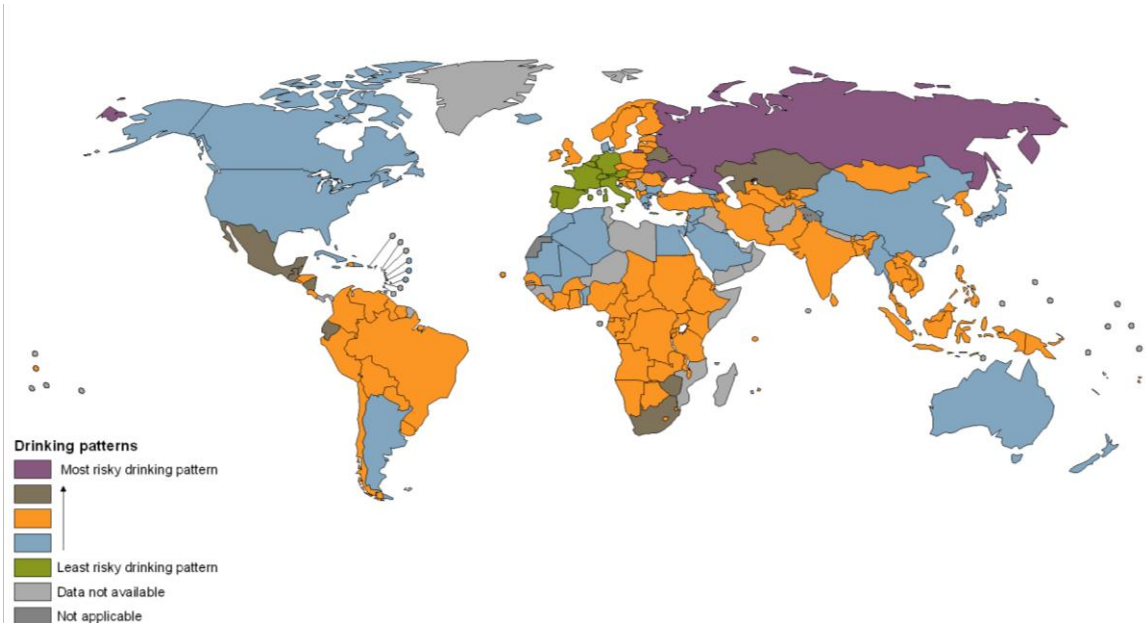
The reforms arising from Glasnost and Perestroika were shortly followed by the collapse of the Soviet Union and its dissolution. In the years following the collapse, inflation continued to rise; prices increased, and in 1998 Russia suffered an economic crisis which affected adversely the economies of neighbouring countries. Statistics on alcohol consumption in this

period were, and still are unreliable, and many of the estimates based on surveys are likely under-estimates, given the tendency for individuals, especially in the fSU, to under-report their own alcohol consumption (17, 18) and for the heaviest drinkers to be omitted from household surveys. Estimates made by Nemtsov, using a combination of data on sales of alcoholic beverages and sugar, and alcohol-related illnesses and deaths suggest that, by 1992 consumption had risen by almost 14%, and by 1994 it was estimated at 14.6 litres, 0.4 litres higher than on the eve of the anti-alcohol campaign (2). However, consumption then began to decline from 1994, only to start a steep upward climb again after the financial crisis in 1998, reaching 15 litres per capita in 2001 (2). The most recent estimates from the WHO indicate that alcohol consumption in the fSU remains higher than in any other region of the world (19). However, it should be noted that there is variation between countries in the fSU. For example, while estimates for Russia (15.7L per year), Ukraine (15.6L), Belarus (15.1L) and the Republic of Moldova (19.2L) are very high, other fSU countries, for example Georgia (6.4 L) and Kyrgyzstan (5.1 L), report much lower annual per capita consumption (19).

But volume of consumption is only one part of the problem. Perhaps of greater concern for public health is the *pattern* of alcohol consumption in the fSU, as there is now a wealth of evidence that drinking pattern has independent effects on health that cannot be explained by volume (20-22). Specifically, research shows a high prevalence among men in the fSU of 'episodic heavy drinking' (EHD) (sometimes referred to as heavy episodic drinking or binge drinking) (23), where large amounts of alcohol are consumed in a short period of time with the intention of reaching intoxication. Figure 1.1 shows 'pattern of drinking scores' assigned by the WHO to each country in 2005, based on various indicators that measure EHD such as quantity of alcohol consumed per occasion, the proportion of drinking occasions where intoxication is reached, the proportion of drinkers who drink daily and whether alcohol is consumed with meals or on its own. Russia and Ukraine are shown to have the most 'risky'

pattern of drinking for health, closely followed by other fSU countries, specifically Belarus, Kazakhstan and Moldova.

Figure 1.1: WHO Pattern of drinking score, 2005



Source: Global status report on alcohol and health, WHO 2011 (19)

This pattern of drinking has implications for health. EHD has been being linked to increased risk of sudden cardiac death (24, 25) as well as acute alcohol poisoning, pneumonia, and injury and violence, both intentional and unintentional (26). According to the most recent *Global status report on alcohol and health* from the WHO, alcohol consumption in these countries is estimated to cause almost 500,000 deaths per year (19). Figure 1.2, also from the WHO, shows that the proportion of alcohol-attributable deaths in countries of the fSU in 2004 was 10-14%. This proportion is higher than anywhere else in the world. For men, this figure rises to one in every five deaths being attributable to alcohol in the fSU. This pattern of drinking has been implicated as one proximal cause of the sharp decline in life expectancy observed in fSU countries since the dissolution of the Soviet Union (25, 27-31), from which it has yet to fully recover. In Russia, for example male life expectancy fell by four years between 1990 and 1994, to a low of 57 years (31).

Figure 1.2: Proportion of alcohol-attributable deaths in WHO sub-regions, 2004

Source: Global status report on alcohol and health, WHO 2011 (19)

Alcohol is also a leading cause of morbidity in the region. The Global Burden of Disease Study 2010, which combines mortality and morbidity, estimates alcohol consumption to be the leading cause of disability-adjusted life years (DALYs) among Russian males, responsible for almost 10 million DALYs (21% of the total) in 2010. In Ukraine and Belarus it is the second leading risk factor for DALYs among males, estimated to cause roughly 2.6 million (18.4%) and 700 000 (15.1%) DALYs, respectively. In all three countries, alcohol consumption increased in its ranking among risk factor causes of DALYs between 1990 an 2010. Alcohol consumption is the third leading cause of DALYs among women in Russia, Ukraine and Belarus, accounting for 16.5%, 15.1% and 16.5% of the totals, respectively.

1.3 Determinants of alcohol consumption in the fSU

While there is increasing consensus on the role of hazardous alcohol consumption in the mortality crisis that has taken place in the fSU, the upstream causes of this behaviour are less clear. Existing literature has predominantly focused on the stress of the collapse of the Soviet Union and subsequent transition, suggesting fluctuations in hazardous alcohol consumption

and mortality have been driven by rapid social and economic upheaval (32-37). However, research on the specific social determinants of alcohol consumption by individuals in the region is limited (as demonstrated by the systematic review undertaken as part of this thesis and discussed in greater detail in Chapter 4). Social determinants have been defined as the circumstances in which people live and work (38), and may include individual-, or micro-level, factors such as education or marital status, community-, or macro-level, factors such as the local environment, availability of social support, social inclusion/exclusion and peer group norms, and macro-level factors such as national or international social and economic policies or climate conditions.

1.4 Social determinants of health behaviours

Acknowledgement of the role of community factors, and social factors generally, as potential determinants of individual health behaviours has gained momentum in recent years (39), although this recognition could be traced back to Rudolf Virchow, a German doctor who in 1847 called for democratic, social and economic reforms to address the causes of diseases he was observing (40). In 1974, the Canadian Lalonde Report (41) introduced the concept of the 'health field' which proposed expanding the focus of disease causation to factors beyond the biomedical system, such as lifestyle and the environment. Subsequent developments in the growing recognition of social determinants of health included the WHO/UNICEF Declaration of Alma Ata (42) in 1978 which established the concept of primary health care as something rooted in the community, the English Black Report (43) in 1979 which sought explanations for the failure to reduce health inequalities during the post-war increase in prosperity, and Dahlgren and Whitehead's (44) framework for addressing health inequalities, which focused on strengthening communities as well as individuals, improving access to services and encouraging macroeconomic and cultural change. These developments have most recently come together in the report of the Commission on Social Determinants of Health in 2008, whose chair, Sir Michael Marmot, called for careful examination of ‘the

social conditions that give rise to high risk of non-communicable disease whether acting through unhealthy behaviours or through the effects of impossibly stressful lives' (45, 46).

This momentum has inspired a burgeoning field of 'social epidemiology' (47), focusing attention on the 'causes of the causes' (48), such as the circumstances in which people live and work, in addition to proximal or endogenous risk factors for disease. Increased social epidemiologic inquiry has resulted in the emergence of 'eco-social' or 'multilevel' theoretical frameworks which recognize that individuals do not exist separately from their contexts, and that health and health behaviours are influenced by a complex interplay of both micro- and macro-level factors (47, 49). (A more detailed discussion of conceptual frameworks for the study of social determinants of health behaviours is provided in Chapter 3.) This approach represents an important shift in public health research, which traditionally only looked at factors beyond the level of the individual in terms of their role in determining health *outcomes* rather than health *behaviours* (50), and was thus limited in its capacity to fully explain behaviour and design effective public health interventions (39, 51). In recent years, this approach has been extended to research on the determinants of substance use, and while this body of work is dominated by studies from the United States, it lends support to the idea that various community-level factors (i.e. physical or social characteristics of the contexts in which people live and work) may indeed play a role in health behaviours such as smoking and alcohol consumption, but research in this area is still limited (52). What evidence does exist suggests that alcohol consumption is influenced by both physical aspects of the community, such as prevalence of advertising (53, 54) and neighbourhood deprivation (55), as well as by social aspects of the community, such as workplace social contexts (56), perceptions of neighbourhood safety (57), community attachment (58) and community participation (59). Many of these social factors are included in the concept of 'social capital', which has gained currency in public health research in recent years and is defined as "those features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (60). Low levels of social capital have been

linked to alcohol consumption in other regions of the world (61, 62), but its role in alcohol consumption in the fSU has not been explored. The concept of social capital will be discussed in more detail in Chapter 6. Policy recommendations at national and international levels on alcohol-related harm have also begun to pay greater attention to the role of community-level factors such as availability, advertising, price initiatives and community engagement to reduce hazardous alcohol consumption, in many cases calling for further policy-relevant research to support and inform these initiatives (63, 64).

A more holistic approach to population health research, which recognizes relationships between factors both endogenous and exogenous to the individual, is likely to be particularly useful in understanding alcohol use in countries of the fSU. Dramatic increases in hazardous alcohol consumption and alcohol-attributable mortality in this region have defied a full explanation by individual-level risk factors (e.g. age, education, occupation) alone and there is a plausible link to the massive social changes in the region that has created 'risk environments' characterized by community disengagement, reductions in social capital and widespread feelings of alienation and low personal control (37, 39, 65-68), as well as and the lack of comprehensive policies in fSU countries to address the accessibility and availability of alcohol (69).

1.5 Current alcohol policies in fSU countries

There is heterogeneity among fSU countries in terms of alcohol policies (Table 1.1). Of the nine countries included in this thesis (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Ukraine and Russia), only Kazakhstan has policies that address all of the major aspects of advertising, outlet density, taxation and hours of availability (70). However, is important to note that this table does not include information on other elements that are important for a comprehensive national alcohol policy, on which data from most fSU countries are unavailable (70) and which will not be addressed in this thesis. These elements

include restrictions on alcohol sales to intoxicated persons or at petrol stations, and legally binding regulations on product placement, alcohol sponsorship and sales promotion.

Table 1.1: Alcohol policy in fSU countries, WHO 2011

	Legally binding regulations on advertising	Restrictions on outlet density	Excise tax on beer, wine & spirits	Restriction on time & days of sale
Armenia	✓	×	✓	×
Azerbaijan	×	N/A	✓	N/A
Belarus	✓	×	✓	×
Georgia	✓	×	✓	×
Kazakhstan	✓	✓	✓	✓
Kyrgyzstan	✓	×	✓	✓
Moldova	✓	×	✓	×
Russia	N/A	✓	✓	✓
Ukraine	✓	×	N/A	×

N/A = Not available

Globally, there is a growing evidence base supporting the effectiveness of policies directed at reducing outlet density (71), reducing alcohol advertising (72, 73), reducing days and hours when alcohol can be bought (63, 74) and increasing minimum prices or taxation on alcohol (73, 75-77) as means to reduce alcohol consumption and alcohol-related harms. There is also evidence that these policies are cost-effective (72). However, the effectiveness of these policies can depend on context and research set in the fSU is extremely limited (72).

1.6 Conclusion

The history of alcohol consumption in the region that today makes up the fSU is extremely partial and, at times, has given way to mythology. Although data from the Soviet era are limited, estimates suggest that alcohol consumption levels fluctuated significantly from the early 20th century until the collapse of the Soviet regime. Today however, there is clear evidence that alcohol consumption in the fSU is higher than in any other region of the world, and the pattern of alcohol consumption in the region is a leading cause of mortality and morbidity. The social determinants of hazardous alcohol consumption in the region are not well understood, but evidence from other regions suggests that physical and social community factors such as alcohol advertising, price, accessibility and availability and social capital may play an important role in this behaviour. This thesis takes one step toward

addressing the gap in knowledge regarding the social determinants of alcohol consumption in the fSU. In the next chapter I will provide more specific detail regarding the rationale for this thesis as well as my specific aims and objectives.

2 THESIS OUTLINE

2.1 Thesis rationale

The previous chapter introduced the problem of alcohol consumption in the fSU. In this chapter I will set out the specific aims and objectives of this dissertation. I will describe the overall structure of the thesis and my contribution to it. As noted in Chapter 1, the countries of the fSU lead the world in terms of hazardous alcohol consumption and alcohol-related mortality and morbidity. Despite growing recognition of the importance of community-level factors in alcohol consumption globally, almost no research on these factors exists in the fSU. In order to inform and support policies that effectively address hazardous alcohol consumption in the fSU, more research on the relationship between social and physical aspects of the communities in which people live and work is required. The thesis presented here sets out to address this research gap.

2.2 Aims and objectives

The aim of this PhD is to investigate the association between community-level factors and alcohol consumption in the fSU and to use the findings to develop a new conceptual framework that can aid our understanding of this relationship. Using a mixed-methods approach, it will address the research question: *"Is there an association between community-level physical and social factors and hazardous alcohol consumption among men and women aged 18+ years in the fSU?".* The specific objectives of this thesis are as follows:

1. To systematically review the existing evidence regarding individual and community-level social factors associated with individual-level hazardous alcohol consumption and other alcohol-related outcomes in countries of the fSU.
2. To quantify the associations between community-level physical factors, namely alcohol advertising, accessibility, availability and price, and hazardous alcohol consumption behaviour among men and women aged 18+ years in the fSU.

3. To quantify the associations between community-level social factors, namely ‘social capital’, and hazardous alcohol consumption behaviour among men and women aged 18+ years in the fSU. For the purposes of this thesis ‘social capital’ is defined as ‘those features of social organization — such as density of civic associations, levels of interpersonal trust and norms of reciprocity — that act as resources for individuals, and facilitate collective action’ (78).
4. To explore and interpret key findings from the quantitative analysis through the use of qualitative research methods.
5. To use key findings from both the quantitative and qualitative research to develop a new conceptual framework for understanding the role of community-level factors in hazardous alcohol consumption in the fSU.

2.3 Definition of hazardous alcohol consumption used in the thesis

For the purposes of this thesis, hazardous alcohol consumption will be taken to mean any alcohol consumption that is harmful to physical or mental health and well-being. In the analyses undertaken for this thesis hazardous alcohol consumption will be operationalised using two outcomes to try to capture both the physical and mental effects of alcohol consumption. The first is a standard measure of problem drinking - the CAGE questionnaire (79, 80). The CAGE questionnaire consists of four questions capturing possible negative consequences of alcohol consumption for mental well-being (feeling the need to cut down, annoyance at criticism, guilt and needing a drink to get rid of hangovers); answering affirmatively to two or more questions indicates alcohol dependence. Early studies validated the use of this instrument (81) for detecting alcoholism and showed the CAGE questionnaire to have 93% sensitivity (82); a more recent systematic review of the reliability and validity of the CAGE questionnaire reported a high test-retest reliability (0.80-0.95) and adequate correlation with other alcoholism screening instruments (0.48-0.70) (80).

The second measure – episodic heavy drinking (EHD) is more specific to the post-Soviet context; this pattern of drinking is widespread and a major driver of mortality, being linked to increased risk of sudden cardiac death (24) as well as to alcohol poisoning, pneumonia, and injury and violence (26). It is particularly common among working-age men in the fSU (23). As noted by Pomerleau et al., researchers in countries of the fSU have used different definitions of EHD (23). In order to be consistent with Pomerleau et al.'s earlier analysis in eight fSU countries, I used the definition of EHD used in that study (i.e. self-reported consumption of >2L of beer, 750g of wine or 200g of strong spirits on one occasion) (23). The specific questions from the HITT survey used to measure EHD are shown in Appendix 1. Relying on self-reported alcohol consumption to measure EHD introduces some important limitations due to under-reporting and non-standardized drink size estimates; these are discussed in greater detail in Section 8.4.1.

2.4 Definition of social capital used in this thesis

For the purposes of this thesis 'social capital' is defined as 'those features of social organization — such as density of civic associations, levels of interpersonal trust and norms of reciprocity — that act as resources for individuals, and facilitate collective action' (78). Social capital is a relatively new concept in public health research, and, as a result, there is no standard approach to its measurement. The challenges associated with measuring social capital are discussed in greater detail in Research Paper 3 as well as in the Discussion chapter (Section 8.4.3).

2.5 Rationale for a mixed methods approach

My research for this thesis is meant to be exploratory, rather than testing a pre-determined hypothesis. In order to explore the relationship between specific community-level factors and hazardous alcohol consumption, I adopted a mixed-methods approach. Several benefits to mixing quantitative and qualitative research methods have been identified. In addition to providing a means to validate or further explain quantitative findings (83) it has been argued

that mixing methods is vital to social research because our social experiences are multi-dimensional and thus so should be our explorations of these experiences (84). In this thesis in particular, although the household and community profile data help to identify community factors that are associated with alcohol consumption, inductive qualitative methods are necessary to uncover how individuals *experience* these factors and the role that these factors play in determining their alcohol consumption. Understanding the ways in which participants experience community factors that are associated with hazardous alcohol consumption will aid in the design of targeted interventions.

2.6 Epistemological approach

Epistemology is defined as the theory of knowledge, or "the study of the nature of knowledge and justification" (85). Understanding our epistemological approach allows us to understand how our knowledge is produced and to trust in the validity of that knowledge (86). In this thesis I take a 'subtle realist' approach (87). A subtle realist approach acknowledges that all research involves some degree of subjectivity and that different methods will produce different perspectives. Unlike anti-realism, which rejects the belief that there is an underlying reality independent of the research and research process (88), subtle realism assumes that this reality exists, but that the role of research is to attain a representation of that reality rather than "the truth" (89). This representation cannot be independent of the researcher's perspective, and in this way subtle realism differs from realism, which argues that research leads to explanations of the real world that are purely objective. This approach accepts the use of different methods and comparison of findings from different studies as a means to improve our understanding of potential social determinants of health. It allows for the quality of both quantitative and qualitative methodological approaches to be assessed using the same broad criteria of relevance and validity, but suggests that these be operationalised differently in qualitative research with such criteria as the degree of reflexivity, transparency of methods used and the attention paid to 'deviant cases' in the qualitative research (89). Reflexivity is the process of reflecting

critically on one's role in the research process (86). Reflexivity is not meant to extract the influence of the researcher from the research, but rather to address this influence explicitly and thereby improve the integrity and trustworthiness of the research (90). Transparency is acquired by giving a clear account of how data collection and analysis were conducted, so that it is clear to the reader whether the conclusions reached are supportable by the data (89). Addressing deviant cases involves searching for and explaining any elements in the data that do not support the emerging hypothesis, and refining the hypothesis until it can fit the majority of cases (91). These approaches to improving the trustworthiness, or validity, of qualitative research are addressed with specific reference to my qualitative research in Research Paper 4 (Chapter 7).

2.7 Structure of the thesis

The remaining chapters of the thesis are as follows: In Chapter 3 I introduce existing conceptual frameworks for research on social determinants of health behaviours and outline the working conceptual framework that guided my research, which I develop further in Chapter 8 based on my findings. In Chapter 4 (Research Paper 1) I describe a systematic review undertaken to identify and critically analyse existing research on social factors and alcohol consumption in the fSU. The review is the first of four research papers that comprise this thesis and is prefaced by a brief preamble. In Chapters 5 to 7 I present Research Papers 2-4, and these are also each prefaced with a brief preamble. In Chapter 5 (Research Paper 2) I present an anlysis using multilevel data to estimate the association between alcohol-related physical community characteristics (the 'alcogenic' environment) and hazardous alcohol consumption among individuals in nine fSU countries. In Chapter 6 (Research Paper 3) I present an analysis that uses the same data to estimate the association between individual and community-level measures of social capital and hazardous alcohol consumption. In Chapter 7 (Research Paper 4) I describe a qualitative study conducted to further explore a key finding from Chapter 6, namely the increased risk of hazardous alcohol consumption among individuals living in communities with a high level of active civic engagement. Finally, in

Chapter 8 I synthesize and discuss the findings from the preceding research papers and, using these findings, propose a new conceptual framework. Chapter 8 includes: overall study limitations, implications for policy; and recommendations for future research. Discussions of findings and limitations specific to the individual research papers are included in those papers (Research Papers 1-4, Chapters 4-7). The abstract and sections of each research paper are structured according to the guidelines provided by the relevant journal.

2.8 Contribution of the candidate to the thesis

Prior to enrolling in the doctoral programme at the London School of Hygiene and Tropical Medicine (LSHTM), I completed a Master of Science in Public Health in the Global Health and Population Department at the Harvard School of Public Health, where my research focused on cardiovascular disease (CVD) and its risk factors in low- and middle- income countries, including Ukraine. After completion of my MSc I was interested in seeking further training in mixed-methods analyses of the determinants of CVD risk factors and applied to the doctoral program at LSHTM. I was offered a scholarship to work with data from the Health in Times of Transition (HITT) study, a European Commission funded collaborative project on health in nine countries of the fSU (Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine) that involves 13 partners, including the European Centre on Health of Societies in Transition (ECOHOST) at the LSHTM. The HITT study collected data on various health behaviours and individual and community level factors from over 18 thousand households and 333 communities in the nine countries in 2010, with the aim of understanding long term trends in population health as a consequence of socioeconomic transition. Further details on the study are discussed in Research Paper 2 (Chapter 5) and Research Paper 3 (Chapter 6).

I used the quantitative data collected in the HITT study and was not involved in the formulation of the HITT survey instruments. I led the design and data collection for the qualitative research for my thesis. For this thesis, I led the conception of the research

question, the choice of methodological approach and the drafting and revision of manuscripts for all four research papers.

Input on the research questions and methodological approach, as well as critical revision of the manuscripts was provided primarily by my supervisor Bayard Roberts, as well as by my associate supervisor Martin McKee. Input on methodological approach for Research Paper 2 was provided by my adviser Mike Kenward and by Bianca DeStavola, for Research Paper 3 this was provided by George Ploubidis. Methodological and practical guidance for Research Paper 4 was provided by my adviser Tim Rhodes and by HITT's research partners in Ukraine, Alexei Kizilov and Kseniya Kizilova. HITT's external collaborator, Andrew Stickley, was involved in critical revision of Research Papers 1, 2 and 3. The forms outlining the specific contributions of the candidate and co-authors for each research paper are included at the end of this thesis.

3 CONCEPTUAL FRAMEWORK

3.1 Introduction

In the previous chapters I described the morbidity and mortality attributed to hazardous alcohol consumption in the fSU and highlighted the gap in research on the social determinants of alcohol consumption in the region. I then set out my aim to address this gap by investigating the role of community factors and outlined the specific research objectives I sought to achieve with this thesis. In order to guide my research, I looked to existing conceptual frameworks for understanding social determinants of health or health behaviour. A conceptual framework represents relationships in a simplified communicable form (92) and can serve as a 'map' of what is known about social determinants of health and what is not yet well understood, thereby aiding our understanding of these relationships. In this chapter I review existing conceptual frameworks of social determinants of health and health behaviour. I conclude that, to the best of my knowledge, there is currently no existing framework that directly relates to the social determinants of alcohol consumption (in the fSU or elsewhere). The chapter concludes by proposing a new conceptual framework based on existing evidence, which will guide my research and which I will develop in Chapter 8 based on the findings of this thesis.

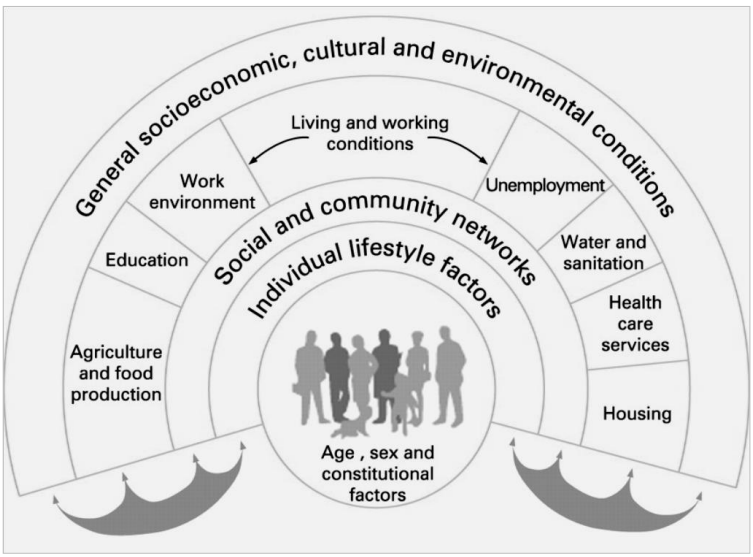
3.2 Social Determinants of Health: Existing Conceptual Frameworks

As discussed in Chapter 1, social determinants are defined as the circumstances in which people live and work (38). They may include individual-, or micro-level, factors such as education or marital status, community-; or meso-level factors such as local environment, social support, social inclusion/exclusion and peer group norms; and macro-level factors such as national or international social and economic policies or climatic conditions. Increased recognition of the role of social determinants in health has resulted in the development of various frameworks aimed at aiding our understanding of the relationship between social factors and health. For the purposes of this thesis I drew on frameworks from

the field of ‘social epidemiology’ (47). Social epidemiology is a field of enquiry that has focused attention on the ‘causes of the causes’ (48), such as the circumstances in which people live and work, rather than simply on proximal or endogenous risk factors for disease, resulting in the emergence of ‘multilevel’ theoretical frameworks (47, 49).

One of the earliest, and perhaps most cited conceptual frameworks of social determinants of health is the 'main determinants of health' framework developed by Dahlgren and Whitehead. This framework is included here to demonstrate how social determinants of health are commonly understood (Fig 3.1) (93). Dahlgren and Whitehead's framework depicts individuals surrounded by spheres of individual-, community- and macro-level factors which all interact with 'constitutional' factors such as age and gender to impact on health outcomes.

Figure 3.1: Main determinants of health



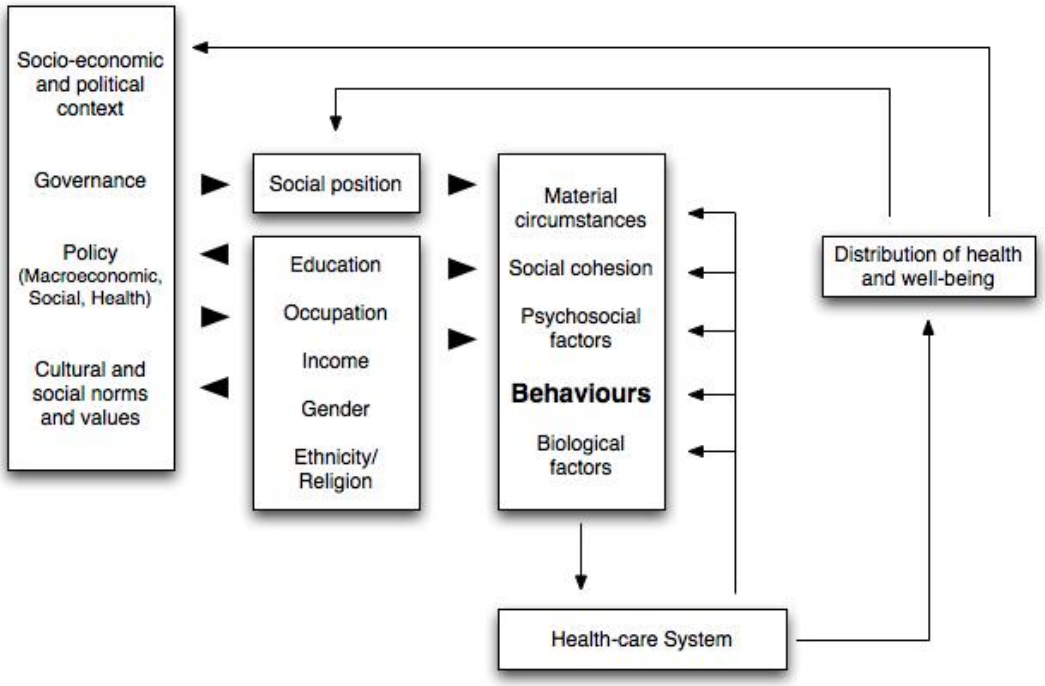
Source: Dahlgren & Whitehead, 1991(93)

Dahlgren and Whitehead's framework has influenced subsequent 'health maps', including that by Barton and Grant, which is conceptually similar to Dahlgren and Whitehead's

framework, but adds more detail to the community-level sphere, identifying factors that may influence health such as the built environment and social capital.

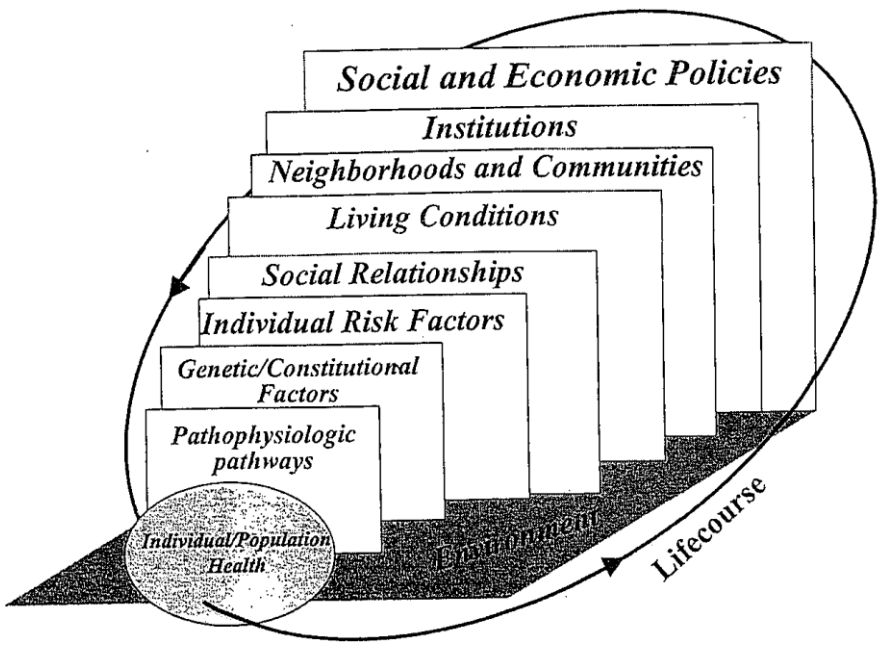
Another prominent framework from the literature on social determinants of individual and population health generally is that of Solar and Irwin (94) (Fig. 3.2), which was developed for the report of the Commission on the Social Determinants of Health. This framework emphasizes the role of factors such as social cohesion and social position, which, although often temporally and spatially distant from the level of the individual, still play a large role in individual health outcomes and are in turn modified by the state of health and well-being among individuals (95). An earlier framework by Kaplan (96) (Fig. 3.3) also recognizes the role of social factors such as communities and social relationships in individual and population health outcomes, but goes further to acknowledge that these relationships might change over the life course. These frameworks are useful for their attention to factors beyond the level of the individual; however, they describe the relationship between these factors and health *outcomes* rather than individual decisions on health behaviour such as alcohol consumption. Moreover, they do not address the pathways via which social factors might be embodied by individual actors and thus influence their health behaviours.

Figure 3.2: Social Determinants of Health Framework



Source: Solar and Irwin, 2007 (94)

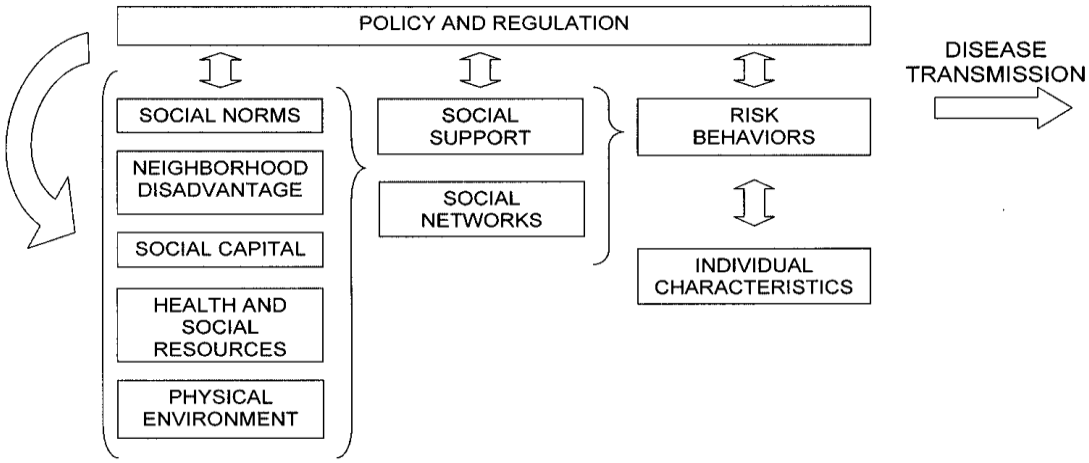
Figure 3.3: The role of social environment in health inequalities



Source: Kaplan, 1999(96)

A framework proposed by Galea et al. highlights the relationships between factors such as social capital, neighbourhood disadvantage and health behaviour (Fig. 3.4) (97). Galea's proposed framework draws on, among others, Kaplan's framework to explore the influence of factors at multiple levels in determining health risk behaviours (in this case, injection drug use) and suggests that this influence might be mediated by other factors such as social support and social networks, but also acknowledges that these relationships have not been sufficiently tested empirically. Further research is necessary to develop a framework that would 'integrate our growing knowledge about multilevel determinants of population health, patterns of feedback and interactions between determinants at different levels, and inform our knowledge about how specific policy interventions influence the pathways that shape the health of populations' (49).

Figure 3.4: Conceptual model of determinants of risk behaviours



Source: Galea, 2003 (97)

3.3 Developing a new Conceptual Framework

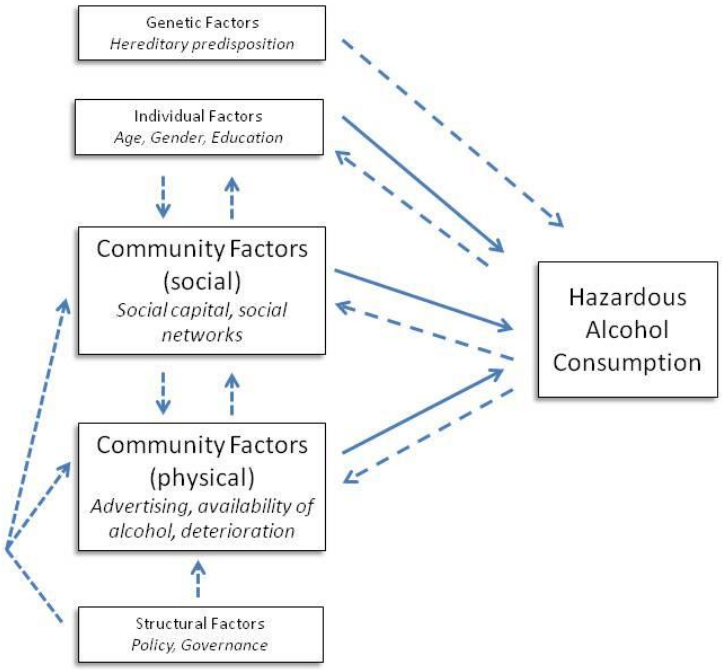
In order to fully understand health behaviour generally, and alcohol consumption specifically, a framework that recognizes the relationships of factors at various levels is required, but this must be supported by empirical evidence. To the best of my knowledge, no conceptual framework currently exists that describes the multiple factors that influence alcohol consumption specifically. Therefore, I have applied elements of existing

frameworks, and evidence from the social epidemiology literature, to a new 'working' framework for understanding social determinants of alcohol consumption (Fig 3.5).

The solid arrows in this framework represent potential relationships that will be tested in this thesis, while the dotted arrows represent potential relationships that are recognised but that will not be tested in this thesis. The framework acknowledges the multilevel influences on health depicted in Dahlgren and Whitehead's framework, but presents them in a format that allows for relationships between these factors. Similar to Galea's framework, this framework recognizes the possible influence of individual-level social factors such as education and employment status on risk behaviours, but goes further to acknowledges their possible reciprocal relationship with social factors at the community level, such as social capital (98). Importantly, this framework also highlights the potential relationship between community-level factors and alcohol in the fSU, such as the built environment and social capital, which is included in the conceptual frameworks discussed above, and for which there is evidence from other regions of the world (53, 54, 61, 62, 99). Also as with Dalgren and Whitehead, Kaplan and Galea, this framework acknowledges the potential impact of macro-level factors, such as trade (100) and welfare policy (101) on alcohol consumption. However, macro-level factors are beyond the scope of this thesis and will not be analysed. Genetic factors, although not considered social determinants of health, nor addressed in this thesis, are also included in the conceptual framework as there is evidence that they can play a role in patterns of alcohol consumption (102-104).

The conceptual framework also recognizes the potential reverse relationship between alcohol consumption and individual- and community-level social factors. However, due to the cross-sectional nature of the data available for this thesis, any reverse causality cannot be tested for. This issue is discussed in greater detail in Research Paper 2, as well as in Section 8.4.5.

Figure 3.5: 'Working' conceptual framework of social determinants of alcohol consumption



The conceptual framework presented here serves to 'map' the key ideas of my thesis and guide my research questions. The importance of factors acting at different levels is recognized in this framework, and while the focus of this thesis is on community-level factors, individual-level factors will also be addressed in the analyses undertaken. In Chapter 8 I will use the findings of this thesis to develop the framework into a tool that can be used for future research on the social determinants of alcohol consumption, particularly at the community-level. The results of this thesis, and in particular the framework that is generated, will take one step towards understanding the complicated processes involved in alcohol consummption in the fSU.

4 SYSTEMATIC REVIEW

4.1 Preamble to Research Paper 1

In the previous chapter I reviewed existing conceptual frameworks of the social determinants of health and health behaviour. Drawing on these and on existing empirical evidence from other regions of the role of social factors in alcohol consumption, I presented a 'working' conceptual framework for understanding social determinants of alcohol consumption in the fSU. The framework highlights the potential role of community-level factors such as alcohol advertising (72, 73), price (72) and social capital which have all been linked to alcohol consumption in other regions, and which will be the focus of this thesis. A preliminary review of the literature suggested that although there is overwhelming evidence pointing to the role of alcohol in decreased life expectancy in the fSU, evidence on social factors associated with hazardous alcohol consumption was limited. However, before beginning my data analysis, it was important to systematically review existing studies of social factors and hazardous alcohol consumption in the fSU to i) identify factors for which there is evidence of an association with alcohol consumption ii) identify key gaps in knowledge of the determinants of this behaviour and iii) identify measures of hazardous alcohol consumption commonly used in the region. In conducting this review, I chose to restrict its scope to literature from former Soviet countries only for two reasons: First, I felt that the social context of the fSU is unique and thus might also be the relationship between social factors and alcohol consumption in the region. Second, although my subsequent research was informed by research on social determinants of alcohol consumption from other regions, it was important to produce a comprehensive inventory of existing research from the fSU so as to ensure research was not being duplicated, to identify covariates that I would include in my quantitative models, and identify outcomes that have been used to measure hazardous alcohol consumption in the region previously. The systematic review undertaken for this thesis is presented here.

Research Paper 1

Social factors associated with alcohol consumption in the former Soviet Union: A systematic review

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ABSTRACT

Aim

Alcohol consumption is a major cause of premature mortality in countries of the former Soviet Union. Despite the unique social profile of the region there exists no systematic review of studies on social factors and alcohol consumption in formerly Soviet countries. Our aim was to critically review the current evidence on social factors associated with alcohol consumption in the former Soviet Union and to identify key gaps in the literature.

Methods

We searched MEDLINE, EMBASE and Global Health databases for cross-sectional, case-control, longitudinal or qualitative studies of demographic, socio-economic, psycho-social and contextual factors associated with alcohol consumption, in any language, published from 1991 until December 16, 2011. Additional studies were identified from the references of selected papers and expert consultation. Our review followed PRISMA guidelines for the reporting of systematic reviews.

Results

Our search strategy resulted in 26 articles for review. Although there is strong evidence in the literature that males and smokers in the former Soviet Union are more likely to engage in hazardous alcohol consumption, findings regarding other social factors were mixed and there were almost no data on the association of contextual factors and alcohol consumption in this region.

Conclusion

This review highlights the extremely limited amount of evidence on social factors associated with heavy alcohol consumption in the former Soviet Union. Given the unique social environment of countries of the former Soviet Union, future research should take these factors into account in order to effectively address the high levels of alcohol-related mortality in this region.

INTRODUCTION

Understanding the determinants of heavy alcohol consumption is especially critical in the countries of the former Soviet Union (fSU), where total alcohol consumption (recorded plus unrecorded) is higher than in any other region of the world (2), with widespread episodic heavy "binge" drinking among working age men (ages 18-59) (23), among whom alcohol is the leading cause of premature mortality (5, 105-108). There is growing recognition of the need to look beyond traditional demographic correlates of hazardous alcohol consumption to understand the role of *social* factors (52, 109), especially given the scale of social and economic turmoil that accompanied the fall of the Soviet Union (110-112). These factors include levels of social support (113), drinking within social networks and with family members (113, 114), and features of built environment (115). In addition, others include contextual variables such as alcohol availability, advertising and price (53, 54).

The collapse of the Soviet regime saw the effortless transmutation of the *nomenklatura* into a powerful oligarchy, leaving a population of "citizens with an 'uncivic' objective", who had little or no connection to, or trust in, state organizations (78). Many successor states formally rejected socialism (116), replacing collective values with individualistic, capitalist ones (117). This created environments where establishment of 'social capital', defined as those features of social organization — such as density of civic associations, levels of interpersonal trust and trust in government institutions, and norms of reciprocity — that act as resources for individuals, and facilitate collective action (78) became difficult. This absence of social capital has been linked to the mortality crisis in the fSU (78), but its specific association with alcohol consumption is still unclear. Other social factors linked to health outcomes in the fSU, such as household economic status (118) and fear of crime (119), may also be important in understanding alcohol consumption in this region.

Despite the importance of this issue, we found no previous systematic review of social determinants of heavy alcohol consumption in this region. To fill this gap, we have

conducted a systematic review of published literature on factors associated with alcohol consumption in fSU countries. We aim to identify populations most at risk of hazardous alcohol consumption and to understand better the social factors that might play a role in this behaviour.

METHODS

Search strategy

We searched MEDLINE, EMBASE and Global Health for papers in any language, published between 1991 (the year of the collapse of the Soviet Union) and December 16, 2011 (date of last search) on factors associated with alcohol consumption itself, pattern of alcohol consumption (frequency or volume) or 'problem drinking' as defined by alcoholism screening instruments, among men and women aged 18+ years, living in any countries of the fSU. Although the Baltic countries experienced the transition differently than the Commonwealth of Independent States (CIS) (29), we included them to maximize the number of eligible papers. The year of the fall of the Soviet Union - 1991 - was selected as the starting date. The search terms used are listed in Table 4.1.

Table 4.1: Search terms used in MEDLINE, EMBASE and Global Health

1.	<Russi:> or < Georgi:> or <Ukrain:> or <Moldov:> or <Belarus:> or <Armeni:> or <Azerbaija:> or <Kazakhsta:> or <Uzbekista:> or <Turkmenista:> or <Kyrgyzsta:> or <Tajikista:> or <Estoni:> or <Latvi:> or <Lithuani:> or <USSR> or <Soviet> or <Post-Soviet>
2.	<alcohol:> or <ethanol> or <drink:>
3.	<pattern:> or <risk:> or <amount:> or <level:> or <determinant:> or <factor:> or <prevalence:>

Study selection

All abstracts identified were reviewed for relevance. Relevant full papers were reviewed against our inclusion criteria (Table 4.2). We included literature on demographic, socio-economic, psycho-social and contextual characteristics, while omitting literature on individual-level genetic factors and macro-level factors such as national alcohol policy and legislation. Citations were searched, and regional experts on alcohol research were consulted to locate studies otherwise missed. The quality of all quantitative papers was assessed using the *Strengthening the reporting of observational studies in epidemiology* (STROBE) quality checklist (Version 3) (120); that of qualitative papers was assessed using the *Consolidated criteria for reporting qualitative research* (COREQ) checklist (121).

Table 4.2: Flow chart showing process of identifying papers for review

Type of study	*Published cross-sectional, longitudinal and qualitative studies*
Outcome measure	*Alcohol consumption*
Independent variables	<u>*Demographic factors*</u> *Demographic Characteristics:* statistical characteristics of an individual such as age, gender, marital status and religion. <u>*Social factors*</u> *Socio-economic characteristics:* characteristics related to one's social and economic status such as education, employment and income level. *Psychosocial and health-related characteristics:* characteristics related to one's psychological and physical well-being such as stress, work satisfaction, conflicts with family/friends and smoking status. *Contextual characteristics:* extrinsic factors that make up the physical, social and attitudinal context in which individuals live and over which they have little or no control; including, but not limited to: place of residence, price and availability of alcohol, alcohol advertisements, community-level poverty, social capital, attitudes and perceptions of the alcohol environment.
Population	*Men and women aged 18+ living in any former Soviet republic* (Papers that described analyses of sample populations that were not exclusively from the fSU (i.e. they were combined with participants from other countries) were excluded from this review.)
Year	*1991 – 2011*
Language	*Any*

Data Extraction

For each included paper the following information was extracted: location, study type, sample details, outcome measure, significant independent variables and related parameters (odds ratio, regression coefficient, correlation coefficient, proportion). In the case of qualitative papers we reported findings relevant to our inclusion criteria. Only statistically significant associations were included (i.e. $p<0.05$). If no p-values were given, estimates of association were assumed to be significant if their confidence interval did not cross 1.00 (in the case of odds ratios) or 0 (in the case of regression coefficients). If several models were presented, results were extracted from the model that adjusted for the most possible confounders. Where any two or more papers reported the same data, only the one with the most detailed information on correlates of alcohol consumption was included. We did not report on factors associated with beverage preference. Our reporting follows PRISMA guidelines (122).

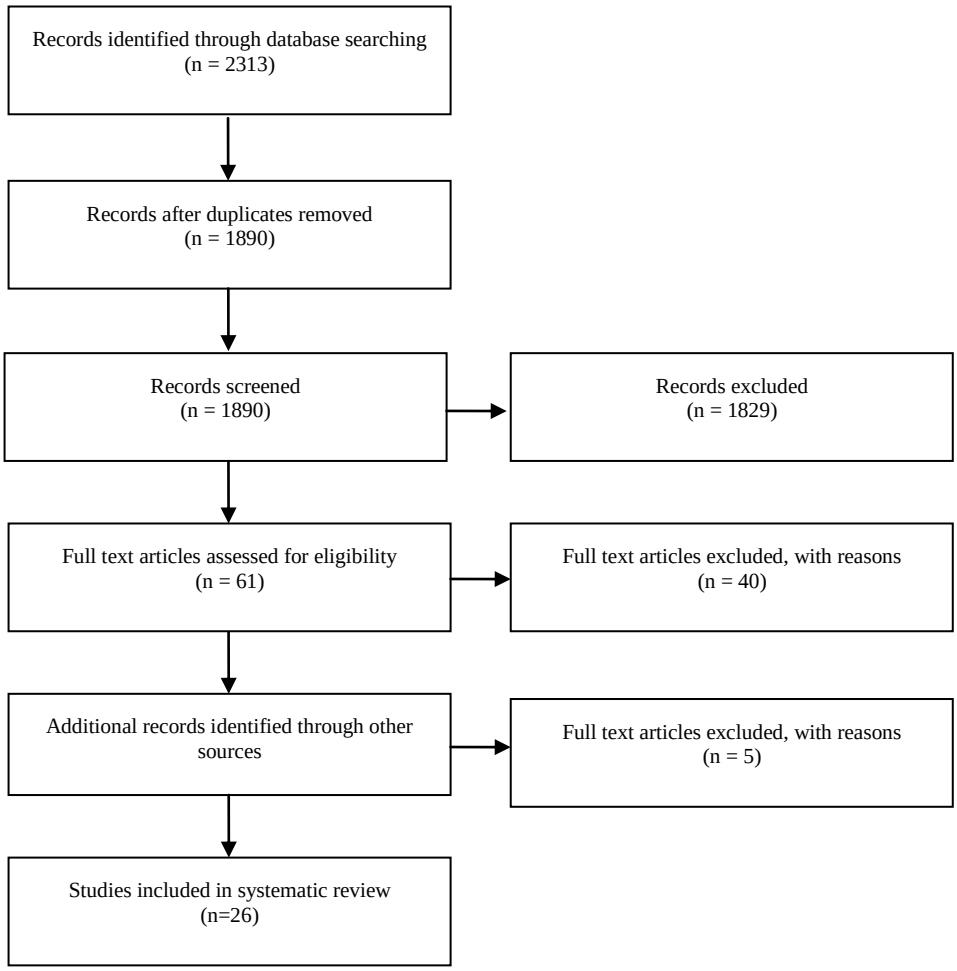
RESULTS

Study selection

Our initial search of the databases uncovered 2313 records; reduced to 1890 after discarding duplicates. All abstracts were evaluated against our inclusion criteria, resulting in 61 relevant abstracts (8 in Russian, 1 in Lithuanian). The full articles for all but 3 abstracts were evaluated (these were Russian language papers unable to be accessed) and 40 were excluded. Two additional papers were identified from cited references and eight from expert suggestions; of these five were excluded, resulting in 45 excluded papers. Papers were excluded for the following reasons: the outcome measure (e.g. alcohol-related mortality), independent variables (e.g. parents' drinking behaviour) or population (e.g. younger than 18 years of age) did not meet inclusion criteria (N=35); results were based on analyses of the same data published in another paper and did not provide new findings relevant for this review (N=3); the record was an editorial (N=4); the record was a letter to the editor (N=1);

the record was an abstract for which no full paper could be retrieved (N=2). No papers were excluded for failing to meet STROBE quality criteria. Our final review included 26 published articles (23, 66, 67, 123-145), all in English (Figure 4.1).

Figure 4.1: Flow chart showing process of identifying papers for review



Quality of the evidence

The included studies fulfilled most of the items on the STROBE or COREQ checklists for reporting studies. However, some studies had low response rates (66), over-represented groups such as the highly educated (137), or sampled only regional vs. national populations (66, 123, 124, 131, 133, 136-138, 143, 144).

Type of study

All included papers used cross-sectional surveys (or cross-sectional data from longitudinal surveys as in the case of the Russia Longitudinal Monitoring Survey), except for one which used qualitative interviews. Several used the same survey data (23, 67, 127, 130-132, 134, 142-145). All but seven focused solely on Russia or the Baltic Republics, and of these only two included Armenia, Belarus, Georgia and Moldova (both from the same survey data) and none included Tajikistan, Turkmenistan or Uzbekistan, highlighting the paucity of evidence from outside of Russia and the Baltic States.

Definition of outcome measure

Alcohol consumption was defined in various ways: 13 papers measured frequency of intake, eight measured amount drunk, nine combined frequency and amount (e.g. episodic heavy / 'binge' drinking), four measured alcohol disorders or problem drinking and one investigated factors associated with 'alcohol dependence' as defined by the Composite International Diagnostic Interview. One study looked at the particular cases of 'consumption of surrogates' and 'zapoi' (a prolonged period of intoxication where the participant withdraws from normal life) in Russia (136). The one qualitative study included in this review interviewed proxy respondents of men whose 'heavy alcohol consumption had contributed to their death'(143). Outcome measures in each study are described in Appendix 2.

Significant factors associated with alcohol consumption

The results are categorised into four sets of factors: demographic, socio-economic, psychosocial and health-related, and contextual (Appendix 3). Studies with multiple exposures are included in more than one category where appropriate. Results are presented descriptively rather than in a meta-analysis as exposure and outcome variables were inconsistent. Data were analysed in various ways, thus the results are presented in a range of formats – odds ratios, regression coefficients and prevalence estimates. P-values are presented where available. The results from those papers that did not report any measures of association but did report prevalence estimates among different groups (e.g. between different age categories) were not reported here but are in Appendix 4.

Demographic factors

Fifteen studies found a statistically significant association between one or more demographic characteristics and consumption. Those that combined men and women all found that men had higher odds of exhibiting all types of alcohol consumption measured (Appendix 3).

Almost all studies finding a significant association between age and alcohol consumption reported that those most likely to engage in hazardous consumption were between ages 18 and 34, with the association declining with increasing age (67, 126, 130, 132, 134, 135, 139, 144, 145). There were four exceptions: Pärna et al. found that men and women in Finland aged 35-44 exhibited the highest odds of consuming alcohol at least once a week (140); Pomerleau et al. found that in their multi-country study of Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Belarus men aged 40-59 were most likely to participate in episodic heavy drinking (EHD) (all countries combined) (23); Puska et al. found that men aged 35-49 in Estonia and Lithuania were the most likely to consume strong alcohol frequently (129); and Cockerham et al. found that with each one-year increase in age among men and women in Russia, the odds of frequent drinking increased by 1.02 (127).

Associations between marital status and alcohol consumption (all age-adjusted unless stated) were mixed. In Estonia, widowed men and women had reduced odds of consuming any type of alcohol at least once a week (men: OR=0.41; women: OR=0.65) (140), and in Russia these odds were even lower (widowed men: OR=0.35; widowed women: OR=0.12) (125). On the other hand, one study that analysed data from Estonia, Latvia and Lithuania found that 'divorced or widowed' men in Lithuania were 1.41 times as likely to engage in 'heavy drinking' (≥15 alcohol portions per week) and 'single, divorced or widowed' men in Estonia were 1.77 times as likely to 'binge drink' (≥ 6 portions per occasion at least once a week) (135), while the prevalence of drinking at least twice per week was found to be highest among widowed men in Russia (131). In their multi-country survey, Pomerleau and colleagues found that 'separated, divorced, widowed' women had 1.73 times the odds of participating in EHD (23), and another analysis of the same data reported that being 'married' was a protective factor for both frequent drinking in general (OR= 0.84) and frequent beer drinking (OR= 0.81) among women (139). However, because these studies present the odds of the outcomes of interest among all non-married (i.e. single, divorced, widowed) men and separated, divorced and widowed women together, it is impossible to tell whether there is a significant difference among the groups. Findings from the analysis by Bromet and colleagues indicate that there may be significant differences between 'no longer married <55 years' (i.e. more likely divorced) men and women and 'no longer married 55+ years' (i.e. more likely widowed) men and women - the odds that these groups would have an alcohol use disorder were 1.94 and 0.17, respectively (132). However, age was not adjusted for. Married men were found to have both increased and decreased odds of alcohol consumption: In cross-sectional surveys in Belarus, Russia and Ukraine married men (and women) were less likely to drink frequently (OR = 0.67) as were married men in Kazakhstan (OR=0.67) (67, 145); whereas another study in these and other fSU countries found that never married men were less likely to engage in episodic heavy drinking (OR=0.78) (23). Two studies looking at women only found that those who were married were less likely to consume alcohol (23, 137). Three studies that included marital status found no statistically

significant association with any measure of alcohol consumption once other demographic variables were adjusted for (130, 133, 134). Among men in Ukraine, odds of heavy alcohol use were higher for those who were a parent of a child compared to those with no children (134).

A study of 4000 men and women living in Kazakhstan or Kyrgyzstan found that Muslim men and women were less likely to drink frequently than non-Muslims (OR=0.48), as were people of Russian ethnicity compared to native Kazakh and Kyrgyz people (OR=0.60) (130). However, Russian-speaking respondents in Ukraine were more likely to be classified as having an alcohol use disorder (OR= 1.38) compared to Ukrainian-speaking respondents (132). Men and women of 'Russian' or 'other' nationality were less likely to drink alcohol frequently compared to native Estonians in Estonia, whereas in Lithuania they were both more likely to drink than native Lithuanians (126). 'Ethnic minorities' in Estonia were also found to be more likely to consume alcohol at least once per week (140).

Socio-economic factors

Eighteen papers found statistically significant relationships between at least one socio-economic characteristic and alcohol consumption (Appendix 3).

Studies of the association with educational level were inconclusive. Better educated men were more likely to drink (127), and to drink more than once a week (126), but less likely to be heavy alcohol users or have alcohol-related problems (123, 135-137). Bromet and colleagues found that, compared to those with higher education, men in Ukraine with primary education were at lower risk of alcohol disorders while men with secondary education were more at risk (132). Women with secondary education were less likely to drink frequently compared to women with primary education (67, 139) and higher education (140) in some studies, but more likely than women with higher education (137) in others. Helasoja and colleagues' study from Estonia, Latvia and Lithuania found mixed associations between women's education and heavy or binge drinking in the three countries (135). Five

studies analysed education but found no statistically significant association with alcohol consumption, once other demographic variables were adjusted for (67, 125, 130, 134, 145).

Most studies detecting a significant association between employment status and alcohol consumption among men found that those who are unemployed are more likely to consume alcohol frequently, consume large amounts of alcohol, be diagnosed with alcohol disorders, consume surrogates, go on *zapoi*, have frequent hangovers, drink spirits daily and exhibit symptoms of alcohol dependence (124, 125, 132, 136). One found that unemployed men who were 'seeking work' had higher levels of both alcohol consumption and alcohol related problems (as measured by the AUDIT questionnaire (146)), compared to men in regular paid employment (144). The qualitative study by Saburova et al. also found that 'unstable employment' was commonly identified as the cause of heavy drinking by wives of men who had died from alcohol-related causes (143). However, others found that episodic heavy drinking was *less* likely among men who were 'unemployed and cannot find work' (OR=0.79) compared to employed men (23), and that both unemployed *and* employed men were at higher odds of heavy alcohol use (OR=1.9; 1.7) than men who were out of the labour force altogether and this association was similar for women (OR= 2.2; 1.6) (134). A few studies also showed that *type* of employment might play an important role. Cockerham and colleagues found that men and women in 'manager/professional' type jobs were less likely to drink frequently (OR = 0.58) (145), while Hinote et al. found that women in 'agricultural/unskilled' or 'manager/professional' positions were less likely than 'skilled workers' to drink beer frequently (139). Pakriev et al. reported that the prevalence of alcohol dependence varied among women with different types of employment in Udmurtia, Russia: 'worker' women (9.3%); 'employee' women (0%); 'retired' women (1.8%); 'unemployed' women (4.0%) (124). In the qualitative study described above, the researchers found that heavy alcohol consumption by some deceased men had begun in the workplace, as they were in industries with alcohol-supportive cultures where remuneration was at times provided in the form of alcohol (143). Four studies found no significant relationship between

employment and alcohol consumption after adjustment for other factors (67, 123, 130, 145). These findings imply that, in addition to whether one is employed or unemployed, the type of employment/unemployment they hold may be an important factor in alcohol consumption and dependence.

With the exception of the study by Carlson and Vågerö, which showed that the poorest men in Taganrog were least likely to drink (123), findings from all other studies that detected a significant relationship between income and drinking among men showed that low economic status is *positively* associated with various measures of alcohol consumption. Men who had '2-4 economic problems' (137) or '3 economic problems (138) on measures that included being unable to afford meat or fish more than once or twice per week, being unable to purchase necessary clothing, abstaining from social or cultural events or having to borrow money, were more likely to binge drink. Those men that had 'neither car nor central heating' were more likely to consume surrogates, experience *zapoi* and have frequent hangovers (136). The picture for women was different. McKee and colleagues found that women in Estonia, Latvia and Lithuania with 'high income' were 2.33, 5.33 and 3.07 times as likely to consume alcohol at least once per week compared to women with very low incomes (126), and Hinote et al. showed that frequent drinking increased with higher disposable income (139). Among studies looking at measures of alcohol consumption among women beyond frequency, one found that women with 'average' economic situations were less likely to engage in episodic heavy drinking compared to those with 'bad/very bad' situations, but the p-value for trend was not statistically significant (147). Others found varying associations between economic status and heavy or 'binge' drinking but these were not statistically significant once other demographic factors were controlled (134, 137). Two studies that analysed men and women together found that higher income was associated with higher odds of drinking generally (127) and of being diagnosed with an alcohol use disorder (132) while three others found that economic status was not significant once other factors were adjusted for (130, 133, 145).

Psychosocial and health-related factors

Nine studies found a significant association between psychosocial or health-related factors and alcohol consumption (Appendix 3).

In a cross-sectional study of men and women from Belarus, Ukraine and Russia, participants who expressed a 'pro-communist ideology' were more likely to be heavy vodka drinkers (OR=1.65) (145), and in another study of these countries, as well as Armenia, Georgia, Kazakhstan, Kyrgyzstan and Moldova, men who felt that 'life would be better under a Communist system' were also more likely to engage in episodic heavy drinking (23). A study of men in Russia alone also showed that men who expressed a 'pro-socialist' ideology were more likely to be frequent drinkers (127). On the other hand, women who *disagreed* that life would be better under a communist system were more likely to drink frequently (OR=1.41) (139). Men in Kazakhstan, Belarus, Ukraine and Russia who displayed symptoms of 'distress' were more likely to be frequent drinkers than those who did not (OR=1.09) (67), as were distressed women in these countries as well as in Armenia, Georgia and Kyrgyzstan (OR=1.23) (139). Men in Russia who agreed with the statement that one can control one's health were less likely to be 'regular drinkers' (i.e. several times a week) (128), while men in Russia and other fSU countries with 'quite good' perceived health were more likely to be heavy episodic drinkers than men with 'bad' perceived health (23). Men in Taganrog, Russia who had poor family relations were more likely to drink heavily (123). Finally, women in Moscow who had 'regular contact with friends' were more likely to binge drink (137), and those who identified with masculine traits were more likely to score higher on an alcohol use index (133). Feelings of hopelessness and powerlessness have also been investigated but were not statistically associated with alcohol consumption (66).

Contextual characteristics

Six studies reported significant associations between place of residence and alcohol consumption (Appendix 3). No other contextual factors were explored in any study included.

Men in urban areas in Latvia and women in urban areas in Latvia, Lithuania and Estonia were more likely to be heavy drinkers than those in small towns or villages (129, 135). In contrast, another study found that urban/rural differences in these countries were not significantly associated with alcohol consumption (126). One study found that men and women in Southeast Ukraine were more likely to engage in heavy drinking (134), while another study using the same data found that neither region of residence in Ukraine, nor 'urbanicity', were significantly associated with alcohol disorders (132). Urban/rural differences were also found to be non-significant in one multi-country study (23).

DISCUSSION

Our review highlighted a shortage of conclusive evidence on social factors associated with alcohol consumption in the fSU. More research is needed to understand the roles of age, marital status, education, employment, economic status, religion, ethnicity, place of residence and psycho-social factors. Inconsistent findings may be a result of variation in the definition of independent variables among studies. For example, contradictory findings regarding the association between employment status and alcohol consumption may be due to the definition of 'employment' used, as previous research in Russia has found that even among those who report being 'employed', the experience of wage arrears, payment in consumer goods or compulsory unpaid leave is common and may be linked to health outcomes (148). Future research should account for such nuances when measuring independent variables. The fact that some studies were specific to one location within our countries of interest, rather than nationally representative, may have also influenced the findings; however, it was necessary to include all such studies in a comprehensive review.

Contradictory findings may also be explained by variation among studies in the number of confounders controlled or in the definition of outcome measure.

The inconsistency in outcome measures also presents a challenge for interpreting findings, and makes it impossible to differentiate between individuals that are engaging in moderate drinking and those that are engaging in more hazardous types of consumption (24, 149). In light of evidence pointing to the variation in health effects of alcohol at different levels of intake, future research on factors associated with alcohol consumption should use clearly defined and standardized measures of alcohol consumed at one time as well as frequency of consumption, albeit recognising the challenges in accurately specifying exposure among the heaviest drinkers. Ideally, it would also take advantage of a range of novel biomarkers to capture recent levels of consumption (150).

Another important gap uncovered by this review is the absence of studies investigating the role of contextual factors in alcohol consumption in the fSU. For example, lower sale prices for alcohol, alcohol promotions, higher prevalence of alcohol advertisements and features of the built environment such as dilapidated buildings and homes with non-working water and heating systems) have all been linked to increased hazardous alcohol consumption in other contexts (53, 54, 115), but have thus far been ignored in studies in this region. Future research should also account for social factors that have been linked to health outcomes in the fSU such as elements of social capital (151).

Lastly, our review also identified a gap in terms of *type* of study conducted. All studies included involved cross-sectional surveys (except for one qualitative study), and all but one used basic regression modelling. This highlights the need for longitudinal studies of factors associated with alcohol consumption in the fSU, as well the use of a wider range of methods to capture complex relationships between social factors and alcohol consumption, such as multilevel modelling and qualitative research methods. Moreover, all of the quantitative papers reviewed relied on self-reported alcohol consumption and under self-reporting of

alcohol consumption is well documented, including in the fSU (17, 18, 152, 153). If biochemical markers or collateral informant reports are not feasible, researchers should pay special attention to those factors which might interact to bias self-reports of alcohol consumption, namely social context, respondent attributes and task attributes (e.g. wording, response format) (154). There is also a shortage of studies in countries of the fSU outside of Russia and the Baltic States, all of which also have severe alcohol problems.

Limitations

It is possible that some studies of interest may not have been captured by our search criteria due to language differences or because they are not indexed in our chosen databases. Although we are confident that our chosen databases provided comprehensive coverage of English-language articles on the topic of alcohol consumption in the fSU, the small number of non-English language records retrieved highlights the need to include more non-English language articles in English-language databases. Our efforts to search the references of included papers and to consult with regional experts in the field of alcohol research sought to account for this limitation. Furthermore, because there are an indeterminate number of social factors that could have been examined for their role in alcohol consumption, it is possible that our search terms did not retrieve them all. Again, we believe that our reference checks and expert consultations sufficiently offset the potential impact of this limitation.

Our population was limited by age (i.e. 18+ year), omitting studies among people younger than 18 years of age in the fSU. However, this restriction was set because we felt that the factors influencing health behaviour among adolescent and adult populations are quite different and should be analysed separately.

It is also important to note that for some groups in the fSU, such as women and Muslims, alcohol consumption may be under-reported due to social stigma (155-157). As such, the social factors associated with alcohol consumption among these groups may not be represented in the results. In addition, the studies included in this review may not have

sufficiently captured social factors associated with surrogate alcohol consumption among individuals in the fSU. Surrogate alcohols - legally manufactured products which contain alcohol but are not intended for consumption (e.g. medical tinctures, eau de cologne) - have been shown to be a significant cause of mortality among men in Russia (158-161). The extent of consumption of surrogate alcohols is difficult to measure due to the stigma attached to their consumption and higher survey non-response rates among surrogate drinkers (161).

Conclusions

There is a substantial body of evidence on the catastrophic impact of hazardous alcohol consumption on health in the fSU. However, this review has highlighted the extremely limited amount of evidence on the factors associated with this behaviour. Evidence regarding factors such as employment and education is inconsistent and there is almost no research to date on the role of contextual factors in alcohol consumption in this region. Given the unique social environment of countries of the former Soviet Union, future research should take these factors into account in order to better inform policies and interventions that can effectively address the high levels of alcohol-related mortality in this region.

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5 THE 'ALCOGENIC' ENVIRONMENT

5.1 Preamble to Research Paper 2

The systematic review of the literature described in the previous chapter revealed a dearth of research relating community-level social factors to alcohol consumption in the fSU. Globally however, there is increased recognition of the importance of community-level social determinants of health behaviours, as well as of health outcomes (162, 163). With regard to alcohol specifically, physical community characteristics such as alcohol advertising, outlet density, price and availability have all been shown to impact on alcohol consumption (72, 99). In order to investigate the role these factors play in hazardous alcohol consumption I analysed their association with with this behaviour using the HITT data (details of the HITT study are described in section 1.11, as well as in the methods sections of Research Paper 2 (this chapter) and Research Paper 3 (Chapter 6). When analysed individually, these variables were not significantly associated with hazardous alcohol consumption. (The odds of CAGE and EHD for each of these factors individually are shown in Appendix 7.) However, informed by research on the social determinants of overweight and obesity, I hypothesized that these variables may in fact act *together* to create conditions that affect alcohol consumption. In overweight and obesity research, an increased focus on characteristics of the individual's physical and social surroundings has given rise to the concept of the 'obesogenic' environment (164), whereby a combination of area-level factors (e.g. access to recreational space, safe walking routes, healthy food products, etc.) influence patterns of diet and physical activity and thus the probability of becoming overweight or obese (164, 165). A key element of this concept is that different aspects of the environment act in concert (166), so that multiple predictors must be analyzed together (167), thereby necessitating the development of a comprehensive approach to assessing the obesogenicity of an environment (164, 168). Drawing from this approach, I set out to identify any common factor underlying alcohol advertising, outlet density, price and availability using factor analysis and to estimate the association of this factor with alcohol consumption in the fSU. Although factor analysis

allows for the the identification of a common factor underlying all the alcohol-related environmental variables, and the association of this underlying factor with hazardous alcohol consumption, it does not allow for conclusions about the relationships between the individual variables included in the factor and alcohol consumption. While individually the included variables did not have an effect on our outcomes, the use of interaction terms could provide evidence of a joint effect of pairs of alcohol-related variables on hazardous alcohol consumption. However, as my hypothesis was that there may be an underlying 'alcogenic environment' that is unmeasurable but represented by measured variables, I felt that factor analysis was the most appropriate statistical approach to use. The methods and results of this analysis are presented in Research Paper 2 below.

5.1.1 Measuring hazardous alcohol consumption

The systematic review presented in Research Paper 1 (Chapter 4) highlighted inconsistencies in the literature with regard to outcome measures used. In Research Paper 1, I recommended the use of standardized measures of hazardous alcohol consumption in order to enable comparison of study findings. For this thesis I used two standardized dichotomous measures of hazardous alcohol consumption, the CAGE measure of alcohol dependence (2 or more affirmative answers on a 4-item questionnaire) and EHD (i.e. >2L of beer, 750g of wine or 200g of strong spirits on one occasion) (23). (These are described in more detail in section 1.7, as well as in Research Paper 2 below). Cronbach's alpha for the CAGE questionnaire in the HITT data was 0.75.

5.1.2 Modelling approach

In order to analyse the association between community-level factors and individual-level alcohol consumption I opted to use a population average model rather than a random effects model, which has been commonly used for multilevel data. I made this decision for two reasons. First, in the random effects approach, the odds ratio produced applies to a comparison within a neighbourhood, that is, comparing two individuals from the same

neighbourhood, or from two neighbourhoods with the same neighbourhood effect (i.e. all relevant characteristics the same). In contrast, in the population averaged approach, the odds ratio produced compares two individuals taken from the whole population, irrespective of neighbourhood. Thus, it provides an estimate of the odds of an outcome associated with a unit change in exposure across all neighbourhoods (i.e. comparing a high social capital neighbourhood to a low one). In other words, it estimates the average population effect of a change in the exposure variable rather than the subject-specific effect, and is in this sense more appropriate for estimating the effect of an intervention at the population-level. Second, the population average approach relies on fewer assumptions about unobservable variables and thus produces a more robust estimate of the association between exposure and outcome (169). Hubbard, et al. (169) have provided a more detailed discussion of the use of population average models vs. random effects models to study community-level effects on health, and this is also discussed in Research Paper 2 below.

The levels included in the model for this paper were the individual- and the community-level. Country was adjusted for because it is a potential confounder of the relationship between community characteristics and alcohol consumption but was not included as a level because i) the number of countries in the HITT is nine, which does not meet widely accepted criteria for the number of groups required at the highest level of hierarchical data and ii) moreover, I did not include any country-level predictors in the model and therefore there was no need to account for clustering at the country-level. This modelling approach was also used in Research Paper 3 (Chapter 6).

In sum, the following paper presents the results of a factor analysis of alcohol-related community-level physical characteristics. The association between the factor identified in this analysis and two measures of hazardous alcohol consumption, CAGE-defined problem drinking (2 or more affirmative answers on a 4-item questionnaire) and EHD (i.e. >2L of beer, 750g of wine or 200g of strong spirits on one occasion) (23) is then estimated using a population average regression model, accounting for clustering at the community-level.

Research Paper 2

Using multilevel data to estimate the effect of an 'alcogenic' environment on hazardous alcohol consumption in the former Soviet Union

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ABSTRACT

Purpose

The purpose of this study was to assess whether alcohol-related community characteristics act collectively to influence individual-level alcohol consumption in the former Soviet Union (fSU).

Methods and Results

Using multilevel data from nine countries in the fSU we conducted a factor analysis of seven alcohol-related community characteristics. The association between any latent factors underlying these characteristics and two measures of hazardous alcohol consumption was then analyzed using a population average regression modelling approach. Our factor analysis produced one factor with an eigenvalue >1 (EV=1.33), which explained 70% of the variance. This factor was associated with increased odds of both CAGE problem drinking (OR=1.40, p=0.01) and this estimate remained statistically significant after bootstrapping. The association between the factor and EHD was positive but not statistically significant (OR=1.10, p=0.46).

Conclusions

Our findings suggest that a high number of beer, wine and spirit advertisements and high alcohol outlet density may work together to create an ‘alcogenic’ environment that encourages hazardous alcohol consumption in the fSU.

BACKGROUND

Drawing on the increasing number of studies using multilevel data (170), it is now established that the physical environment can contribute to health-related behaviours and thus impact on health (162). This focus on the individual's wider surroundings has given rise to the concept of the 'obesogenic' environment (164), whereby a combination of area-level factors (e.g. access to recreational space, safe walking routes, healthy food products, etc.) influence patterns of diet and physical activity and thus the probability of becoming overweight or obese (164, 165). A key element of this concept is that different aspects of the environment act in concert (166), so that multiple predictors must be analyzed together (167), thereby necessitating the development of a comprehensive approach to assessing the obesogenicity of an environment (164, 168).

Although this work has focused largely on diet and physical activity (and to a lesser extent, smoking), there are strong grounds for applying this perspective to other health phenomena, such as the consumption of alcohol. A number of studies using multilevel data have evaluated the association between aspects of what might be termed the 'alcogenic' environment and consumption. They include studies of alcohol outlet accessibility (171-173) and advertising (54). The results of these studies have been mixed; however, a recent systematic review concluded that, although the evidence was limited, higher outlet density and greater advertising did seem to be associated with increased drinking and heavy drinking (99). Despite these findings, to the best of our knowledge, no studies have analyzed these factors simultaneously with other potentially important area-level characteristics such as price (174, 175).

Moreover, to our knowledge, the multilevel studies undertaken on this topic to date have been from very few countries, with the majority from the United States. Thus, there is a need for research on area-level characteristics conducive to hazardous alcohol consumption in a greater range of countries, especially where alcohol is a major determinant of health. This is

particularly the case in the countries of the former Soviet Union (fSU), where annual adult per capita alcohol consumption is the highest in the world (e.g. Russia: 15.76 L per year; Ukraine: 15.60 L; Republic of Moldova: 18.22 L compared to 9.44 L in the United States, 10.30 L in Sweden and 13.37 L in the United Kingdom), and is estimated to cause almost 500,000 deaths per year (19), from causes such as accidents, cirrhosis of the liver, alcohol poisoning and cardiac arrest (105, 106, 108, 131, 176). Yet, despite the scale of the problem in this region, recent systematic reviews revealed remarkably little research on the social determinants of hazardous alcohol consumption there (177), and none on the alcohol environment specifically (99). Moreover, alcohol policy in the fSU is, in general, very weak (although there have been some positive developments recently in Russia (178)), with only some restrictions on alcohol outlet density in Russia and Kazakhstan and only partial bans on print or billboard advertising (most often for wine and spirits but not beer) (69).

We hypothesize that, as with obesogenic environments, alcohol-related environmental characteristics may act together, rather than in isolation, to create contexts conducive to hazardous alcohol consumption in the fSU. Using multilevel data from nine countries in this region, we employ factor analysis to assess whether a specific alcogenic environment can be identified and whether it is associated with hazardous alcohol consumption in this region.

METHODS

Data

Household Survey

We used data from the Health in Times of Transition 2010 (HITT) study. This included nationally representative household surveys among men and women aged 18 years and older in nine fSU countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine (Fig 5.1). Households were selected using multi-stage random sampling with stratification by region and rural/urban settlement type. One respondent was randomly selected from each household. Surveys were undertaken between March and May

2010 (the survey was conducted one year later in Kyrgyzstan due to political unrest) and included 1800 respondents in each country, except in Russia and Ukraine, where 3000 and 2000 respectively were sampled to reflect their larger and more regionally diverse populations and in Georgia (n=2200) where a booster survey of 400 additional interviews was undertaken in November 2010 to ensure a more representative sample. Individual exclusion criteria included being institutionalised, hospitalised or homeless, being intoxicated at the time of the survey, and being in the military or in prison. Response rates in countries varied from 43.7% to 83% and the final sample size was 18000. More details of the HITT surveys have been published previously (179).

Figure 5.1: Countries included in the HITT study, 2010

Measuring hazardous alcohol consumption

We used two measures of hazardous alcohol consumption from the HITT household survey data. The first measure was the CAGE questionnaire, a validated standard measure of alcohol dependence (79-81). The CAGE tool identifies alcohol dependence as two or more

affirmative answers on its four-item questionnaire, which asks about individuals' feelings of wanting to cut down their alcohol consumption, annoyance at criticism of their drinking behaviour, guilt about drinking and need to drink in the morning to get rid of a hangover. This criterion has been widely validated and has been shown to have 93% sensitivity and 76% specificity for the identification of problem drinkers (180). Cronbach's alpha for the CAGE questionnaire in the HITT data was 0.75. The second measure – episodic heavy drinking (EHD) – is more specific to the post-Soviet context where this pattern of drinking is particularly widespread among working-age men (23) and is a major driver of mortality, being linked to increased risk of sudden cardiac death (24, 25) as well as injury and violence (26). As noted by Pomerleau et al., researchers in countries of the fSU have used different definitions of EHD; for consistency we use Pomerleau et al.'s definition (i.e. >2L of beer, 750g of wine or 200g of strong spirits on one occasion) (23).

Community profiles

The HITT study also conducted 'community profiles' to record characteristics of the communities in which survey participants live, including prevalence of alcohol advertisements, retail shops selling alcohol, prices and aspects of the built environment. Community sampling was designed to capture a representative cross-section of communities in each country. A few small regions of Georgia, Russia, and Moldova were omitted from the sampling frame due to geographic inaccessibility, dangerous political situations and ongoing military actions. The selected communities were randomly drawn from the larger number of sampling units used in the main HITT household survey (approximately 160–330 per country) which were selected using multi-stage random sampling with stratification by region and rural/urban settlement type.

Community profile data were collected for 333 communities across the nine countries – 30 community profiles were conducted in each country except Russia (N = 73) and Ukraine (N=50), to reflect their larger and more diverse populations - during the same period as the

household survey data collection. The total number of respondents living in those communities in which profile data were collected was 3082.

The instrument used for these profiles was based on the Environmental Profile of a Community's Health (EPOCH), an instrument developed by Chow et al. for the Prospective Urban Rural Epidemiology study (PURE) (181) and adapted to the context of the HITT countries, following its piloting in each country. A final standardized instrument, the Community Observation Form (COF) was used in all of the study countries to ensure consistency and comparability. The COF is reproduced in Appendix 5.

Within each of the communities selected for the community profile method, the data collectors (two per community) chose a starting point by selecting a prominent land mark, such as a major road intersection, a bus station, train station, market or post office or crossroads in the village centre. They would then select a walking route (approximately 1 kilometre) and follow the walking route and systematically complete the COF. In villages, this route would be the entire village. In towns or cities, it involved a walk along the main shopping streets and residential areas.

Measuring the alcohol environment

The HITT community profile data included measures of the following characteristics: 24-hour availability of alcohol, density of alcohol outlets (over a distance of approximately 1 km), frequency of exterior advertisements for beer, wine and spirits (also over approximately 1 km), and the cost of a 0.5 L bottle of vodka and beer. Specifically, 24-hour availability was defined by whether or not the data collectors observed a shop, kiosk, street vendor or private home where alcohol could be purchased at all hours of the day. For alcohol outlets, collectors were asked to count the number of alcohol shops, vendors or other outlets (licensed or not) selling alcohol that they passed on their 1km walk. For advertisements, they were asked to count the number of alcohol advertisements they saw, including that on billboards, pasted on shop windows, bus shelters or other locations that are easily visible

from the street. Finally, costs were assessed by entering various outlets (supermarket, market places, kiosks, alcohol shops) and recording the cheapest price available for a 0.5 bottle of vodka and beer. A description of the variables as they were entered into the factor analysis is included in Table 5.1.

Table 5.1: Variables as entered into factor analysis

Characteristic	**Method for entering into factor analysis**
24-hour availability	Binary (yes/no)
Number of alcohol-selling outlets	Continuous variable converted into categorical variable based on quartiles.
Number of beer advertisements	Continuous variable converted into categorical variable based on quartiles.
Number of wine advertisements	Continuous variable converted into categorical variable based on quartiles.
Number of spirit advertisements	Continuous count variable converted into categorical variable based on quartiles.
Vodka price	Continuous ratio of price of 1L of vodka to price of 1L of milk, converted into categorical variable based on quartiles
Beer price	Continuous ratio of price of 1L of beer to price of 1L of milk, converted into categorical variable based on quartiles

Using these seven variables (with the cost of vodka and beer expressed as a ratio to that of an equivalent volume of milk and with each continuous variable converted to a categorical format), we conducted an exploratory factor analysis (EFA), using the 'factor' command in STATA, to test whether an unmeasured latent factor exists that could explain the common elements among these variables. Specifically, we extracted factors using principal axis factoring, which measures the common variance between items, thus focusing on the latent factor underlying them (182). As has been noted, EFA is used to "arrive at a more parsimonious conceptual understanding of a set of measured variables by determining the number and nature of common factors needed to account for the pattern of correlations among the measured variables" (183). It is thus an appropriate method for identifying unmeasured variables that underlie our measured variables, thereby assessing how conducive the environment is to hazardous alcohol consumption, or how 'alcogenic' the environment

is, in a given community. We employed the commonly used rule of extracting only those factors with an eigenvalue greater than 1 (184).

At the second stage of the analysis, we assigned scores derived from the exploratory factor analysis, using the 'predict' command in STATA. We included variables with negligible loadings in the factor score in order to maximise transparency for our approach. Items with very small loadings account for a tiny amount of the variance in the underlying factor and they do not influence the ranking of communities on said factor. Our results are identical if these items are excluded from the score (the correlation between the two scores – with and without the items with negligible loadings - is 0.99), but we chose to retain these items as they were originally intended to contribute to the latent factor. We then used a population averaged regression model to estimate the association between the alcogenic latent factor and both CAGE and EHD. Although recent research using multilevel data has favoured the use of random-effects models, which use maximum likelihood estimation, we opted to use a population average model, which uses a generalised estimating equation approach. Applied to our research question, a random effects approach would provide us with an estimate of the average odds ratio (OR) of CAGE problem drinking or EHD associated with a unit change in social capital, *within a given community* (i.e. comparing two individuals from the same community, or from two communities with all relevant characteristics equal), whereas the population average approach provides an estimate of the ORs of these outcomes associated with a unit change in social capital *across all communities* (i.e. comparing two individuals taken from the whole population, irrespective of community). The latter provides estimates that represent average effects over the whole population, and so reflects population level changes in social capital. Such models require fewer assumptions than the corresponding random effects models in terms of the distribution of unobservable community random effects. Furthermore, in cases of non-rare events random effects logistic regression estimates may be biased due to the non collapsibility of the odds ratio, which arises from the failure of group odds to equal a weighted average of subgroup odds. Hubbard, et al.(169) have

provided a more detailed discussion of the use of population average models vs. random effects models to study community-level effects on health.

We fitted the following model:

$$logit\ \{pr(A_{ij}=1)\} = \beta_0 + \beta_1(F_{ij}) + \beta_2 X_{ij},$$

where A_{ij} is the dependent variable (CAGE or EHD) for individual *i* in community *j*, F_j is the factor score for individual i in community j (the factor score will be equal among all individuals in the same community), and X_{ij} is the set of socio-demographic potential confounders for individual i and community j.

Our model controlled for the following socio-economic and demographic characteristics: age, gender, education, occupation, household economic status, marital status, religion and smoking status (all self-reported) and country and type of settlement (urban vs. rural). Finally, we used bootstrapping (10000 replications) to test the robustness of our parameter estimates.

RESULTS

Table 5.2 shows the descriptive characteristics of our sample. Table 5.3 shows the prevalence of CAGE, EHD and both CAGE and EHD in our study population, by country and gender. As expected, these outcomes are much more prevalent among men than among women, and are most common in Belarus, Russia and Ukraine. Our findings are similar to those of previous research in the region (23).

Table 5.2: Sample characteristics (full sample and analysed sample), HITT 2010

Characteristic*	Frequency (%)**	
	Full sample (n=18000)	Sample included in final analysis (n=2124)
Gender		
Male	7828 (43.5)	923 (43.5)
Age category		
18-29	5042 (28.0)	588 (27.7)
30-39	3411 (19.0)	363 (17.1)
40-49	3380 (18.8)	396 (18.6)
50-59	2755 (15.3)	335 (15.8)
60+	3410 (19.0)	442 (20.8)
Marital status		
Married	11129 (62.1)	1260 (59.7)
Single	3691 (20.6)	447 (21.1)
Divorced	1152 (6.4)	160 (7.6)
Widowed	1962 (10.9)	245 (11.6)
Religion		
Muslim (vs. Non-Muslim)	4436 (24.7)	467 (22.0)
Education		
Incomplete secondary or lower	2345 (13.1)	244 (11.5)
Incomplete higher or lower	11543 (64.3)	1375 (64.9)
Complete higher	4066 (22.65)	499 (23.6)
Occupation		
Employed	15766 (88.2)	1850 (87.8)
Unemployed (not seeking work)	608 (3.4)	71 (3.4)
Unemployed (seeking work)	1499 (8.4)	187 (8.9)
Household economic status		
Very bad/bad	3616 (20.3)	461 (22.0)
Average	10195 (57.3)	1228 (58.6)
Very good/good	3984 (22.4)	407 (19.4)
Place of residence		
Urban (vs. Rural)	10864 (60.4)	1531 (72.1)

**All characteristics were self-reported (except for place of residence)*

*** Proportions may not sum to exactly 100 due to rounding*

Table 5.3: Prevalence of CAGE problem drinking and EHD by country and gender, HITT 2010

Country	*CAGE*		*EHD*		*Both*	
	Men N (%)	*Women N (%)*	*Men N (%)*	*Women N (%)*	*Men N (%)*	*Women N (%)*
Armenia	150 (18.7)	29 (3.1)	117 (14.2)	7 (0.7)	36 (4.5)	0
Azerbaijan	101 (16.6)	4 (2.8)	80 (9.46)	1 (0.1)	31 (5.1)	1 (0.7)
Belarus	229 (30.4)	95 (9.5)	290 (36.9)	52 (5.1)	139 (18.4)	21 (2.1)
Georgia	224 (28.2)	17 (1.2)	180 (22.5)	19 (1.4)	69 (8.7)	4 (0.29)
Kazakhstan	185 (24.5)	52 (6.8)	274 (32.1)	69 (7.3)	114 (15.1)	17 (2.2)
Kyrgyzstan	158 (18.4)	43 (4.8)	104 (12.0)	14 (1.5)	60 (7.0)	4 (0.4)
Moldova	208 (27.2)	82 (8.5)	89 (11.2)	14 (1.4)	48 (6.3)	4 (0.4)
Russia	357 (31.8)	122 (7.3)	390 (32.2)	110 (6.2)	181 (16.1)	35 (2.1)
Ukraine	231 (29.0)	67 (6.1)	236 (28.0)	63 (5.5)	119 (15.0)	25 (2.3)
Total	1843 (25.4)	511 (5.8)	1760 (22.5)	349 (3.4)	797 (11.0)	111 (1.3)

Table 5.4 shows the mean number of alcohol outlets, alcohol ads and price of vodka and beer (in 2010 International dollars) in each country, as well as the proportion of communities in each country where alcohol was available 24h/day. The highest mean number of alcohol outlets and advertisements was observed in Moldova. The lowest price for vodka was in Kazakhstan; for beer the lowest price was in Ukraine. The country with the highest proportion of communities where alcohol was available 24h/day was Belarus. In all included countries, other than Georgia and Moldova, alcohol was available 24h/day in more than 80% of communities observed. The correlation matrix for the community-level factors in this analysis is shown in Appendix 6.

Table 5.4: Summary statistics for community-level characteristics

Country	Alcohol outlets/ community	Alcohol ads/ community	Price of .5 L of vodka (INT$)	Price of .5 L of beer (INT$)	Alcohol available 24h/day
	Mean (95% CI)	*Mean (95% CI)*	*Mean (95% CI)*	*Mean (95% CI)*	*% of communities (95% CI)*
Armenia	6.7 (5.9-7.5)	3.5 (3.1-4.0)	3.16 (3.08-3.25)	1.47 (1.44-1.50)	76.7 (71.5-81.7)
Azerbaijan	6.7 (6.2-7.2)	1.0 (0.7-1.2)	4.76 (4.59-4.92)	1.86 (1.80-1.91)	87.9 (83.3-90.3)
Belarus	6.9 (6.1-7.7)	2.5 (2.1-3.0)	6.21 (6.08-6.35)	1.51 (1.47-1.55)	96.2 (93.8-98.5)
Georgia	6.9 (6.4-7.4)	3.6 (3.1-4.1)	4.72 (4.49-4.95)	1.60 (1.57-1.63)	69.7 (65.2-74.2)
Kazakhstan	6.4 (5.8-6.9)	5.6 (4.4-6.7)	2.34 (2.28-2.39)	1.35 (1.17-1.52)	83.3 (79.1-87.6)
Kyrgyzstan	5.3 (4.8-5.8)	2.7 (2.2-3.3)	2.64 (2.56-2.72)	1.39 (1.35-1.43)	83.3 (79.1-87.6)
Moldova	8.5 (7.9-9.2)	17.2 (15.6-18.7)	3.80 (3.69-3.90)	1.24 (1.22-1.26)	38.9 (32.8-45.0)
Russia	6.6 (6.2-6.9)	5.8 (5.3-6.3)	4.63 (4.54-4.71)	1.14 (1.12-1.16)	85.1 (82.3-87.9)
Ukraine	6.7 (6.1-7.4)	10.9 (9.5-12.3)	4.97 (4.89-5.05)	1.02 (0.98-1.07)	83.3 (78.3-88.2)

Our factor analysis produced only one factor with an eigenvalue greater than 1 (eigenvalue = 1.33), which explained 70% of the variance. The loadings for this factor, which show how each item is correlated with it, are shown in Table 5.5. The factor was mostly explained by frequency of spirit advertisements, but wine advertisements, beer advertisements and alcohol outlets also had strong factor loadings. As discussed above, rather than dropping those variables with lower loadings, we included all of the alcohol environment variables when assigning a factor score for the following reasons: i) the amount of variance that those variables with lower loadings contribute to the factor is negligible, ii) in theory each variable is supposed to contribute to the factor and iii) empirically their inclusion offers some refinement (although small in magnitude) to the factor. The factor score ranged from approximately -1.11 to 1.87, with 236 unique values. The mean factor score by country is reported in Appendix 8.

Table 5.5: Factor loadings for each variable pertaining to the alcohol environment

	Factor loading
Alcohol outlets	0.3301
Beer advertisements	0.6493
Spirit advertisements	0.6678
Wine advertisements	0.4953
Alcohol available 24/day	-0.0684
Cost ratio of milk to vodka	0.0350
Cost ratio of milk to beer	0.2290

The total number of individuals for whom we had data to assign a factor score and who answered the CAGE questionnaire was n=1835. For EHD this number was n=2066. The reduction in sample size from 3802 was due to missing data on the price of milk or alcohol for some communities. The intraclass correlation for the null CAGE model was 0.18 (i.e. level 2, the community, is responsible for 18% of the variance). For the EHD model this figure was 0.19. The results of our population average regression model, controlling for socio-economic and demographic variables, showed that the factor retained from our factor

analysis was associated with increased odds of CAGE problem drinking (OR=1.40, p=0.01). The factor also increased the odds of EHD, but this relationship was not statistically significant EHD (OR=1.10, p=0.46) (Table 5.6). After bootstrapping the estimate for CAGE problem drinking remained statistically significant (p=0.02).

Table 5.6: Single population average model and bootstrapped results of logistic regression of CAGE problem drinking and EHD*

	CAGE (n=1077)			EHD (n=1136)		
	OR	95% CI	P-value	OR	95% CI	P-value
'Alcogenic' Factor	1.40	1.08-1.82	0.01	1.10	0.85-1.44	0.46
Male	4.74	3.32-6.76	<0.001	4.95	3.27-7.49	<0.001
Household econ. status	0.84	0.67-1.06	0.15	0.98	0.79-1.21	0.84
Urban (vs. Rural)	0.85	0.55-1.31	0.46	0.92	0.61-1.37	0.67
Muslim (vs. Non-Muslim)	0.90	0.40-1.99	0.79	0.79	0.31-2.01	0.62
Smoker (vs. Non-smoker)	2.65	1.95-3.56	<0.001	3.75	2.69-5.22	<0.001
Country						
Armenia	ref.			ref.		
Azerbaijan	1.42	0.45-4.52	0.55	0.93	0.24-3.69	0.92
Belarus	4.45	2.09-9.49	<0.001	10.93	4.35-27.5	<0.001
Georgia	1.98	0.88-4.47	0.10	2.05	0.73-5.79	0.18
Kazakhstan	1.79	0.54-6.00	0.34	5.30	1.68-16.8	0.004
Kyrgyzstan	1.10	0.37-3.28	0.86	1.36	0.36-5.10	0.65
Moldova	1.10	0.39-3.08	0.86	1.79	0.56-5.80	0.33
Russia	3.00	1.59-5.63	0.001	5.75	2.60-12.7	<0.001
Ukraine	3.00	1.46-6.19	0.003	7.58	2.93-19.6	<0.001
Age category						
18-29	ref.			ref.		
30-39	0.89	0.56-1.43	0.64	1.00	0.60-1.66	0.99
40-49	1.54	0.96-2.47	0.07	1.15	0.70-1.87	0.59
50-59	1.32	0.80-2.17	0.28	0.93	0.52-1.68	0.82
60+	0.73	0.42-1.24	0.24	0.47	0.26-0.87	0.02

Marital status						
Married	ref.			ref.		
Single	0.85	0.53-1.35	0.50	0.98	0.59-1.63	0.95
Divorced	1.52	0.95-2.44	0.08	0.87	0.53-1.43	0.58
Widowed	0.84	0.42-1.67	0.62	0.27	0.09-0.85	0.03
Education						
Incomplete 2ndary or lower	ref			ref.		
Incomplete higher or lower	0.97	0.57-1.64	0.91	1.03	0.59-1.79	0.91
Complete higher	0.73	0.40-1.33	0.31	0.95	0.50-1.82	0.88
Occupation						
Employed	ref.			ref.		
Unempl.(not seeking work)	1.14	0.38-3.58	0.82	0.50	0.13-1.90	0.31
Unempl.(seeking work)	1.28	0.79-2.07	0.32	1.47	0.90-2.38	0.13

** Results shown are for full model (i.e. all covariates listed are included in model).*

DISCUSSION

There is a surprising and disappointing lack of research on the alcohol environment and its role in alcohol consumption in countries of the fSU and our study takes a first step towards addressing this gap. To the best of our knowledge, we have collected the only community-level data in the fSU that estimates the prevalence of various alcohol-related environmental characteristics. Some of the findings (e.g. that there are a high number of alcohol outlets and frequency of advertising in communities in Moldova; and that beer prices are comparatively low in Ukraine) are consistent with what is known about alcohol consumption in the region (e.g. that the volume of alcohol consumption is high in Moldova (185), and there is increasing beer consumption in Ukraine (186)).

Our study acknowledges that the alcohol-related characteristics of one's environment are unlikely to act in isolation and so it attempts to identify a common factor that captures 'alcogenicity'. We find that, in our data, one underlying factor accounts for the correlation between several measures of the alcohol environment, and that this factor is mostly related to the frequency of alcohol advertisements and alcohol outlets. The underlying factor identified in our analysis is statistically significantly associated with CAGE problem drinking in our population. Although the estimated association is not of statistical significance for EHD, this may be due to an underestimate of the true prevalence of EHD in our study population since this outcome relies on self-report of the amount of alcohol consumed which is commonly under-reported (18). In the fSU this might be especially problematic (17), not least because the heaviest drinkers tend to be underrepresented in surveys. As the goal of factor analysis is to uncover independent variables that are not measured directly, it is necessarily hypothetical and does not allow us to identify the direct effect of each indicator included in our factor on alcohol outcomes. However, our findings suggest several alcohol-related environmental characteristics are captured by one unmeasured – latent – factor, and that this inferred factor is associated with increased alcohol consumption. In other words, we suggest that a high number of beer, wine and spirit

advertisements and high alcohol outlet density may work together to create an alcogenic environment that encourages hazardous alcohol consumption. This is consistent with findings from other multilevel studies conducted in the U.S. that found a relationship between advertising and consumption among both adolescents (53) and adults (54) and between outlet density and consumption among adolescents (187, 188), although other multilevel research looking at adults in the U.S. (women only) found no association between outlets and consumption (54). However, more multilevel studies are needed to better understand the nature of the association between outlet density, advertising and alcohol consumption among both adolescent and adult populations outside the U.S.

As is the case with all observational studies, our findings should be interpreted with caution due to the potential bias created by unknown and unmeasured confounders. Moreover, although all community profile data collectors participated in standardized training and used a standardized tool for data collection, it is possible that relying on subjective observations introduced some degree of bias to our variable measurements. However, the EPOCH tool on which the HITT community profile tool was based has been shown to have high inter-rater reliability and feasibility for measuring aspects of the community related to physical activity, diet and smoking (181). Objective measures of alcohol outlet density, price, advertisements, and 24-hour availability would be preferable but these data do not currently exist in the countries included in this study.

There is also the potential in our study for reverse causality between prevalence of alcohol advertisements and outlets and alcohol consumption (i.e. it is possible that alcohol companies simply increase marketing and availability in communities where there are more drinkers). We were not able to control for this possible endogeneity with an instrumental variable analysis, a standard approach to estimating causality (189, 190), as there were no variables in our data which fit the assumptions required for instrumental variables (i.e. that they be directly correlated with the explanatory variables but not with the outcome variable).

However, a review of longitudinal studies from other regions of the world (albeit among adolescents) found strong and consistent evidence that exposure to advertising not only increases the likelihood of drinking initiation but also increases the odds of increased consumption among baseline drinkers (72), suggesting that advertising does indeed influence drinking behaviour, rather than the other way around. This conclusion is also supported by a meta-analysis of estimated elasticities of alcohol demand that suggests that the advertising elasticity of demand for alcohol tends to be positive (i.e. as advertising increases so does demand) (73). With regard to alcohol outlets, other research using time-series cross-sectional data from the US showed that, even when controlling for endogeneity, physical availability had a direct effect on sales of alcohol (171).

The price of alcohol did not contribute to our factor, nor did it have a significant effect on alcohol consumption when analyzed separately (results not shown) which is surprising given the existing evidence from other regions of the world supporting the role of tax and price increases in reducing consumption of alcohol (168), and a recent study on alcohol consumption in historical Russia which also suggested that higher alcohol taxes were associated with reduced consumption (191). The inability to detect a relation may have been due to missing data on price, especially in small villages where alcohol is often produced in the home for personal consumption or sold informally. The nature of the alcohol market in this region is complex. For example, it is estimated that 40-50% of the alcohol market in Russia is not regulated by the state (4) and homemade and surrogate (e.g. aftershaves and medicinal tinctures) alcohol is relatively easy to obtain and consumed by a significant number of men in the country (192). Because of the informal nature of supply of these substances, it is difficult to assess prices. The inability to detect a relation between price and consumption may also be partly due to the limited variability in vodka and beer prices between communities in each country, which makes it difficult to observe an effect of price on consumption.

These results have implications for policy in this region where, historically, the response to hazardous alcohol consumption has focused on the individual, with treatment being delivered by narcologists. With the recent exception of Russia, there has been very little action to address the broader determinants of alcohol consumption. These findings highlight the importance of a comprehensive approach that addresses all aspects of the alcogenic environment.

6 SOCIAL CAPITAL AND ALCOHOL CONSUMPTION

6.1 Preamble to Research Paper 3

The systematic review undertaken for this thesis uncovered a gap in research on both physical and social aspects of the community and hazardous alcohol consumption in the fSU. In the previous chapter I presented Research Paper 2, an analysis of the association between alcohol-related physical aspects of the community (advertising, outlet density, price and availability) and hazardous alcohol consumption. In this chapter, I will present Research Paper 3 which focuses on social aspects of the community, namely 'social capital'. As noted in Chapter 2, for the purposes of this thesis 'social capital' is defined as 'those features of social organization — such as density of civic associations, levels of interpersonal trust and norms of reciprocity — that act as resources for individuals, and facilitate collective action' (78).

I chose to explore the role of social capital in alcohol consumption for the following reasons: i) a lack of social capital has been linked to worse health outcomes generally among individuals in Russia (78, 193, 194), elsewhere in the fSU (195), and in the wider post-communist world (196-198); ii) any association between social capital and alcohol consumption in the region has not been explored; iii) studies from other countries suggest that some elements of social capital may indeed play an important role in alcohol consumption among adults (61, 62).

6.1.1 Measuring Social Capital

The concept of social capital was introduced into popular culture by Robert Putnam, with his book *Bowling Alone: The Collapse and Revival of the American Community'* (199). Putnam credits others though - Pierre Bourdieu, James S. Coleman, Glenn C. Loury, Jane Jacobs and John R. Seeley - for earlier uses of the concept, and attributes the "first known use of the concept" to Lyda J. Hanifan, a rural educator from West Virginia. Hanifan referred to social capital in a letter published in 1916 in the *Annals of the American*

Academy of Political and Social Science to urge the importance of community involvement for the success of schools, describing it as capital, "in the figurative sense", that an individual accumulates through increased contact with neighbours and that can benefit the community as well as the individual themselves (199). Since then, social capital has been given an increasingly prominent place in sociological research, being linked to academic performance (200, 201), occupational attainment (202, 203), integration of ethnic minorities (204) and juvenile delinquency (205).

Social capital is a relatively new concept in public health research and, because it represents a phenomenon that is not directly observable, operationalisation of this concept is challenging. There are few long standing surveys that were designed to measure social capital, and, as a result, contemporary researchers have generally constructed indices from a range of approximate measures such as voting trends, active engagement in civic organisations and hours spent volunteering (206). Definitional ambiguity in existing research on social capital limits the comparability of findings across studies and thus our understanding of its role in health and health behaviours. The challenges associated with operationalising social capital are discussed in greater detail in the Discussion (Section 8.4.3). For the purposes of this study, I chose indicators of social capital that have been used in previous health research in the fSU (195) and elsewhere (207-209): 'social isolation', 'interpersonal trust', 'help in a crisis' and 'active civic participation'. These indicators are described in the Methods section of the following paper as well as in Appendix 9. As there is debate as to whether social capital is an individual- or community-level construct, I included both individual-level and community aggregated indicators in this analysis.

Research Paper 3

Hazardous alcohol consumption in the former Soviet Union: Does social capital play a role?

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ABSTRACT

Background

Hazardous alcohol consumption is a leading cause of mortality in the former Soviet Union (fSU), but little is known about the social factors associated with this behaviour. We set out to estimate the association between individual- and community-level social capital and hazardous alcohol consumption in the former Soviet Union (fSU).

Methods

Data were obtained from Health in Times of Transition 2010, a household survey of nine fSU countries, (n=18,000 within 2027 communities). Individual-level indicators of social isolation, civic participation, help in a crisis and interpersonal trust were aggregated to the community-level. Adjusting for demographic factors, the association of individual- and community-level indicators with problem drinking (CAGE) and episodic heavy drinking (EHD) was estimated using a population average model for the analysis of multilevel data.

Results

Among men, individual-level social isolation (odds ratio [OR]=1.20), community-level social isolation (OR = 1.18), and community-level civic participation (OR=4.08) were associated with increased odds of CAGE. Community-level civic participation (OR=2.91) increased the odds of EHD, while community-lelve interpersonal trust (OR=0.89) decreased these odds. Among women, individual-level social isolation (OR=1.30) and community-level civic participation (OR=2.94) increased odds of CAGE.

Conclusion

Our results provide evidence of the role of some elements of social capital in hazardous alcohol consumption in the fSU, and highlight the importance of community effects. The nature of civic organizations in the fSU, and the communities in which civic participation is high, should be further investigated to inform alcohol policy in the region.

INTRODUCTION

The former Soviet Union (fSU) region experienced a sharp decline in life expectancy in the 1990s, from which it has yet fully to recover (31). Although there is now compelling evidence that alcohol has played a major proximal role in this mortality crisis (25), driven by rapid social change (37), the factors determining individual vulnerability, or conversely, resilience, are still being worked out in detail. A recent systematic review of research from the fSU on social factors and alcohol consumption found little on the role of commonly studied factors such as education and income, with what exists providing mixed results, and no published research examining the role of the social environment on consumption (177).

One social factor that has recently gained attention in public health research from other regions is 'social capital', defined as 'those features of social organization — such as density of civic associations, levels of interpersonal trust and norms of reciprocity — that act as resources for individuals, and facilitate collective action' (78). Specific mechanisms via which social capital may affect health, such as by reducing the negative impacts of stress (210), or facilitating the dissemination of health-related information (211), have been hypothesized (212). With regard to health behaviours specifically, the hypothesis that communities with higher levels of social capital are better able to exercise social control over health behaviours (211) has found some empirical support in evidence linking elements of social capital (namely civic engagement, trust and social support) to individual health behaviours (212), including alcohol consumption (59, 209). Further research showed that the association between social capital and mortality was attenuated when differences in health behaviours were accounted for, suggesting that health behaviours may mediate the effect of social capital on overall health (213).

While consensus regarding the importance of social capital in health behaviour research has grown, there is persisting disagreement in the literature as to whether social capital should be treated as an individual attribute or a collective one (e.g. at the level of the community or

state) (214). In their summary of the various conceptualizations of social capital in public health research, Kawachi and colleagues argue that the most theoretically appropriate level for analysis of its association with health is *both* the individual and collective level, within a multilevel framework (214). They provide evidence for the legitimacy of aggregating individual survey responses to obtain collective measures of social capital (214), an approach now commonly used (59). Several studies have found a positive association between aggregate social capital measures and individual health outcomes (215). However, as pointed out by d'Hombres and colleagues (195), these studies did not simultaneously include individual-level measures of social capital, thereby failing to eliminate the possibility that the positive effect of community-level social capital was due to its positive correlation with individual-level social capital (195). Some subsequent studies that measured both individual- and community-level social capital simultaneously found no residual association between community-level social capital and health once individual-level social capital was adjusted for, leading d'Hombres and colleagues to conclude that 'community social capital does not have an independent effect on self-reported health' once individual-level social capital is accounted for and therefore 'affects health only indirectly' (195). However, studies from elsewhere have reported independent associations between community-level social capital and self-reported health (207), as well as alcohol consumption (59).

That social capital, either at the community or individual level, might have an effect on alcohol consumption in the fSU is plausible, given what we know of the region. The Soviet regime suppressed civil society, leading its citizens to rely on informal networks, such as friends and family for financial or other means of support, leaving socially isolated individuals vulnerable (78). This lack of social capital has been linked to worse health outcomes generally among individuals in Russia (78), elsewhere in the fSU (195), and in the wider post-communist world (198); however, any association between social capital and alcohol consumption in the region has not yet been explored. Recognizing the need for

research on social determinants of alcohol consumption in the fSU, and building on existing evidence of the specific role of social capital in health in the fSU, and in alcohol consumption elsewhere, we set out to analyze the association between individual- and community-level social capital and hazardous alcohol consumption in nine fSU countries.

METHODS

Data

Data were obtained from the Health in Times of Transition (HITT) study 2010. HITT conducted nationally representative surveys in nine fSU countries - Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine - between March and June 2010 (data collection in Kyrgyzstan was postponed by one year due to political violence). Multistage random sampling with stratification by region and rural/urban settlement type was used; within each primary sampling unit (PSU; local administrative unit), households were selected by standardised random route procedures. Using a standardized survey instrument, trained fieldworkers interviewed survey participants in their homes. The response rates for the HITT varied from 47.3% in Kazakhstan to 83% in Moldova. There were 1800 respondents in each country, except in Russia (3000) and Ukraine (2200) to reflect the larger and more regionally diverse populations in these two countries, and in Georgia (2200) where a booster survey of 400 additional interviews was undertaken in November 2010 to ensure a more representative sample. The final sample size was N=18000.

Measuring social capital

Social capital is still a relatively new concept in public health research and, as yet, there is no standard approach to its measurement. One model regards social capital as consisting of two components: a structural component which includes the ‘extent and intensity of associational links and activity’ and a cognitive component which includes ‘perceptions of support, reciprocity, sharing and trust’ (216). Using this framework, we operationalised

social capital using the following indicators: social isolation (structural), active civic participation (structural), having someone to turn to for help in a crisis (cognitive) and interpersonal trust (cognitive). Using self-reported survey responses, 'social isolation' ("How often do you feel lonely?") and 'interpersonal trust' ("To what degree do you feel that people can be trusted?") were measured as continuous variables, while 'help in a crisis' ("Is there anyone who you can really count on to help you out in a crisis?") and 'active civic participation' ("Are you an *active* member of at least one of these organizations?") were measured as binary variables. More detailed information on the survey questions used and response options can be found in Appendix 9.

We used the PSUs in the HITT survey to represent communities - 2027 PSUs were included with approximately 8-10 individuals per PSU. To estimate simultaneously the association between community-level and individual-level social capital and our outcomes of interest, we followed standard multilevel practice (217) and introduced both the individual-level score as well as the average of all scores in the community into the linear predictor. Unlike recent studies of social capital and health that have used 'self-excluded' measures of community-level social capital (i.e. the individual's score is not included in the average community-level score) (207), we used a 'self-included' measure (i.e. the individual's score is included in the average community-level score). This approach decomposes the collective effect of social capital into its within- and between- group components, and allows us to estimate the expected changes in hazardous alcohol consumption of individual i in community j associated with a unit change in individual level social capital, expressed as a deviation from the community mean, and with a unit change in community-level social capital respectively.

Measuring hazardous alcohol consumption

Two measures of hazardous alcohol consumption were used. The first used a validated standard measure of hazardous alcohol consumption - the CAGE four-item questionnaire for

assessing alcohol dependence (79). Cronbach's alpha for the CAGE questionnaire in the HITT data was 0.75.

The second measure – episodic heavy drinking (EHD) is more specific to the post-Soviet context where this pattern of drinking is widespread and a major driver of mortality, being linked to increased risk of sudden cardiac death (24) as well as injury and violence (26). It is particularly common among working-age men in the fSU (23). As noted by Pomerleau et al., researchers have used different definitions of EHD; for consistency with their previous multi-country study of alcohol consumption in the fSU we use Pomerleau et al.'s definition (i.e. >2L of beer, 750g of wine or 200g of strong spirits on one occasion) (23).

Statistical Analysis

Our dataset consists of 18000 individuals nested in 2027 communities, thus calling for a modelling approach that accounts for the non-independence of individuals within the same community. Though much of the recent research on community-level social capital and health has favoured 'random effects' multilevel modelling (207, 214, 215) which uses maximum likelihood estimation, we have opted for a 'population average model', which uses a generalized estimating equation approach. Applied to our research question, a random effects approach would provide us with an estimate of the average odds ratio (OR) of CAGE problem drinking or EHD associated with a unit change in social capital, *within a given community* (i.e. comparing two individuals from the same community, or from two communities with all relevant characteristics equal), whereas the population average approach provides an estimate of the ORs of these outcomes associated with a unit change in social capital *across all communities* (i.e. comparing two individuals taken from the whole population, irrespective of community). The latter provides estimates that represent average effects over the whole population, and so reflects population level changes in social capital. Such models require fewer assumptions than the corresponding random effects models in terms of the distribution of unobservable community random effects. Hubbard, et

al. (169) have provided a more detailed discussion of the use of population average models vs. random effects models to study community-level effects on health.

We began with the following model (which has been used in previous research on community-level social capital (207)):

$$logit\ \{pr(A_{ij}=1)\} = \beta_0 + \beta_1(S_{ij}-S_j) + \beta_2 S_j + \beta_3 X_{ij},$$

where A_{ij} is the dependent variable (CAGE or EHD) for individual *i* in community *j*, S_{ij} is the social capital indicators measured for individual i in community j, S_j is the average of social capital indicators in community j, and X_{ij} is the set of socio-demographic potential confounders for individual i and community j.

We then re-parameterized this model in the following way:

$$logit\ \{pr(A_{ij}=1)\} = \beta_0 + \beta_1 S_{ij} + (\beta_2 - \beta_1) S_j + \beta_3 X_{ij},$$

where $(\beta_2 - \beta_1)$ represents the effect of community-level social capital over and above any individual-level effect (i.e. if $\beta_2 = \beta_1$ there is no effect of social capital at the level of the community).

Both models give the same individual-level coefficient but while the community-level coefficient in the first model represents the combined effect of individual- and community-level social capital on hazardous alcohol consumption, in our model it represents the contribution of community-level social capital variables over and above individual-level variables. Men and women were analysed separately given the large differences in consumption patterns between them (23), and the following variables were controlled for in the analysis: age, marital status, religion, education, occupation, household economic status, place of residence (urban v. rural), country of residence and smoking status.

RESULTS

Table 6.1 shows the characteristics of the study sample and the distribution of social capital indicators. Roughly 44% of the sample was male, most were married (62%), employed (88%) and living in urban areas (60%). Almost 10% of the sample reported being lonely 'often', roughly 6% reported being active in a civic organisation, 92% had someone to go to in a crisis and about 5% reported low trust in others. Social capital indicators were not highly correlated with each other.

Table 6.1: Sample characteristics, HITT 2010

Characteristic*	Frequency (%)**
Gender	
Male	7828 (43.5)
Age category	
18-29	5042 (28.0)
30-39	3411 (19.0)
40-49	3380 (18.8)
50-59	2755 (15.3)
60+	3410 (19.0)
Marital status	
Married	11129 (62.1)
Single	3691 (20.6)
Divorced	1152 (6.4)
Widowed	1962 (10.9)
Religion	
Muslim (vs. Non-Muslim)	4436 (24.7)
Education	
Incomplete secondary or lower	2345 (13.1)
Incomplete higher or lower	11543 (64.3)
Complete higher	4066 (22.65)
Occupation	
Employed	15766 (88.2)
Unemployed (not seeking work)	608 (3.4)
Unemployed (seeking work)	1499 (8.4)
Household economic status	
Very bad/bad	3616 (20.3)
Average	10195 (57.3)
Very good/good	3984 (22.4)
Place of residence	
Urban (vs. Rural)	10864 (60.4)

Smoking status	
Smoker	4,642 (25.8)
Social isolation	
Never	8454 (47.6)
Rarely	3723 (21.0)
Sometimes	3892 (21.9)
Often	1702 (9.6)
Active civic engagement	
Yes (vs. No)	1,149 (6.4)
Help in a crisis	
Yes (vs. No)	16233 (91.5)
Interpersonal trust	
1 (Low)	954
2	781
3	1638
4	2079
5	3674
6	2912
7	2650
8	1950 (11.0)
9	680 (3.8)
10 (High)	487 (2.7)

The prevalence of CAGE problem drinking and EHD in our sample, by age category and gender, are shown in Table 6.2. As expected, men were much more likely to report CAGE-defined problem drinking and EHD than women, and our estimates are similar to the earlier study by Pomerleau, et al. that examined the prevalence of EHD in this population (23).

Table 6.2: Prevalence of CAGE problem drinking and EHD by age category and gender, HITT 2010

	CAGE problem drinking		Episodic heavy drinking		Both	
Age category	*Men N (%)*	*Women N (%)*	*Men N (%)*	*Women N (%)*	*Men N (%)*	*Women N (%)*
18-29	421 (18.7)	160 (7.2)	488 (19.8)	102 (4.0)	182 (8.1)	29 (1.3)
30-39	383 (27.7)	120 (7.0)	403 (27.6)	107 (5.5)	191 (14.0)	39 (2.3)
40-49	408 (30.7)	104 (6.30)	387 (27.0)	78 (4.0)	179 (13.5)	21 (1.3)
50-59	353 (33.1)	77 (5.5)	299 (26.1)	42 (2.6)	160 (15.0)	18 (1.3)
60+	278 (22.8)	50 (2.7)	183 (13.9)	20 (1.0)	85 (7.0)	4 (0.2)
Total	1843	511	1760	349	797	111

	(25.4)	(5.8)	(22.5)	(3.4)	(11.0)	(1.3)

The results from our population average model in Table 6.3 show the additional effect of community-level social capital variables on CAGE problem drinking and EHD among men, over and above the individual-level effect. Adjusting for possible socio-demographic confounders, we found that in addition to the increased odds of individual CAGE problem drinking associated with higher individual-level social isolation, higher community-level social isolation also increased the odds of this behaviour, as did community-level civic participation. The odds of EHD also increased with higher community-level civic participation but were not significantly associated with individual-level social isolation, while the odds of engaging in EHD among men decreased with higher levels of community-level interpersonal trust.

Table 6.3: Association between community- and individual-level social capital and hazardous alcohol consumption among males*, HITT 2010

	CAGE			EHD		
	OR	95% CI	P-value	OR	95% CI	P-value
Community-level variables						
Social isolation	1.18	1.00-1.38	0.045	1.02	0.87-1.19	0.326
Active civic participation	4.08	2.23-7.47	<0.001	2.91	1.51-5.59	0.001
Help in a crisis	1.36	0.72-2.54	0.343	1.17	0.66-2.10	0.586
Interpersonal trust	0.97	0.92-1.03	0.380	0.89	0.83-0.95	<0.001
Individual-level variables						
Social isolation	1.20	1.11-1.29	<0.001	1.06	0.97-1.15	0.109
Active civic participation	0.94	0.72-1.22	0.622	0.91	0.69-1.19	0.484
Help in a crisis	0.99	0.78-1.26	0.921	1.05	0.81-1.36	0.708
Interpersonal trust	0.98	0.94-1.02	0.257	1.02	0.98-1.05	0.358
Household econ. status	1.17	1.07-1.29	0.001	1.05	0.95-1.15	0.335
Urban (vs. Rural)	0.79	0.69-0.92	0.002	0.97	0.84-1.12	0.692
Muslim (vs. Non-Muslim)	0.65	0.50-0.85	0.002	0.66	0.52-0.83	<0.001
Smoker (vs. Non-smoker)	2.29	2.02-2.60	<0.001	2.68	2.36-3.31	<0.001
Country						
Armenia	ref.					
Azerbaijan	1.35	0.83-2.18	0.228	0.94	0.58-1.51	0.783
Belarus	2.03	1.50-2.75	<0.001	4.19	3.00-5.85	<0.001
Georgia	1.58	1.11-2.24	0.010	1.76	1.24-2.50	0.001
Kazakhstan	1.77	1.24-2.52	0.002	3.77	2.67-5.33	<0.001
Kyrgyzstan	1.50	1.02-2.21	0.039	1.20	0.79-1.83	0.393

Moldova	1.53	1.12-2.10	0.008	0.82	0.54-1.24	0.342
Russia	2.17	1.61-2.93	<0.001	3.29	2.39-4.52	<0.001
Ukraine	1.84	1.36-2.50	<0.001	2.57	1.85-3.56	<0.001
Age category						
18-29	ref.					
30-39	1.34	1.10-1.63	0.004	1.14	0.94-1.39	0.175
40-49	1.54	1.26-1.89	<0.001	1.15	0.95-1.41	0.158
50-59	1.60	1.29-1.98	<0.001	1.07	0.86-1.34	0.524
60+	1.09	0.86-1.38	0.474	0.52	0.41-0.67	<0.001
Marital status						
Married	ref.			ref.		
Single	0.81	0.67-0.97	0.024	0.74	0.61-0.89	0.002
Divorced	1.42	1.11-1.82	0.006	0.97	0.75-1.27	0.847
Widowed	0.73	0.52-1.02	0.069	0.90	0.63-1.29	0.578
Education						
Incomplete 2ndary or lower	ref.			ref.		
Incomplete higher or lower	0.93	0.77-1.13	0.474	1.06	0.86-1.31	0.583
Complete higher	0.85	0.68-1.07	0.162	1.03	0.81-1.32	0.787
Occupation						
Employed	ref.					
Unempl.(not seeking work)	1.46	1.04-2.05	0.030	0.80	0.54-1.20	0.283
Unempl.(seeking work)	1.18	0.97-1.44	0.098	1.18	0.96-1.46	0.121

**Results are for full model (i.e. all covariates listed are included in model).*

Table 6.4: Association between community- and individual-level social capital and hazardous alcohol consumption among females*, HITT 2010

	CAGE			EHD		
	OR	95% CI	P-value	OR	95% CI	P-value
Community-level variables						
Social isolation	1.09	0.86-1.37	0.486	1.34	1.01-1.79	0.044
Active civic participation	2.94	1.20-7.21	0.018	1.01	0.35-2.89	0.990
Help in a crisis	0.34	0.11-1.03	0.056	1.24	0.30-5.17	0.771
Interpersonal trust	1.06	0.96-1.17	0.268	0.98	0.87-1.10	0.705
Individual-level variables						
Social isolation	1.30	1.16-1.46	<0.001	0.99	0.86-1.14	0.898
Active civic participation	1.47	1.02-2.11	0.037	0.72	0.44-1.20	0.209
Help in a crisis	0.96	0.68-1.37	0.833	1.28	0.70-2.35	0.426
Interpersonal trust	0.96	0.90-102	0.190	0.95	0.86-1.02	0.141
Household econ. status	1.05	0.90-1.23	0.529	0.85	0.71-1.02	0.078
Urban (vs. Rural)	1.22	0.94-1.59	0.139	0.82	0.62-1.10	0.187
Muslim (vs. Non)	0.79	0.50-1.26	0.324	0.52	0.33-0.81	0.004
Smoker (vs. Non)	3.91	3.07-5.00	<0.001	5.49	4.20-7.16	<0.001
Country						
Armenia	ref.					
Azerbaijan	1.73	0.49-6.08	0.394	0.39	0.05-3.35	0.393
Belarus	3.21	1.93-5.34	<0.001	6.09	2.52-14.71	<0.001
Georgia	0.51	0.27-0.97	0.043	2.22	0.83-5.96	0.112
Kazakhstan	3.14	1.79-5.50	<0.001	13.7	5.59-33.62	<0.001

Kyrgyzstan	2.52	1.29-4.94	0.007	3.03	1.11-8.29	0.030
Moldova	3.19	1.82-5.59	<0.001	1.96	0.75-5.17	0.172
Russia	2.65	1.63-4.30	<0.001	7.80	3.29-18.50	<0.001
Ukraine	2.21	1.33-3.68	0.002	7.30	2.99-17.84	<0.001
Age category						
18-29	ref.			ref.		
30-39	1.15	0.86-1.54	0.334	1.45	1.03-2.03	0.032
40-49	1.10	0.80-1.52	0.554	1.29	0.89-1.87	0.186
50-59	0.99	0.71-1.39	0.965	0.87	0.56-1.38	0.561
60+	0.46	0.32-0.78	0.002	0.38	0.20-0.74	0.004
Marital status						
Married	ref.			ref.		
Single	1.17	0.87-1.57	0.282	1.17	0.384	0.82-1.66
Divorced	0.97	0.71-1.33	0.851	1.40	0.058	0.99-2.00
Widowed	0.84	0.58-1.23	0.380	0.78	0.358	0.45-1.33
Education						
Incomplete 2ndary or lower	ref.			ref.		
Incomplete higher or lower	0.76	0.56-1.05	0.097	1.31	0.78-2.18	0.308
Complete higher	0.72	0.50-1.04	0.082	1.62	0.93-2.82	0.088
Occupation						
Employed	ref.			ref.		
Unempl.(not seeking work)	0.78	0.41-1.50	0.462	0.44	0.19-1.02	0.055
Unempl.(seeking work)	1.24	0.85-1.82	0.264	0.72	0.42-1.24	0.237

**Results are for full model (i.e. all covariates listed are included in model).*

The results of the same analysis for women are found in Table 6.4. A similar pattern was observed among women as among men for CAGE problem drinking. Higher odds were observed for individual-level social isolation and community-level civic participation, although, unlike men, civic participation was also associated with increased risk of CAGE problem drinking at the individual level. Also unlike men, social isolation at the community level was associated with increased risk of EHD among women.

DISCUSSION

To the best of our knowledge, this is the first analysis of both individual- and community-level social capital and their relation with hazardous alcohol consumption in countries of the fSU. We used two measures of hazardous consumption, both relevant to health but addressing different constructs. Responses to the CAGE instrument capture the role of alcohol in aspects of the individual's daily life, in particular the extent to which they are dependent on it. EHD captures a particular behaviour that may be seen in those who are not necessarily dependent but which, nonetheless, has profound health consequences. The associations of social capital indicators with the two measures differ.

Individual-level social isolation is associated with CAGE problem drinking among both men and women. One possible explanation is that socially isolated individuals are less well-equipped to cope with stressors, particularly given the shock of the social and economic transition that occurred in the fSU, leading them to turn to alcohol as a coping mechanism. This hypothesis is supported by previous research linking social isolation to poor self-reported health (195) and to psychological stress (218), which may in turn lead to hazardous alcohol consumption (111), and is consistent with the excess mortality observed among single men in post-communist societies compared to married men (198), and among the socially marginalized (219). It is important to note the possibility of reverse causality, as individuals who engage in hazardous alcohol consumption may in fact be more likely to experience family conflicts (123), withdraw from society (220), and become psychologically

distressed (221). Qualitative research in Russia, using narratives provided by widows of men who died of alcohol-related causes, indicates a bi-directional relationship, with hazardous alcohol consumption and psychological distress mutually reinforcing each other, although either can start the process off (143).

We found that higher interpersonal trust was associated with lower odds of EHD among men at the community level. This is consistent with previous reports of a strong association between community-level trust and self-rated health (207), (although there is only limited support thus far for the hypothesis that the relationship between social capital and health is mediated by health behaviours such as alcohol consumption) (212). The relationship between community-level trust and EHD in the fSU might be explained, in part, by fear of crime. There was a sharp rise in crime in many fSU countries in the immediate post-Soviet period (222), and crime has been associated with worse health outcomes (37), including increased psychological distress (223). This is important because, as mentioned above, psychological distress may in turn increase the risk of hazardous alcohol consumption (111). It is possible that communities with higher levels of mistrust are those in which crime, and resulting psychological distress, is more prevalent. Research from the United States provides evidence of increased community-level social mistrust in communities with higher rates of firearm homicides (224). A simple regression of community-level interpersonal trust on community-level fear of crime in our data showed that the former was strongly negatively associated with the latter ($\beta = -6.822$); however, a more in-depth analysis of these factors is required before drawing conclusions concerning their relationship.

Perhaps our most surprising finding is that of a positive association between community-level civic participation and CAGE problem drinking among men and women, and EHD among men. This finding challenges the theory that membership in groups may encourage the dissemination of health information and curtail deviant and hazardous health behaviours (211), including alcohol consumption among college students in the United States (59). However, our study differs from the college study in terms of study population and context.

Another key difference is the *nature* of the organisations to which study participants belong, which likely differs significantly between the fSU and American college campuses.

Further analysis of our data indicated that the most commonly reported (27%) organization of which individuals were members was a 'trade union'. While comunity-level engagement in other types of organisations (e.g. art and music groups, non-governmental organisations) did now show a statistically significant relationship with hazardous alcohol consumption when analysed individually, higher community-level trade union membership was significantly associated with an increased risk of both CAGE problem drinking and EHD (for males: OR=4.12 SE=2.43 p=0.017; for females: OR=10.66 SE=8.52 p=0.003). What is it about trade union membership that results in increased hazardous alcohol consumption in the fSU? One possible explanation is that trade unions are an example of 'single issue organisations' that entail a narrow 'radius of trust' and are not likely to improve generalised trust in others (209). This form of civic participation has been coined the 'miniaturization of community' (225) and has been linked to alcohol consumption (209). Another, perhaps more likely explanation, given the weakened role of trade unions in people's lives since the fall of the Soviet Union, is that communities with high levels of union membership simply represent communities where many inhabitants are in industrial employment where there is mandatory union membership. This latter hypothesis is consistent with research from Ukraine which has shown that alcohol consumption is higher in the industrial South and East regions of the country compared to the agrarian West (134). This might also explain why we found an association between membership and hazardous alcohol consumption only at the community level for men and not at the individual level (although there was an association at the individual-level for women).

One other possible explanation for the association between community-level civic participation and hazardous alcohol consumption is that communities where there is a high level of membership in organisations may offer frequent opportunities to gather at social events where drinking is common and expected. This explanation was offered by an earlier

study in Taiwan that found a similar association between community social participation and frequent drinking (61). The potential for social capital to create demands for conformity among community members has been described by Portes (226), and Ferlander (227), and is plausible in the fSU context; however, further qualitative research is required to better understand the nature of civic organization membership (especially trade union membership) in the fSU and the role that it plays in alcohol consumption.

There are some limitations to our study. First, the cross-sectional nature of the data prohibits us from making conclusions about causality, as discussed above in regards to social isolation and alcohol use. Secondly, there is a tendency for respondents, especially in the fSU, to under-report their own alcohol consumption (18). As such, our estimate of the prevalence of EHD may be an underestimate; however, there is no reason to believe that this potential underestimate would create spurious associations between our indicators of interest and EHD. The measurement of CAGE problem drinking may be less vulnerable to bias as it does not focus on perceived alcohol consumption (79). Also, this study will have probably missed the most severe drinkers (e.g. intoxicated, homeless) who may also be the most socially isolated, thereby producing somewhat conservative estimates of the relationship between social capital and hazardous alcohol consumption across these countries. Third, as there is almost no existing research on the relationship between social capital and alcohol consumption among adults, we were forced to compare and contrast our findings with those from studies of social capital and general health, despite inconsistent evidence thus far that alcohol plays a mediating role between them (212, 213). Fourth, we were not able to distinguish between different forms of social capital that may be important in the association between civic engagement and alcohol consumption, namely ‘bonding’, ‘bridging’ and ‘linking’, which have shown to be important to health outcomes in other contexts (228). Lastly, because of the resources required for conducting a multi-country study, the number of individuals in each community in the HITT survey was small (an average of nine per

community). Although this does not invalidate our findings, it does highlight the need for further research within individual countries using larger community samples.

Conclusions

Our results provide evidence of the independent association between individual-level social isolation, as well as community-level civic participation and interpersonal trust, and hazardous alcohol consumption in the fSU. The finding that community-level civic participation is associated with increased odds of hazardous alcohol consumption seems to contradict evidence from other regions that links civic participation to improvements in health and should be investigated further.

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7 CO-WORKER SOLIDARITY AND DRINKING IN UKRAINE

7.1 Preamble to Research Paper 4

In the previous chapter I presented Research Paper 3, which analysed the association between individual- and community-level social capital indicators and hazardous alcohol consumption in the fSU. The strongest associations in that analysis were between community-level active civic participation and both CAGE and EHD, and these associations were driven mostly by communities with high levels of trade union membership. Some other studies have suggested that social participation may be linked with increased drinking, depending on the type and cultural context of the social group (61, 209). Discussions with our research partners in the region indicated that the individuals in our survey reporting trade union membership were more likely than those not doing so to be employed by state-operated (often male-dominated) industrial enterprises. Taking this into account, I asked: *How does the social environment created by membership in an occupational group (in this case trade unions) influence one's drinking behaviour?*

In order to answer this question, I conducted a qualitative study of male railway employees in Ukraine. It would not have been feasible for me to conduct qualitative research in all the countries that are included in the quantitative survey. Instead, adopting a case-study approach and focusing on one country in particular allowed me to explore the role of community context in alcohol consumption behaviour more deeply (229). Ukraine was chosen as the focus for this study not only because it is among the leading alcohol-consuming countries in the HITT study, but also because my experience working in Ukraine, my personal interest in the country and my fluency in the Ukrainian language, all of which made this country the most practical option for pursuing qualitative research.

Interviewing only a small sample of respondents from Ukraine limits the representativeness of findings from this analysis to other countries of the fSU. However, this analysis provides a starting point for exploration of community factors and alcohol consumption in the fSU

and future research can assess the applicability of its results to fSU countries beyond Ukraine. As discussed by Green and Thorogood, although the specific findings regarding the role of community factors in alcohol consumption in Ukraine will not generalize to a wider population, what may be generalized is the *concept* that these factors might be experienced by people in ways that influence their alcohol consumption and that these perceptions may vary depending on social, economic or cultural context (86).

7.1.1 Reflexivity

Unlike quantitative research, practitioners of qualitative research accept that pure objectivity on the part of the researcher is impossible. Qualitative research acknowledges that the kinds of 'political values, subjective impressions and partial accounts' (86) that might bias research findings cannot be separated from, or 'adjusted for' in the research process. These values and subjectivities need not render qualitative research findings without value however, as long as they are acknowledged through a process of reflexivity, or reflecting critically on one's role in generating and analyzing the data (86). Rather than try to neutralize the researcher's role, the aim is to address this role explicitly and thereby improve the integrity and trustworthiness of the research (90). Some attempts at reflexivity have been criticized for presenting highly personal 'confessional' accounts which position the researcher as the focus of the story rather than add any methodological rigour (230). On the other hand, simple descriptions of the researcher's demographic characteristics without any reflection on how these characteristics may have shaped the research process and findings also do nothing to improve the validity of qualitative findings. In this section I will discuss the most relevant aspects of myself as a researcher and how these might have affected the qualitative research that I conducted.

Previous research experience

Kvale and Brinkmann (231) describe qualitative interviewing as a 'craft' which must be learned through practice, in contrast with the methodological positivism of quantitative

research which follows rules and predetermined steps of specific methods. My prior research experience has involved solely quantitative methods and, as such, I am a novice qualitative researcher. My inexperience first led me to approach my qualitative research from a positivist perspective, designing interview questions that would have a finite number of possible answers and that, my approach implied, would lead me to some objective truth about the role of social contexts and co-workers in alcohol consumption in the fSU. In the course of having to defend my qualitative research proposal to quantitative and qualitative research experts at the LSHTM and in Ukraine as well as of piloting and revising the topic guide for the interviews, my understanding of the 'subtle realist' perspective (described in Section 2.6) and my ability to apply it in my research has evolved. From the perspective of subtle realism, both the researcher's and research subjects' realities are shaped by their perspectives. Thus, I had to learn to adopt a more open-ended, participant-led approach to interviews in order to allow this perspective to come through in the data. Despite my evolving awareness, my relative inexperience likely continued to shape my approach to the research process. This inexperience does not undermine the integrity of the study or the reliability of its findings, but may explain any missed opportunities for capturing data that could have provided a more comprehensive understanding of the phenomenon being studied.

Ethnic background

My mother was born in Ukraine and when growing up I spent a lot of time with Ukrainian family members both at home in Toronto as well as when visiting Ukraine. Alcohol consumption played a prominent role in many family social occasions and, as a result, I was conscious that I may be approaching my research with pre-existing beliefs about the social context of alcohol consumption among Ukrainians. However, being conscious of this, I was careful to acknowledge my potential bias both in discussions with my supervisor as well as with our research partners in Ukraine. I am confident that, by reflecting on the possible influence of my ethnic background both independently and openly with others, and by discussing possible interpretations of the data with researchers not involved in the study, I

was able to minimize its effect on the research process. However, for the sake of transparency it should be acknowledged.

As mentioned in Section 2.6, in addition to reflexivity, the quality of qualitative research can be also be improved by transparency in one's description of data collection and analysis and by sufficient attention paid to deviant cases. I have aimed to achieve both of these in my research, which is described in the paper below.

Research Paper 4

One for all: Co-worker solidarity and drinking behaviour among railway workers in Ukraine

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ABSTRACT

Background

Hazardous alcohol consumption is a leading cause of mortality and morbidity in countries of the former Soviet Union, but little is known about the social determinants of this behaviour. Recent research has suggested that occupational contexts may play a role.

Methods

Using qualitative methods, we aimed to generate a hypothesis as to the role of occupational social contexts in drinking among male employees of a railway company in Ukraine. We conducted 24 semi-structured interviews and two focus group discussions, in Lviv and Kharkiv, Ukraine. Men aged 18 years or more and who were employed by the railway company were sampled using convenience sampling. Data were analysed using a thematic analysis approach. Reporting followed guidelines set out by the 'Consolidated Criteria for Reporting Qualitative Research' checklist.

Results

Men in our sample expressed strong feelings of interdependence and trust towards their co-workers which we defined as 'social solidarity'. Drinking with co-workers was often seen as an obligatory activity and an integral part of co-worker social occasions. Engagement in sport or family obligations seemed to act as a deterrent to drinking among some workers.

Conclusions

Our findings suggest that a strong sense of solidarity exists between railway co-workers in Ukraine, which may represent a resurgent atavism relating to the Soviet era during which individuals were forced to rely on informal networks for support. Alcohol may be used as a means of expressing this solidarity. Our findings also point to factors, namely engagement in sports and family, that may offer opportunities for interventions aimed at reducing alcohol consumption among workers in Ukraine.

INTRODUCTION

Alcohol consumption in the former Soviet Union

The role of hazardous alcohol consumption in the mortality fluctuations observed in countries of the former Soviet Union (fSU) in the last few decades is now well established (25, 27-31). After periods of economic stagnation or decline since the 1970s, life expectancy in fSU countries increased during Gorbachev's anti-alcohol campaign in 1985-1987, only to decline precipitously with the termination of the campaign and the dissolution of the Soviet Union (31, 33, 232, 233). Cause-specific analyses of mortality trends have implicated hazardous alcohol consumption (i.e. drinking pattern that is harmful to health such as episodic heavy or 'binge' drinking, or drinking to intoxication) as a primary cause of premature mortality in the region (25, 28, 234, 235), as well as of morbidity (236). Subsequent research has demonstrated that these fluctuations in mortality have been driven by rapid social and economic upheaval (32-37).

Some recent research has explored the role of social networks in mortality fluctuations and suggests that the health impact of rapid privatisation may have been mitigated in countries where there were high levels of membership in social organisations (36). However, other research has suggested that social networks may negatively affect alcohol consumption: A mixed-methods study among men aged 25-54 years in Izhevsk, Russia demonstrated that although hazardous alcohol consumption was much more frequent among men who were unemployed (as well as those who had less education and fewer material assets) (136), qualitative data (from interviews with close relatives of men dying from alcohol-related causes) identified the role of the workplace 'drinking culture' in employees' behaviour, including pressure from colleagues to drink, the frequent use of alcohol as remuneration, and the consumption of non-beverage alcohols (e.g. medicinal tinctures, eau de cologne) (143). Other work has examined the historical roots of alcohol consumption among men in Russia, proposing its role as a means of demonstrating masculinity among male working-class social groups (237).

With the exception of the aforementioned papers, research on social factors and hazardous alcohol consumption in the fSU is limited. A recent systematic review of the literature on such found that, although there is strong evidence that males and smokers are at a higher risk for hazardous alcohol consumption, evidence on other social factors such as education and employment is mixed, and there are almost no studies on the role of contextual factors in alcohol consumption in the fSU (177).

Social capital and alcohol consumption in the former Soviet Union

Social capital is defined as 'those features of social organization - such as density of civic associations, levels of interpersonal trust and norms of reciprocity - that act as resources for individuals, and facilitate collective action'(78). In recognition of the need for more research on the social determinants of alcohol consumption in the fSU, and informed by evidence of the role of social capital in drinking from other regions (59, 209), we recently conducted a quantitative study investigating the role of social capital in alcohol consumption in the region. An absence of social capital has been acknowledged as possibly having a negative effect on various health outcomes among individuals in Russia (78), elsewhere in the fSU, (195) and in the wider post-communist world (197, 198); however, we discovered that the association between social capital and alcohol consumption in the region was largely overlooked. Our analysis used nationally representative survey data from nine fSU countries (238). We found that some elements of social capital (*i.e.* individual-level social isolation, and community-level mistrust in others) were positively associated with hazardous alcohol consumption among men in the fSU. Interestingly, our study found that higher average active civic participation at the community-level was positively associated with hazardous alcohol consumption. This finding is perhaps surprising given the much larger body of research from other regions of the world showing a strong negative association between civic participation and drinking (59, 62, 239). However, some studies have suggested that social participation may be linked with increased drinking, depending on the type and cultural context of the social group (61, 209). Further analysis by specific types of organization in

our study indicated that membership in trade unions in particular may be driving the association we observed between active civic participation and hazardous alcohol consumption (238). Anecdotal evidence from our research partners in the region indicated that the individuals in our survey reporting trade union membership were more likely than those not reporting trade union membership to be employed by state-operated (often male-dominated) industrial enterprises – this was not entirely unexpected however given that trade union membership is often, though not always, compulsory for those in the employ of state-operated industry. Thus, those communities with high levels of trade union membership may represent communities in which many individuals are employed by these enterprises. Taking these findings collectively into account, we asked: *How does the social environment created by membership in an occupational group (in this case trade unions) influence one's drinking behaviour?*

A study of the influence of trade union membership on drinking behaviour in Ukraine

Earlier research of state-operated or industrial occupational groups in other regions of the world, such as police forces (240), navy (241), builders (242), and factory workers (243) have described occupational social contexts with permissive drinking norms to which employees may feel pressure to conform. However, with the exception of the Saburova et al. (143) study cited above, the role of occupational context in alcohol consumption in the fSU has not been sufficiently explored. Further research would provide a better understanding of how the occupational context in the fSU affects (and is potentially affected by) individual alcohol consumption behaviour. A clearer understanding of this relationship might inform context-specific interventions to address hazardous alcohol consumption and the consequent alcohol-related morbidity and mortality.

The study context: Ukraine

We chose to conduct our study in Ukraine, one fSU country that has received little attention in the public health literature (244). Per capita alcohol consumption in Ukraine is among the

highest in the world (245), and alcohol is the second leading cause of disability adjusted life years (DALYs) among males in the country (246). Men in Ukraine are more likely than women to engage in 'heavy alcohol consumption' (defined as >80g of ethanol in a typical drinking day, or either >60g every 3–4 days/week, or >40g nearly every day) (134), and the prevalence of heavy alcohol consumption among men in the country is 38.7% compared to 8.5% among women (134). Although official statistics from Ukraine show a gradual decrease in the prevalence of alcohol dependence and psychosis since 1997, research on rates of alcohol-attributable morbidity and mortality, decreased life expectancy and the high demand for addiction treatment since the collapse of the Soviet Union, suggests that these statistics are misleading (247). The total mortality burden attributable to alcohol for men in the country is estimated at 24% (compared to WHO estimates of 18% for males in all of Eastern Europe). Despite the significant health burden imposed by alcohol in the country, there is almost no research on the social determinants of hazardous drinking in this country (177).

Recognizing this research gap, we sought to generate hypotheses about the relationship between trade union membership and alcohol consumption by carrying out a descriptive, qualitative study among trade union members in the Ukraine.

METHODS

Our study employed a combination of face-to-face semi-structured interviews and focus group discussions (FGDs). Semi-structured interviews are useful for in-depth exploration of an individual’s perception of a particular phenomenon (248), while FGDs allow for observation of group dynamics which we suspected would play an important role in alcohol consumption behaviour. Specifically, we conducted 24 individual semi-structured interviews (12 in Kharkiv and 12 in Lviv) and two FGDs (one in Kharkiv and one in Lviv) with eight participants each.

Participants

Study participants were men aged 18-64 who were employed by a large Ukrainian railway company (UNR), which has six main branch offices in Ukraine. We sampled participants from two of the largest UNR offices; one in East Ukraine (Kharkiv), and one in West Ukraine (Lviv) which would allow us to interview those from regions with different levels of alcohol-related mortality (244) and alcohol consumption (132, 134). Since the fall of the Soviet Union, membership in trade unions has ceased to be obligatory for railway employees; however, 98% of UNR employees are members of the Trade Union of Railwaymen and Transport Builders of Ukraine. UNR was chosen for our study as: a) nearly all UNR employees are trade union members and b) it has offices both in East Ukraine and West Ukraine. Participants were recruited using convenience sampling through the Human Resources Office of UNR – the study was advertised and individuals who expressed interest were directed to our study coordinator. Any male UNR employees over the age of 18 years were eligible to participate and we aimed to include participants from a range of ages, years spent working at UNR and occupational category (*i.e.* manual labour, administrative, managerial).

Data collection

First, we held one FGD with eight men in Kharkiv to assess the appropriateness of our proposed topic guide and to help identify additional topics to be included in our interviews (data from these FGDs were included in the final analysis). After completing the initial FGD, we revised our topic guide and subsequently piloted it with two randomly selected individual interview participants. After further revision of our topic guide we conducted another five interviews. Following a preliminary analysis of these interviews we refined our topic guide once again and adapted our sampling strategy to increase our opportunities to follow up on emerging themes and to identify possible 'deviant cases' (*i.e.* cases that contradict emerging explanations for the data). Finally, we continued conducting individual interviews until data saturation was achieved (*i.e.* additional interviews did not uncover new themes related to our

research question). Data from all interviews (including pilot interviews) were included in the final analysis. We then followed the same procedure outlined above in Lviv.

The topic guide covered demographic information (*i.e.* age), biographical information (*e.g.* years at job, occupational role), and qualitative information (*e.g.* role of work and co-workers in one's life, work-related social life and work-related drinking occasions, social life outside of work and perceptions of drinking generally). The complete final English version of the topic guide can be found in Appendix 10. All interviews and FGDs were conducted by local Russian- and Ukrainian-speaking researchers, both male and female, who were involved both in the preparation and piloting of the topic guides. One of the primary investigators (AM), who is a native Ukrainian-speaker, observed, but did not participate in, one-to-one interviews and FGDs. All interviews were conducted in a private room on UNR premises. All interviews were audio-recorded; recordings were transcribed in either Russian or Ukrainian, and then translated into English by trained third-party researchers not otherwise involved in the study.

Ethics statement

Ethical approval was provided by the London School of Hygiene and Tropical Medicine Research Ethics Committee and the Sociological Association of Ukraine. Each participant was given an information sheet in both Russian and Ukrainian regarding the objectives of the study, which explicitly stated that the study was voluntary and anonymous. All participants gave signed consent to be interviewed, audio-recorded, and to have excerpts of their interviews included anonymously in any reports or papers resulting from the study.

Analysis

Although the research question for this study was informed by our quantitative findings, and was in that sense deductive (*i.e.* driven by theory or analytical interest), analysis of interview data was conducted using an inductive thematic approach. According to Braun and Clarke, inductive thematic analysis requires that data are coded for emerging themes and concepts

without trying to accommodate a hypothetical framework; analysis is thus 'data driven' (249). Analysis was conducted by AM and followed the steps to thematic analysis outlined in Braun and Clarke's paper (249). First, transcripts were read in their entirety and initial codes (*e.g.* 'co-workers as extended family', 'drinking at work-related social occasions as necessary') were generated. Second, all coded excerpts were organised into categories (*e.g.* 'role of co-workers in participant's life', 'attitude regarding appropriateness of work-related drinking'). Finally, the categorised excerpts were used to generate themes (*e.g.* 'co-worker solidarity', 'normalisation of work-related drinking') and these themes were 'mapped' to try to build a theory that would explain the data. Excerpts that did not fit into the emerging theory (i.e. deviant cases) were compared to identify new themes. Finally, any emerging themes were related back to the research question and to existing literature. Data were coded using NVivo 10™. Findings of the analysis were reported following guidelines for transparency set out by the 'Consolidated Criteria for Reporting Qualitative Research' checklist (121).

RESULTS

The demographic characteristics of our sample (with pseudonyms) are outlined in Table 7.1. Interviews focused primarily on participants' relations with their co-workers, the effect of their work and co-workers in their lives and circumstances surrounding their drinking occasions. During the coding process, some dominant themes emerged that provide insight into the role that membership in a work collective (a term used to describe a co-worker 'team' where members share work responsibilities, interact regularly at the workplace and belong to the same trade union) may play in alcohol consumption among railway workers in Ukraine.

Table 7.1: Sample characteristics

Pseudonym	Age	Position	Years at job
Kharkiv FGD			
Cyril	49	Administrative	13
George	24	Engineer	2.5
Karlo	35	Administrative	12
Levko	26	Middle-level manager	5
Ostap	32	Engineer	9
Sasha	35	Engineer	14
Sergiy	28	Administrative	6
Yaroslav	32	Engineer	6
Kharkiv Interviews			
Alexander	37	Manual worker	16
Adrian	25	Management/admin	2
Andrij	46	Manual worker	12
Boris	51	Manual worker	11
Damian	26	Manual worker	4
Danylo	22	Technician	1
Evgeniy	24	Manual worker	2
Ihor	39	Manual worker	13
Ivan	28	Non-manual shift	<1
Lubomyr	59	Non-manual shift	21
Matthew	38	Manual worker	13
Marko	33	Manual worker	9
Lviv FGD			
Andrew	38	Non-manual shift	1.5
Dennis	21	Manual	3
Leonid	24	Engineer	1.5
Misha	28	Non-manual shift	3
Ruslan	20	Manual	2
Theodosius	27	Middle-manager	6
Vasyl	23	Administrative	5
Viktor	26	Manual	6
Lviv Interviews			
Michael	45	High-level manager	30
Nicholas	32	High-level manager	8
Erast	48	Middle-level manager	27
Oleg	32	Management/admin	10
Peter	19	Manual worker	1
Stephan	24	Manual worker	2
Taras	18	Manual worker	1
Volodymyr	30	Non-manual shift	9
Walter	31	Manual worker	6
Yarema	25	Manual worker	4
Yurij	53	Manual worker	20
Zenon	57	Manual worker	19

The two predominant themes emerging from our analysis were ‘social solidarity’ between co-workers, and ‘drinking as conformity’.

Social solidarity

In response to our probes regarding the role of co-workers in our participants' lives nearly all participants described close relations with other members of their collective. The participants’ perceptions of their co-worker networks suggested that the ties between members were very strong, and that these networks played the role of an ‘extended family’ on which workers could depend for help and support. For instance, Damian, a 26-year old manual worker, when asked about his relations with his co-workers, said the following:

> Some of them (co-workers) I've known for nine years, some for 10 years, one guy and I attended school with, so we've known each other for 15 years already. Well, I've known everybody for a long time and I have good relations with all of them.

And Marko, a 33 year old manual worker describes his co-worker network in the following way:

> Well, I trust everybody (on the team). If I need help, then without any problems everybody will help me, and I can help them if they need help. So we’re as one family.

Many participants described ties with their co-workers that are stronger than simply collegial or friendly. There were repeated expressions of interdependence among co-workers including that of Andrij, a 46-year old manual worker, who claimed that “[t]he brigade is all for one and one for all”. Volodymyr, a 30 year-old non-manual shift worker, when asked what his co-workers mean to him said:

> Well, they are the support for me. When you’re sick or have problems at home they are always there to help. They are not just friends, they are friends for life.

We defined this emerging theme of interdependence among workers in a collective as 'social solidarity'. Sandefur and Laumann define social solidarity as something achieved "among two or more individuals when there is a degree of mutual trust and commitment that is independent of any specific transaction" and that "may arise out of conditions of repeated interaction among the same actors over time, during which forms of social capital such as trust and mutual obligations accumulate"(250, p. 491). Building on Coleman's theory of social capital (200), Sandefur and Laumann (250) highlight social solidarity as one benefit of social capital that allows individuals to attain various goals, by fostering a sense of mutual obligation and reciprocity.

There were participants in our study who did not express a sense of social solidarity with their co-workers. In most cases these were younger workers who had been working at the railroad company for shorter periods of time. Although these participants often described their relations with co-workers as 'friendly', they did not perceive their co-workers as an 'extended family' or as 'best friends' as did older participants. It is possible that this is because they had not been exposed to 'conditions of repeated interaction among the same actors over time' (250), which tend to foster feelings of solidarity. This was demonstrated in an excerpt from our FGD in Kharkiv:

> Moderator: With whom do you feel closer - with your co-workers or with others outside work?
>
> Ostap: I think that friends are where you work, because most of your time is spent with colleagues at work.
>
> Cyril: You spend 8 hours at work of the twenty-four hours.
>
> Ostap: That does not mean that you have friends only in your work team, you also interact with management, and with others in other teams, but I think the majority of friends are those with whom you work every day. Because you come home, spend an hour and a half with the family, wake up, and go to work again....

> George: I can tell you about myself. I have been working at the company for just two and a half years. Maybe it depends on the team, but I have more friends in the city, as it were, outside of work, but at work I only have acquaintances....
>
> Sergei: You say that now but eventually everything will change.
>
> George: Maybe if I work for a longer, things will change.

Other participants who did not express a strong sense of solidarity with co-workers were those who held higher-level managerial or director positions. These men were more likely to describe their co-worker relations as friendly, but more strictly professional. This is demonstrated in an excerpt from an interview with Nicholas, a 32-year old high-level manager:

> Interviewer: Perhaps there are some friends in your team for whom you feel a special trust? Some people you can rely on and be open with?
>
> Nicholas: Well, don't confuse matters. As it is called, work is work. There must not be special friends at work. There should not be familiarity at work, I always say. There is a business relationship and that's all. I prefer to be stricter at work. It should be like this. They are all my subordinates, even in other departments they consider me their director. I do not like to give up, to relax.
>
> Interviewer: All right. So there are no co-workers with whom you have a friendly relationship rather than strictly a professional relationship?
>
> Nicholas: No, I get more from maintaining professional relationships.

Drinking as conformity

In addition to asking our participants about the nature of their relations with co-workers, we discussed circumstances under which co-workers would drink together. One theme that emerged was that of drinking with co-workers out of a sense of obligation to each other, perhaps as one manifestation of the solidarity between co-workers discussed above, or as a mechanism for attaining this solidarity. Specifically, many co-workers described occasions in which their decision whether or not to drink, as well as what to drink, was not driven by their own personal desire or by some explicit pressure from their co-workers, but by a feeling of duty to their 'team'. This was reflected in the following excerpt from our interview with Walter, a 31-year old manual worker:

> Interviewer: If your colleagues are going somewhere for a drink, do you feel that you have to go with them?
>
> Walter: Yes, I do, even if I have other plans. It feels uncomfortable not to go and then maybe be considered an outsider.
>
> Interviewer: But is it optional whether or not to go?
>
> Walter: It is absolutely optional event, yes, but as I say - I want to be with the team.

And from Volodymyr, 30-year-old non-manual shift worker:

> Interviewer: Imagine that you went to drink beer with colleagues after work. And when you came to the bar, you were suddenly told that they had decided to drink something heavier, for example vodka. What will you do in this situation?
>
> Volodymyr: Well, I will support them.
>
> Interviewer: So you will drink vodka then?
>
> Volodymyr: Yes, if society requires.

The theme of drinking as a means of expressing or realising solidarity or ‘being with the team', was associated with another recurrent theme, that being the perceived acceptability, and almost inevitability, of alcohol as a part of any social interaction with co-workers. Alcohol was often described as a necessary, and in one case even ‘integral’, element of any social occasion; however it was unclear whether this was because the consumption of alcohol had become ritualised, or whether its use was simply deemed necessary to enhance conviviality. Numerous excerpts demonstrated this perception among our participants. For example, Walter, a 31-year old manual worker, explained the role of alcohol in the following way:

> Interviewer: Tell me, do you celebrate any event, birthdays, holidays, the New Year at work? Are these events scarce or numerous?
>
> Walter: They are numerous. We have a great team, and taking everyone together it’s about 200 people. So, according to the theory of probability once or twice a month someone has a birthday. We congratulate him and celebrate accordingly. We have no such tradition not to congratulate a person and not to drink for his health.
>
> Interviewer: And why is it necessary to drink?
>
> Walter: We drink because we drink - we have this mentality. It is something that we are educated to do since our childhood. We learn by habit that vodka is an integral part of a holiday or other social interaction.

The inescapability of alcohol consumption was also noted by Boris, a 51-year old manual worker in Kharkiv:

> Interviewer: And has it ever happened, on those occasions when you all gathered together after work, that you gathered without

> alcohol, for example just to drink coffee? Or is leisure with co-workers for you accompanied always with hard drinks?
>
> Boris: It is accompanied.
>
> Interviewer: And why is it like this, what is the reason, is it because of work, is it connected with difficult work or...?
>
> Boris: That is connected with tradition, I guess. Already on holidays we've got accustomed that all the time it is necessary in a circle of the collective to drink there 100 ml, there a little-here a little, for better conversation (laughter).

While our interviewees did not report explicit pressure on those who abstained from drinking with their co-workers, several excerpts suggested that those who chose to abstain were generally considered unusual and, at times, even excluded from co-worker social circles. In our FGD in Kharkiv, Cyril, a 49-year old administrative worker, put it this way:

> In the company, if there is a new person...you can call it a test, when the person is poured a drink. If the person refuses to drink, then he is asked: Are you a sportsman or are you sick? We are interested in the reason: either you are strictly against it, or just at the moment you can't drink because of something you are planning in the future.

This issue was also raised in later in the FGD:

> Cyril: The one who joins [the drinking] is of more interest than the one who doesn't. It's more interesting to join someone and to forget those who fall out.
>
> Moderator: And if a person often cannot go? Often does not want to go?
>
> Cyril: Twice invited, and the next time maybe simply not invited, and this is his loss.

> Yaroslav: He said it right- these people isolate themselves. Invited once, invited the second time, third, always to the same work parties...
>
> Cyril: A person just has to think that if you are called for three times, and you cannot, then you either just do not ever go at all, or there is a good reason which you should explain to get the invitation the next time.

This excerpt implies a shared sense of the 'rules of engagement' (*i.e.* three times invited and then excluded) in which participation, including the consumption of alcohol, is understood as a marker of inclusion and group membership. On the other hand, where participants observed co-workers who drank to inebriation, the response they described having to this behaviour (which in other populations might be called ‘deviant’) revealed a tolerant, and at times, enabling attitude towards heavy drinking. The individual interviews reflect this attitude as does the following excerpt from our FGD in Kharkiv:

> Moderator: And if it is New Year, February 23 (a holiday) and you're in the cafe, what do you drink there?
>
> Karlo: That's after work hours, so there can be cognac, vodka, [and] beer in the end. (Everybody laughs). There’s enough to make people relax, drink, have fun, dance, but that everybody could get home on their own. And if someone tries not to restrain himself, then there are colleagues and friends who will help him to figure it out.
>
> Moderator: And how do you help in these situations?
>
> Karlo: Well, just sincerely come and say, but not as a criticism: Maybe some coffee or tea, to rein in everything?. Or, if there is dancing, then it [drunkenness, intoxication] disappears at a run [quickly]. And if it does not work, then [he goes] home by taxi.
>
> Sergiy: In the extreme case, with an escort.

> Karlo: And if you know the person who drives [taxi-driver], he would carry him home himself.

These excerpts paint a picture of an occupational culture, or an occupational sub-culture within the larger drinking culture of Ukraine, where certain drinking practices are established as acceptable and expected, and where drinking may act as a means of expressing solidarity.

Despite this possible threat of exclusion, we did see examples of participants who rarely drank with co-workers and sought to identify factors that influenced this decision. In all cases the reasons most often cited were involvement in sports or family obligations (*e.g.* a young child at home, a wife who disapproved of alcohol). For example, Volodymyr a 30 year old non-manual shift worker, stated the following:

> Interviewer: How would you go about participating in drinking less?
>
> Volodymyr: I must do more sport. When you do sports, then alcohol is not compatible with sports. So I think that I should just stop drinking.
>
> Interviewer: Were your efforts to drink less in the past successful?
>
> Volodymyr: Yes, they were very successful.
>
> Interviewer: Why?
>
> Volodymyr: Because I played football.
>
> Interviewer: And why did go back to previous levels of alcohol consumption?
>
> Volodymyr: Because my sports career ended and now I have the opportunity to drink beer and vodka.

DISCUSSION

With the sole exception of some limited attention by Saburova et al. (143), this is the first study to look specifically at the role of workplace-related social factors and alcohol consumption in the fSU since the collapse of the Soviet regime. It is also the first to specifically focus on Ukraine, a country which has been overlooked in the alcohol literature. We draw two main conclusions from our study and offer some possible explanations for our findings from the existing literature. First, among workers in two sites of the UNR, a social environment exists in which members feel a strong sense of solidarity with others in their collective. The theme of social solidarity among co-workers in industrial, or 'blue collar' jobs in the fSU has been explored previously (though this work has focused exclusively on Russia). Lonkila and Salmi, in their study of work collectives in St. Petersburg, provide evidence of the strength of co-worker social relations and support among Russian factory workers (251). They argue that while the institutional role of the work collective in allocating benefits has diminished since the fall of the Soviet Union, the informal support that is provided by the collective continues to play a very important role in individual workers' lives. Lonkila's later comparison of Russian and Finnish workers further suggests that the tendency to rely heavily on the work collective as a form of social, and at times economic, support may be unique to countries that have experienced communism, where the factory played a central role in workers' lives, as allocator and provider of housing, medical care, cultural recreation and a venue for social interaction that offered an, "…escape from the drudgery of home" (251, 252, p.11). Survey data from post-Soviet Russia also shows a high-level of mistrust in state institutions and a strong reliance on informal networks, both of which may have been born under a totalitarian regime, but have been fuelled by the failure of state organisations to provide sufficient means of economic or social support when the regime itself collapsed (78). As mistrust in state organisations persists in fSU countries (253), so does a reliance on informal, horizontal networks of trusted co-workers for

acquiring goods or odd-jobs to make ends meet (254). This context may, in part, explain the strong expressions of solidarity we observed among workers in our study.

Second, within this social environment, drinking has been established as a normative behaviour, perhaps as means of expressing solidarity between co-workers, thus creating an occupational subculture which encourages regular, and often excessive, alcohol consumption. This finding echoes the work of Ronald Cosper (255), in which he critically analyses existing theories of occupational drinking such as 'structural strain', 'selection' and 'social control', and proposes an alternative 'subculture theory', or 'drinking as conformity'. Cosper proposes that in certain types of occupations, particularly those that are marginalised, dangerous, or that involve unusual working hours (all descriptions that may apply to the manual and shift workers in our sample), workers will be more likely to engage in off-the-job leisure activities predominantly with co-workers. He argues that although social interaction with co-workers alone does not predict drinking behaviour, if it occurs in occupations where drinking is positively evaluated (for example due to the dominant culture in which the occupation is found, or owing to its use as a means of expressing or reinforcing solidarity), then an occupational subculture where collective drinking is valued is likely to evolve, and thus influence the alcohol consumption of its members (255). Cosper quotes the earlier work of Danielle Hitz:

> ...certain occupations may, for various reasons (geographical isolation, unusual working hours or shifts, particularly esoteric skills required) form sub-cultural groups or cliques characterized by a great deal of intra-group socialization even when off duty, with special customs or rituals, and argot. Drinking together may well form a large part of the social and even work life of these groups (256, p.504).

The subculture theory seems applicable to our study as many of our participants are employed in manual work, often with some element of danger, and in which leisure is restricted by unusual work schedules or long hours. As discussed above, they express

feelings of friendship and solidarity with their collective, perhaps borne out of a tradition of reliance on work-related informal networks that remains as a legacy of the Soviet Union. The positive perception of drinking together as a means of expressing this solidarity, combined with the permissive drinking norms in Ukraine generally (*e.g.* "In our country to celebrate some holiday or birthday without alcohol is almost impossible"), may work to create an occupational subculture where distinctive drinking customs are formed. Our findings further suggest that, although those who choose not to participate in the drinking subculture are not explicitly ostracised or marginalised, they may be mistrusted or excluded by their drinking co-workers.

As noted above, there were individuals in our sample who deviated from the norm and cited engagement in sports and family obligations as reasons for not drinking with their co-workers. The suggestion that non-alcohol-related leisure activities and family may play a role in reducing co-worker drinking is consistent with earlier research from the United States. Ames and Janes (243), in their study of union members previously employed by a large manufacturing plant in California, reported findings that support Cosper's 'drinking as conformity' theory and suggest that a subculture had indeed evolved among the plant workers they interviewed and, "...included a well-developed system of beliefs about alcohol use that made heavy work-related drinking acceptable for enhancing conviviality and interpersonal communication" (243, p. 953). They point out that although this was the primary driver of alcohol consumption patterns among workers, the workplace subculture alone is not sufficient to explain heavy drinking. They argue that the subculture *enabled* this behaviour among men who demonstrated other important characteristics, such as a reliance on male-oriented social circles made up of only co-workers or an absence of non-work related social groups that included their wives and children. Similarly in our study, it is possible that an occupational subculture had evolved among the railway workers that simply acted as an enabling factor, and that only those who were not deterred by other 'subcultures' where drinking is less valued, such as athletic groups or family, were vulnerable to its

influence.

Our study points to the crucial role that co-worker solidarity may play in alcohol consumption in Ukraine, and in the fSU in general, and highlights the need for further research on alcohol consumption in this context. While our data describe a strong sense of solidarity between co-workers, and the place of alcohol in expressing or realising this solidarity, we are not able to comment specifically on the mechanisms via which alcohol facilitates/enables the expression or realisation of solidarity. The data make implicit reference to alcohol being key, even necessary, but further research is required to understand the multiple ways it does this. Some of our data (*e.g.* "We drink because we drink", and "We have this mentality") suggests that drinking is just part of what is done, out of habit or routine, and therefore, not critically reflected upon or enacted as part of an active decision or strategy. However, this cannot be confirmed without further data collection.

Limitations

Some limitations should be considered when interpreting our findings. First, although we feel that conducting more interviews would not have captured further themes relating to the role of co-workers in participants' lives and the nature of co-worker drinking occasions, it is possible that additional interviews may have provided more comprehensive information on the role of non-work related leisure activities and family in participants' drinking behaviour. Future research should address these factors and the role they may play in alcohol consumption interventions in the fSU.

Second, alcohol consumption carries with it some social stigma and, as such, it is possible that interview participants may not have felt comfortable being honest about their alcohol consumption behaviour, especially as they were sampled through their place of employment. However, we feel that our study overcame this obstacle by: a) conducting interviews in a private room, b) assuring our participants that our research was not connected with UNR in any way and that their interview data would be kept anonymous, c) discussing after-work

drinking with co-workers rather than drinking at work and, d) focusing on the social context of co-worker drinking occasions rather than on the volume or frequency of participant alcohol consumption.

It is also possible that those interviews that were conducted by women were biased, as men in our sample may talk about their drinking behaviour differently to men than they would to women. However, we feel that since we were asking primarily about the role of one's co-workers in one's life, and about drinking contexts, rather than about levels of alcohol consumption, the gender of the interviewer would not have a significant impact on our results (and a comparison of interviews conducted by men and by women did not reveal major differences).

Conclusion

Despite these potential limitations, this study has provided evidence of the role of the work-related social context in alcohol consumption in the fSU, and highlighted directions for future research. While much of the research on alcohol in the fSU has focused on the possible role of social and economic *transformation* on alcohol consumption in the region, our study offers evidence of a relatively neglected phenomenon – the *persistence* of Soviet-era solidarity among trade union co-workers in industrial enterprises and the potentially negative effect this solidarity may have on alcohol consumption behaviour. That such solidarity exists among co-workers in an industrial enterprise in the fSU is not surprising, given the central role that the trade union played in workers' lives during the Soviet regime, and the continued reliance on informal co-worker networks for social and economic support since the dissolution of the Soviet Union. Our findings are consistent with Cosper's 'drinking as conformity' theory (255), which argues that frequent social interaction between co-workers and permissive drinking norms work together to create occupational subcultures that enable heavy drinking.

Our findings also offer insight into factors that may be important in planning interventions to

alter alcohol related norms among these occupational subcultures in Ukraine, a country which currently lacks any comprehensive policy addressing social determinants of alcohol consumption (257). If involvement in non-work related leisure activities or in family activities does indeed ‘protect’ workers from the unhealthy drinking norms of their occupational subculture, then effective interventions might focus on encouraging participation in sport or strengthening family ties. Moreover, our findings suggest that efforts to foster occupational subcultures that are less permissive to drinking may be necessary to reduce consumption among workers. We learned from our interviews that all formal social activities at UNR are planned by the trade union and, as such, the trade union may play a role in altering occupational norms by organising groups that promote alcohol-free hobbies, sports or other leisure activities, and facilitating outings and recreational activities that include workers’ families. Similar recommendations were made by Ames and Janes, based on their research of blue-collar workers in the United States (243) and subsequent research in the US and UK has suggested that workplace intereventions aimed at health behaviours such as diet and physical activity can be successful (258, 259), especially when employees' families are involved (260). Further research would be required to assess the effectiveness of such interventions for reducing co-worker drinking in the fSU context.

8 DISCUSSION

8.1 Introduction

The aim of this PhD was to investigate the association between community-level factors and alcohol consumption in the fSU and to use the findings to develop a new conceptual framework. Using a mixed-methods approach, I sought to answer the research question: *"Is there an association between community-level physical and social factors and hazardous alcohol consumption among men and women aged 18+years in the fSU?".* The specific objectives of this thesis were as follows:

1. To systematically review the existing evidence regarding individual and community-level social factors associated with individual-level hazardous alcohol consumption and other alcohol-related outcomes in countries of the fSU.
2. To quantify the associations between community-level physical factors, namely alcohol advertising, accessibility, availability and price, and hazardous alcohol consumption behaviour among men and women aged 18+ years in the fSU.
3. To quantify the associations between community-level social factors, namely 'social capital', and hazardous alcohol consumption behaviour among men and women aged 18+ years in fSU.
4. To explore and interpret key findings from the quantitative analysis through the use of qualitative research methods.
5. To use key findings from both the quantitative and qualitative research to develop a new conceptual framework for understanding the role of community-level factors in explaining patterns of hazardous alcohol consumption in the fSU.

The analyses conducted to achieve these objectives have been presented in this thesis as research papers. Each of those papers includes a discussion section specific to the findings presented in that paper. In the final chapter of this thesis I will first review the findings from these papers. Next I will synthesize these findings and use them to refine the conceptual

framework (presented in Chapter 3) designed to understand the social determinants of alcohol consumption in the fSU. This will be followed by a reflection on the challenges and limitations faced while undertaking this thesis. Next, I will describe the original contribution that this thesis has made to current knowledge concerning the role of community factors in alcohol consumption in the fSU. The chapter will conclude by highlighting the implications of this research for policy and suggesting directions for future research.

8.2 Findings of the thesis

The results of each analysis are presented in each of the research papers (Chapters 4 to 7) and are briefly summarized here.

8.2.1 Systematic review of the literature

The systematic review of the literature undertaken as part of this thesis revealed a shortage of evidence on social factors associated with alcohol consumption in the fSU. After screening for eligibility criteria, the review included only 26 research papers and the evidence they provided was mixed. Although males and smokers were consistently found to have increased odds of all alcohol-related outcomes, other factors such as age, marital status, education, employment status, economic status, religion, ethnicity, place of residence and psycho-social factors showed no consistent association. Inconsistent findings may have been due in part to variation in the definition of the independent variables among studies and future research should be careful to adopt definitions used in previous research to allow for comparability. For example, contradictory findings regarding the association between employment status and alcohol consumption may be due to the definition of ‘employment’ used, as previous research in Russia has found that even among those who report being ‘employed’, the experience of wage arrears, payment in consumer goods or compulsory unpaid leave is common and may be linked to health outcomes (148).

Variation among studies in terms of the definition of hazardous alcohol consumption is also likely to have contributed to the inconsistent associations observed. In light of evidence of the variation in health effects of alcohol consumed in different patterns and in different amounts (24, 149), future research on factors associated with alcohol consumption should use clearly defined and standardized measures of frequency and amount of alcohol. Challenges related to measuring hazardous alcohol consumption are discussed in greater detail in Section 8.4.1 below.

An important finding of the systematic review was that, with the exception of six studies which looked at the association between place of residence (urban/rural, country), there was no published research on the role of meso-, or community-level, factors in alcohol consumption in the fSU. The subsequent analyses presented in this thesis sought to address this gap in the literature.

8.2.2 Physical community-level factors and alcohol consumption in the fSU

The systematic review conducted for this thesis uncovered a lack of research on community-level factors and hazardous alcohol consumption in the fSU. In particular, there was no research on physical community-level alcohol-related factors such as alcohol advertising, outlet density, price and availability, despite evidence from multilevel studies in other regions supporting the role of these factors in explaining alcohol consumption patterns (99).

In order to analyse the association between community-level physical variables and hazardous alcohol consumption in the HITT data, I conducted a factor analysis to test whether these variables shared a common latent factor. This approach was informed, in part, by research on the analogous 'obesogenic' environment (164), whereby a combination of area-level factors (e.g. access to recreational space, safe walking routes, healthy food products, etc.) act in concert to influence patterns of diet and physical activity and thus the probability of becoming overweight or obese (164, 165). The analytical approach I chose

acknowledges that the alcohol-related characteristics of one's environment are unlikely to act in isolation and so it attempts to identify a common factor that captures 'alcogenicity'.

In this analysis, I found that one underlying factor accounts for the correlation between several measures of the alcohol environment, and that, of the measures included in the factor analysis, the frequency of alcohol advertisements and alcohol outlets contributed most to this factor. The underlying factor identified in this analysis was statistically significantly associated with CAGE-defined problem drinking in the fSU. Although the association found was not statistically significant for EHD, this may have been due to an underestimate of the true prevalence of EHD in the fSU population. In other words, the findings of this analysis suggest that a high number of beer, wine and spirit advertisements and a high alcohol outlet density may work together to create an 'alcogenic' environment that encourages hazardous alcohol consumption among individuals in the fSU. Although price and 24-hour availability did not contribute significantly to the factor, this was possibly due to the inability of the community profile instrument to capture the availability and price of home-made or surrogate alcohols. This limitation is discussed in greater detail in Section 8.4.2 below.

8.2.3 Social community-level factors and alcohol consumption in the fSU

In addition to a lack of research on community-level physical characteristics, my systematic review uncovered a lack of research on the role of community-level social factors and hazardous alcohol consumption in the fSU. In Research Paper 3 (Chapter 6), using the HITT data, I sought to estimate the association between four elements of social capital - social isolation, civic participation, help in a crisis and interpersonal trust - both at the individual level and aggregated to the community level. I found that individual- and community-level social isolation were associated with CAGE-defined problem drinking. One possible explanation for this is that socially isolated individuals are less well equipped to cope, and this hypothesis is supported by previous research linking social isolation to poor self-reported health (195) and to psychological stress (218), which may in turn lead to hazardous

alcohol consumption (111). This finding is also consistent with the excess mortality observed among single men in post-communist societies compared to married men (197, 198), and among the socially marginalised (219). At the community-level, higher interpersonal trust decreased the odds of EHD. This relationship may be explained partly by fear of crime, which increased in the fSU in the post-Soviet period (222) and has been associated with worse health outcomes (37) including increased psychological distress (119). As mentioned above, psychological distress may in turn increase the risk of hazardous alcohol consumption (111). It is possible that communities with higher levels of mistrust are those in which crime, and the resulting psychological distress, is more prevalent.

My analysis also found a particularly strong association between community-level civic engagement and both CAGE-defined problem drinking and EHD in men, and CAGE-defined problem drinking among women. A closer analysis by type of civic organisation revealed that this association was strongest in communities with high levels of trade union membership. Discussions with our colleagues in the region led us to hypothesize that communities with high levels of union membership are simply those where many inhabitants are in industrial employment, where union membership is mandatory. This hypothesis is consistent with research from Ukraine that has shown that alcohol consumption is higher in the industrial South and East regions of the country compared to the agrarian West (132, 134). Another possible explanation is that communities where there is a high level of membership in organisations may offer frequent opportunities to gather at social events where drinking is common and expected (61). The finding regarding trade union membership and alcohol consumption informed the subsequent qualitative work conducted in Ukraine.

8.2.4 Trade union membership and alcohol consumption in Ukraine

To better understand the social context of jobs where trade union membership is common, and to generate hypotheses as to the role that this context plays in alcohol consumption, I

conducted a qualitative study among male railroad employees in Ukraine. There were two main findings from this study: first, among workers in two sites of the Ukrainian railway company, there is a social environment in which members feel a strong sense of solidarity with others in their collective. This finding is consistent with earlier evidence of the strength of social relations among Russian factory workers (251), and their tendency to rely on informal, horizontal networks of trusted co-workers to acquire goods or odd-jobs to make ends meet (254). Second, within this social environment, drinking has been established as a normative behaviour, perhaps as a means of expressing solidarity between co-workers, thus creating an occupational subculture which may encourage alcohol consumption. This finding echoes the theory of Ronald Cosper, in which he argues that in occupations where social interaction between co-workers is common and where drinking is positively evaluated, an occupational subculture can emerge that encourages collective drinking, with implications for the alcohol consumption of its members (255).

Taken together, the findings of this study offer evidence of a relatively neglected phenomenon – the *persistence* of Soviet-era solidarity among trade union co-workers and the potentially negative effect this solidarity may have on alcohol consumption behaviour. The data from this study also suggested that non-alcohol-related leisure activities and family circumstances may play a role in reducing co-worker drinking. The suggestion that non-alcohol-related leisure activities and family may play a role in reducing co-worker drinking is consistent with earlier research from the United States (243).

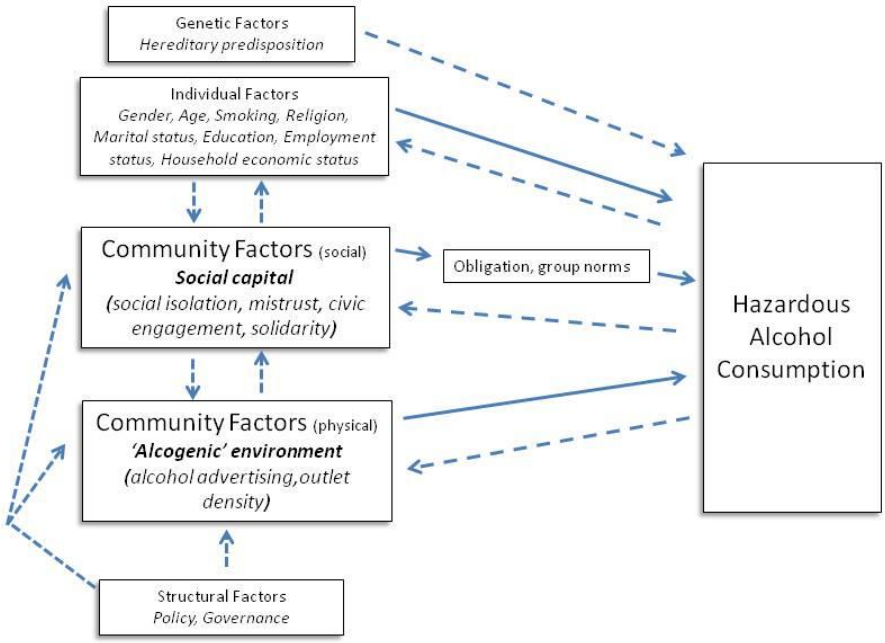
8.3 Synthesized findings: A new conceptual framework

In this section I synthesize the findings from each of the analyses discussed above and describe how I used them to refine the conceptual framework presented in Chapter 3. This process involved first developing a framework based on existing conceptual frameworks of social determinants of health behaviours. Next, I populated this framework with evidence on social factors associated with alcohol consumption uncovered by the systematic review and

by my own quantitative analysis of physical and social characteristics of the community. Last, I added potential mechanisms via which these social factors influence alcohol consumption that emerged from my qualitative research.

The graphical depiction of a new conceptual framework for understanding potential social determinants of alcohol consumption in the fSU is presented in Fig. 8.1. The potential causal pathways between social determinants and alcohol consumption are represented by arrows leading from the determinants to hazardous alcohol consumption. Solid arrows are those which depict relationships for which there is evidence in the quantitative and qualitative analyses of this thesis (and the specific factors for which there is evidence are identified in the boxes), while dotted arrows represent relationships which were suggested from the systematic review, or by research from other regions, but which require further research. The conceptual framework also allows for a possible reverse effect of alcohol consumption on the factors listed, but because this thesis relied on cross-sectional data I could not make conclusions about causality. The issue of reverse causality is discussed in greater detail in Section 8.4.5. Some of the pathways depicted in this framework are likely to be indirect, and these have been identified in the text below, but more research is needed to identify intermediate factors acting on these pathways. In the case of civic engagement, where I was able to investigate its association with alcohol consumption more deeply, a potential intermediate factor is identified in the conceptual framework. As discussed in Chapter 2, hazardous alcohol consumption is any alcohol consumption that is harmful to physical and mental health and well-being, but in this thesis has been measured by CAGE problem drinking and EHD.

Figure 8.1: A new conceptual framework of social determinants of alcohol consumption



8.3.1 Individual-level factors

The systematic review undertaken found that existing evidence regarding the precise associations between age, marital status, education, employment status, economic status, religion, ethnicity and alcohol consumption in the fSU was mixed. However, there is evidence in the reviewed literature (177), as well as evidence from other regions of the world (52, 109), to suggest that these factors play some role in alcohol consumption behaviour and should be acknowledged in future research on the subject. The analyses conducted for this thesis found that, before entering the exposure of interest into the model, gender, age, smoking, religion, employment status, marital status and household economic status were associated with CAGE problem drinking, while gender, age, smoking, religion, education and employment status were statistically significantly associated with EHD. These factors were adjusted for in the analyses in this thesis and are included in the conceptual framework

as having an indirect effect on alcohol consumption. For example, being male or having a low educational status do not make one more likely to consume more alcohol necessarily, but these factors may affect the norms to which one is subjected (although there is evidence that gender norms with regard to alcohol consumption are changing (261)), one's expectations, economic opportunities, access to information or other variables which in turn may affect alcohol consumption. Qualitative interviews and FGDs conducted in the UK suggest that male and female drinking patterns are influenced by 'gender-appropriate' norms, where drunkenness among males is considered 'masculine' and an important way of achieving camaraderie, while among females it is was associated with vulnerability (262, 263). These interviews also point to concerns about being able to fulfil responsibilities the next day as a possible deterrent to hazardous alcohol consumption, and may explain one way in which employment status affects alcohol consumption (263). Similar qualitative research in the fSU would help elucidate the pathways via which individual-level social factors affect alcohol consumption in the region.

There was evidence from the systematic review to suggest that psycho-social factors are also associated with alcohol consumption in this region, as is the case elsewhere. These have been included in the conceptual framework and warrant further research. Some psychosocial factors identified in the review (e.g. ‘regular contact with friends’, pro-Communist ideology, nostalgia for the Soviet-era) may be associated with alcohol consumption indirectly through elements of social capital such as interpersonal trust, while others (e.g. distress) may impact alcohol consumption more directly. As with the individual social factors discussed above, further qualitative research may help us to better understand these pathways.

Individual-level social isolation is also included in the conceptual framework. Social capital theory suggests that individuals who are socially isolated have fewer 'actual or virtual resources' (i.e. social capital) (264) that enable them to cope more effectively with stressful life events. As such, socially isolated individuals may be more likely to turn to alcohol as a coping mechanism. Therefore, social isolation is depicted here as having an indirect effect

on alcohol consumption, but further evidence is needed in order to test this hypothesis. The findings of this thesis were that social isolation was the only element of social capital that had an association with hazardous alcohol consumption (specifically CAGE-defined problem drinking) at the individual-level, after adjusting for community-level effects. However, the conceptual framework allows for the possible role of other elements of individual-level social capital, which were not measured in the HITT data and which may not yet be known or fully understood. The challenges of measuring social capital are discussed in more detail in Section 8.4.3 below.

As discussed in Chapter 3, genetic factors are not *social* determinants of health, so were not addressed in this thesis, but are included in the conceptual framework as there is evidence of their role in alcohol consumption patterns and problem drinking (102, 265).

8.3.2 Community-level factors

Although, in the regression models used for the quantitative analyses in this thesis, place of residence (i.e. urban vs. rural) was not statistically significantly associated with alcohol consumption, findings from the systematic review suggested that it may play a role. Research from other regions also provides evidence of an effect of place of residence on alcohol consumption (266, 267). Place of residence has been included in the conceptual framework, and should be assessed further in future research. It is represented in the conceptual framework as having an indirect effect on alcohol consumption, possibly due to variation in the alcogenicity of communities in urban and rural areas, which would be consistent with our finding that urbanicity was not statistically associated with hazardous alcohol consumption when the regression model included the 'alcogenic' factor.

Country of residence was significantly associated with alcohol consumption in the quantitative analysis and should also be accounted for in multi-country studies. As discussed in Chapter 1, there is considerable heterogeneity in alcohol policies and volume of alcohol consumption among fSU countries. These countries are also diverse in terms of the type of

alcohol consumed and pattern of consumption (23, 147). Russia, Ukraine and Belarus are traditionally spirit-drinking countries and have the lowest number of abstainers, while Georgia, Moldova and Armenia have long traditions of wine-making and drinking (although Armenia is also famous for its brandy). In the Central Asian countries, Islam is the dominant religion and prohibits alcohol consumption, although adherence to the tenets of Islam is much weaker than in many other Islamic countries. However, Kyrgyzstan, which has the largest Muslim population, also has the highest number of abstainers (23, 147). In the analyses conducted for this thesis (Research Paper 2, Table 5.2), the prevalence of EHD was highest in Belarus and Russia, and lowest in Azerbaijan and Moldova.

The factors making up the 'alcogenic' environment, namely alcohol advertisements, outlets, availability and prices, are all included in the conceptual framework. The factor analysis in Research Paper 2 found that 24-hour availability and price were not major contributors to the underlying factor, or alcogenic environment; however, this may have been due to the inability of the community profile tool to capture price and availability of commonly consumed home-made or surrogate alcohols. The potential contribution of alcohol price and availability to an alcogenic environment which affects consumption should still be acknowledged in the conceptual framework. This is especially true for price, given the extensive evidence from other regions of the world supporting the role of tax and price increases as means of reducing consumption (174). A recent study on alcohol consumption in Imperial Russia also suggested that higher alcohol taxes were associated with reduced consumption (191). In the conceptual framework, alcohol-related physical characteristics in the community are depicted as having both a direct effect on alcohol consumption (by affecting the ease with which alcohol can be acquired), as well as an indirect effect (by possibly affecting community norms, such as in the case of obesogenic environments (268)). Further qualitative or longitudinal data would be valuable for gaining a better understanding of the mechanisms by which these characteristics affect alcohol consumption in the region and the magnitude of their impact.

The conceptual framework depicts an indirect relationship between elements of community-level social capital (interpersonal trust, social isolation and civic engagement) and alcohol consumption. The qualitative research undertaken for this thesis generated a hypothesis that civic engagement (in this case in trade unions) may affect alcohol consumption via social solidarity and a sense of obligation to engage in normalized drinking, perhaps to maintain this solidarity. This hypothesis needs to be tested among workers in other fSU countries. Further qualitative research in other fSU countries would also allow us to better understand the mechanisms via which other elements of social capital, such as social isolation and mistrust affect alcohol consumption. The need for further research in this area is discussed in Section 8.6.2.

Macro-level social factors were not addressed in this thesis, but as there is evidence of the role of these factors, such as trade (100) and welfare (101) policy, on health-related behaviours, they are also included in the conceptual framework. Earlier work on the impact of trade policy on cigarette consumption used country-level data on such factors as 'trade openness', per capita gross national product, and lagged cigarette consumption (to account for a lag in changes in smoking behaviour due to the addictive nature of cigarette consumption) from 42 countries to estimate the effect of tobacco trade liberalization on per capita cigarette consumption (100). Similar macro-level data from fSU countries, where available, may benefit our understanding of the potential impact of macro-level policies on alcohol consumption in the region.

8.3.3 Applications of the conceptual framework

The conceptual framework presented in Figure 8.1 serves as a guide to understanding the social determinants of alcohol consumption and identifies possible areas for future research. Although this conceptual framework was initially developed based on existing *global* frameworks of social determinants of health, it was refined based on evidence from my systematic review of literature from the fSU and my quantitative and qualitative analyses of

fSU data. While it is likely to be useful for understanding determinants of alcohol consumption in countries outside the fSU, its applicability to a broader population would have to be tested.

8.4 Overall limitations

Limitations specific to each paper are discussed in those papers (Chapters 4 to 7). In this section I will discuss the most significant conceptual and methodological challenges I faced in conducting the research for this thesis and the limitations of the findings.

8.4.1 Defining hazardous alcohol consumption

This thesis defined 'hazardous alcohol consumption' as alcohol consumption that is harmful to physical and/or mental health and well-being. Two outcomes were used to operationalise hazardous alcohol consumption: EHD, a pattern of consumption of large volumes of alcohol to the point of intoxication and CAGE-defined problem drinking, a measure of alcohol dependence. Another outcome that was considered for the analysis is total volume of pure alcohol consumed in one year (a continuous outcome), which has been used in other research on the correlates and consequences of hazardous alcohol consumption in Russia (269). While dichotomous outcomes may have the advantage of simplicity of interpretation, using a continuous outcome offers the advantage of having more power to detect differences potentially attributable to the exposure variable (270). The variable representing total volume of ethanol consumed is defined as the sum of pure ethanol (estimated using known data on the amount of pure ethanol for a given drink size) consumed in each beverage type (spirits, beer, wine) that the individual reports consuming 1-2 times per month or more. Applying this definition strictly requires the exclusion of any individuals who reported drinking a particular beverage type 1-2 times per month or more, but then did not report how much they drank on those occasions (even if they reported amounts for other beverage types). Applying this definition to the HITT data resulted in a high proportion of missing data (70%) on total volume of ethanol consumed. It is possible that those who consume the highest amount of

alcohol are more likely not to report their consumption (271). If this is the case, these data are not missing at random and a model using the total volume of alcohol consumption would have produced biased estimates of the association between community factors and hazardous alcohol consumption.

The use of EHD as an outcome did not face the same challenge of missing data as total volume of alcohol consumption because it only required that at least one amount of alcohol consumed be reported (i.e. beer, wine or spirits). The use of EHD is also consistent with a previous multi-country study on alcohol consumption in the fSU, and this thesis used the same definition as that study (i.e. self-reported consumption >2L of beer, 750g of wine or 200g of strong spirits on one occasion) (23). However, this definition of EHD relies on individual self-reports of the amount of each beverage consumed on each drinking occasion and is therefore limited in two important ways: First, it is known that individuals tend to under-report their own alcohol consumption (18). In the fSU this might be especially problematic (17), not least because the heaviest drinkers tend to be underrepresented in surveys. (In the HITT study, being intoxicated (which may be a marker for heavier drinking) was an exclusion criterion for participation). However, the survey questions used in the HITT study were designed to reduce this limitation as much as possible by listing consumption frequency options in descending order (i.e. from most to least frequent), which has been recommended as one way to make higher frequencies seem more normal and reduce respondent embarassment (272). Second, respondents cannot be relied on to accurately estimate their drink sizes and so estimates of the amount of alcohol consumed may not be standardized across respondents (273). Representational aids such as actual glasses and bottles have been recommended to assist respondents in converting their actual drink sizes to standard sizes (272). This may also be particularly problematic in the fSU where surrogate or homemade alcohols are consumed, as the drink size and ethanol content of these alcohols is difficult to estimate and standardize. The use of CAGE-defined problem drinking as an outcome was used to compensate for the limitations of measures that rely on

self-reported alcohol consumption. Generally, measures of dysfunction may provide information on heavy alcohol intake that is not captured by conventional measures of frequency and volume (269). The CAGE instrument has been validated extensively and has been shown to have 93% sensitivity and 76% specificity for the identification of problem drinkers (180), and may be less vulnerable to bias as it does not focus on perceived alcohol consumption (79). However, the CAGE instrument is meant to capture alcohol dependence which, although hazardous to psychological well-being, may not necessarily capture alcohol consumption that is hazardous to physical health. Ideally, research on hazardous alcohol consumption would take advantage of a range of novel biomarkers to capture recent levels of consumption (150), but this is not always possible for practical reasons.

8.4.2 Measuring community-level physical characteristics

The measures of alcohol-related physical characteristics at the community level that are used in this thesis relied on the novel Environmental Profile of a Community's Health (EPOCH), an instrument developed by Chow et al. for the Prospective Urban Rural Epidemiology (PURE) study (181) and adapted for use in the HITT countries, following its piloting in each country. Although the EPOCH tool has been shown to have high inter-rater reliability and feasibility for measuring aspects of the community related to physical activity, diet and smoking (181), prior to the HITT study it had not been used to assess alcohol-related characteristics of the community, and its inter-rater reliability and validity as a measure of the alcohol environment was not assessed. It is possible that this tool was limited by its inability to capture all alcohol-related aspects of the community accurately, especially with regard to price, outlets, and 24-hour availability. In the fSU it is common to drink homemade drinks such as 'samogon', and homes where samogon is produced (and possibly sold) would not have been captured by the community profile tool, even though these are essentially alcohol outlets where alcohol is available cheaply 24 hours a day. The price of samogon was also not recorded. Moreover, non-beverage, or 'surrogate' alcohols (e.g. medicinal tinctures, eau de cologne) are relatively easy to obtain and are consumed by a significant number of

men in Russia (192, 274) (and also probably in other fSU countries); the price, availability and accessibility of these products were also not captured by the community profile tool. More detailed community profiles, possibly using qualitative research methods such as interviews with key informants in the community, are required to more accurately assess elements of the alcogenic environment such as the price, availability and accessibility of home-made or surrogate alcohols, although the nature of these products will inevitably make this difficult.

8.4.3 Defining social capital

As mentioned in the preamble to Research Paper 3 (Section 6.1.1), social capital is still a relatively new concept in public health research and, as yet, there is no widely agreed approach to its measurement. The questions used to measure social capital in existing studies have varied greatly. In addition to the indicators used in this thesis, examples have included measurements of 'friends' educational expectations' (275) (to estimate children's community-level social capital), whether neighbours know each other or not (276) (to estimate adults' community-level social capital) and individuals' agreement with the statement 'it is never justified to cheat on your taxes' (277) (to estimate country-level civic co-operation). As noted by Farr, scholarly critiques of the concept of social capital express concern about the implications of this definitional ambiguity (278). Their authors fear the "indiscriminate applications" that accompany such a "wide variety of meanings" and warn "that the meaning of social capital will become muddled".

According to Durlauf (279), the definitional ambiguity also makes it impossible to satisfy the 'identifiability' property of statistical modelling that is necessary for making inferences. (A model is identifiable if it is theoretically possible to learn the true value of its parameters with the data available.) Social capital has become a 'rubric for very different phenomena' (279, p.F471) and in their ambiguity, existing operational definitions have failed to distinguish between social capital and other potential individual- and community-level

effects. In other words, it is possible that the indicators used to measure social capital may affect outcome variables in various ways that have nothing to do with social influences. For example, social isolation may be associated with hazardous health behaviours because without social networks individuals are less able to cope with daily stressors (280), but, just as plausibly, this may be because socially isolated individuals experience boredom and seek stimulation through alcohol or cigarettes (281). Similarly, membership of church groups may represent belonging to a strong social network that can be trusted and relied on in times of need (208), or it may represent higher levels of spirituality and practice of prayer, which has also been linked to improved health outcomes (282).

Recognizing the challenges presented by this definitional ambiguity, I selected indicators of social capital that have been used most commonly in previous research, and that have been linked to various health outcomes and behaviours both in the fSU (195) and elsewhere (207, 208). However, it must be acknowledged that it is impossible with the available data to say whether or not the associations observed between certain elements of social capital in this analysis and hazardous alcohol consumption were truly due to social capital, rather than some other unmeasured individual or contextual effects. The qualitative analysis was a step toward addressing this topic, as it explored in greater depth the association between one element of social capital (i.e. trade union membership) and hazardous alcohol consumption. Further qualitative research would aid understanding of the pathways between other elements of social capital and health generally, and alcohol consumption specifically. More sophisticated quantitative data analysis (e.g. with longitudinal data) is required in order to support assertions that the statistical associations observed between social capital indicators and health outcomes such as alcohol consumption are indeed causal.

8.4.4 Defining ‘community’

There is an extensive body of literature focused on defining the concept of community (283, 284). One author writing on the subject, Anthony Cohen, argues that rather than searching

for a strict lexical meaning, there is more value in seeking the word's *use* (284). He further argues that a reasonable interpretation of the use of the word 'community' implies "two related suggestions: that the members of a group of people a) have something in common with each other, which b) distinguishes them in a significant way from the members of other putative groups."(284). However, how to define the boundaries of one's social and physical community when conducting research is still unclear. For the purposes of the analyses included in this thesis, community was defined as the PSU in the HITT study. For the community profiles, data collectors were instructed to choose a point within the PSU and collect data on a 1 km walk from that point. This was done in the interest of practicality, but it is important to acknowledge that individuals are mobile beings who are not necessarily only exposed to the physical and social environments that are defined by a boundary around their place of residence. Work, school, leisure, and other activities may take individuals outside of the boundaries defined by PSUs, administrative areas, or defined distances (285), thus exposing them to spatial, or community, influences that are not captured by focusing on their place of residence. Advances are being made in developing more flexible definitions of 'community' that "measure what matters to people over the area that really matters to people" (286), such as the use of global positioning systems to track where people spend most of their time, but such approaches were not feasible for this thesis and are subject to a number of limitations (287, 288). Further research would be required to assess the appropriateness of these approaches in the context of the fSU.

8.4.5 Reverse causality

This thesis relied on the use of cross-sectional data and, as such, the possibility of reverse causality must be acknowledged. For example, it is possible that the observed association between the alcogenic environment (contributed to mostly by alcohol advertisements and outlet density) may be due to a choice made by alcohol retailers or producers to market and sell alcohol in areas where more individuals consume alcohol. That is, it is possible that the outcome variables used in this study (i.e. CAGE and EHD) precede the explanatory variables

(alcogenic environment). This is also possible in the case of the associations observed between social isolation, mistrust and civic engagement, as individuals who engage in problem drinking may in fact be more likely to experience family conflicts (123), withdraw from society (220), and become psychologically distressed (221).

As mentioned in Research Paper 2, I was not able to control for this possible endogeneity with an instrumental variable analysis, a standard approach to addressing issues concerning the direction of causality in observational studies (189, 190), as there were no variables in the HITT data which fit the assumptions required for instrumental variables (i.e. that they be directly correlated with the explanatory variables but not with the outcome variable). However, a review of longitudinal studies from other regions of the world (albeit among adolescents) found strong and consistent evidence that exposure to advertising not only increases the likelihood of drinking initiation but also increases the odds of increased consumption among drinkers (72), suggesting that advertising does indeed influence drinking behaviour, rather than the other way around. This conclusion is also supported by a meta-analysis of estimated elasticities of alcohol demand that suggests that the advertising elasticity of demand for alcohol tends to be positive (i.e. as advertising increases so does demand) (73). Of course, it is also supported by the fact that the alcohol industry spends many millions of pounds in advertising their products, something it would be unlikely to do if advertising was ineffective. With regard to alcohol outlets, other research using time-series data from the US showed that, even when controlling for endogeneity, physical availability had a direct effect on sales of alcohol (171). With respect to social capital and health, an instrumental variable analysis found an association between social isolation and trust and health (195). Nevertheless, this does not rule out the possibility that alcohol consumption may affect social capital, rather than the other way around. Qualitative research in Russia, using narratives provided by widows of men who had died of alcohol-related causes, implied a bi-directional relationship, with hazardous alcohol consumption and psychological distress mutually reinforcing each other, although either can start the process off (143). In order to

better understand the relationship between the alcogenic environment, social capital indicators and alcohol consumption in the fSU, longitudinal research in the region is needed.

8.4.6 Overall contribution of the thesis

Despite the challenges and limitations discussed above, the results of this thesis take an important step toward addressing the gap in research regarding social determinants of alcohol consumption in the fSU. Specifically, this thesis has made the following contributions to knowledge concerning the role of social factors in alcohol consumption in the fSU:

1. This thesis includes the first systematic review of literature on social factors associated with alcohol consumption in the fSU. This review revealed a major shortage of evidence, particularly with regard to community-level factors.

2. This thesis includes the first quantitative analysis of physical community-related factors and alcohol consumption in the region, using nationally representative data from nine fSU countries. The findings of this analysis suggest that alcohol-related aspects of the community, in particular alcohol advertising and outlet density, may act in concert to create an 'alcogenic' environment that is associated with hazardous alcohol consumption.

3. This thesis contains the first study to use a community profile tool to measure and analyze alcohol-related aspects of the environment. By doing so, it has highlighted some of the limitations of this tool, but also some opportunities for enhancing its ability to measure alcohol-related aspects of the environment in future studies (discussed in Section 8.4.2 above).

4. This thesis includes the first quantitative analysis of the association between both individual- and community-level social capital indicators and hazardous alcohol consumption in the region, using nationally representative data from nine fSU countries. The findings suggest that while socially cohesive communities with high levels of interpersonal trust may be associated with reduced odds of hazardous alcohol consumption, high community-level average engagement in certain types of civic organizations (especially trade unions) may increase these odds.

5. With the exception of one study by Saburova, et al. (143), this thesis includes the first qualitative analysis of the role of workplace social contexts and alcohol consumption among men in the fSU, and is the first such study in Ukraine. This analysis offered a potential explanation for the relationship observed between high-community-level trade union membership and hazardous alcohol consumption in the quantitative analysis, namely that men who work in jobs where trade union membership is common may experience a strong sense of solidarity with their co-workers and participate in drinking occasions as a means of expressing, or realizing, this solidarity.

6. This thesis includes a synthesis of findings from the quantitative and qualitative findings discussed above to generate a new conceptual framework for understanding social determinants of alcohol consumption in the fSU, and possibly more broadly.

8.5 Implications for policy

In the following section I will describe the implications of my findings regarding the alcogenic environment and social capital for policy in the fSU.

8.5.1 The alcogenic environment

The fluctuations observed in alcohol consumption and associated mortality in fSU countries (4, 6, 8, 289), as well as the presence of abstainers in these countries (125), (especially in Georgia and Kyrgyzstan) (147), shows that hazardous alcohol consumption in this region is not inevitable and is likely to be influenced by state policy (5). The findings of this thesis indicate that alcohol advertisements and outlet density are associated with hazardous alcohol consumption. It is likely that alcohol price and availability would also have been found to be associated with consumption if more robust data were available, given evidence from other regions of the world supporting the role of tax and price increases (168, 290, 291), and reduced hours of alcohol sale (63, 74) in reducing consumption of alcohol. As discussed in Chapter 1, there is extensive evidence of the effectiveness of policies directed at each of the alcohol-related community characteristics analysed in this thesis (72). Specifically, a review of the literature (72) found that i) reducing outlet density can reduce violence, harm to others and drunk driving fatalities (71), ii) reducing alcohol advertising can delay youth initiation of drinking and lessen the amount of alcohol consumed by current drinkers (72, 73), iii) reducing days and hours of alcohol sale can limit consumption and alcohol-related harm (63, 74) and iv) increasing minimum prices for alcohol or increasing taxation on alcohol can lower consumption (i.e. consumption is price elastic) (73, 75) and reduce acute and chronic alcohol-related harms (76, 292). There is also evidence that these policies are cost-effective (72). More evidence is needed at the country level in the fSU, but the findings of this thesis suggest that the state can play a role in reducing the prevalence of hazardous alcohol consumption in this region by addressing the marketing and accessibility of alcohol.

Despite the great mortality and morbidity burden caused by alcohol consumption in the region, as of 2011, only one of the nine countries included in this study (Kazakhstan) had policies addressing all of the issues studied in this thesis (advertising, outlet density, price and availability) (Table 1.1) (70). A stakeholder analysis conducted in 2007 on alcohol policy in Russia provides some clues as to the barriers to adopting comprehensive policies in

the region (293). Its findings suggested that organisations which might be expected to take action on alcohol policy, such as health-sector and education sector agencies, and oblast and municipal-level authorities, are disengaged from the issue, have a very limited view of their power to influence policy and low awareness of effective policy options. Moreover, those organisations that favour alcohol restrictions seem to be highly fragmented (293). The factors preventing countries in the fSU from adopting comprehensive policies are likely also similar to those identified in an earlier analysis of alcohol policy-making in Hungary, such as an absence of shared vision and ownership of policies, a lack of technical and policy-making capacity and corruption (5, 294). The alcohol retail and hospitality industries in these countries are also likely to have a strong influence over policy. With respect to price specifically, it is also possible that governments are reluctant to increase prices on alcohol for fear of possible negative consequences such as increased smuggling or home production of alcohol (63). However, despite opposition among some groups, there is evidence of public support for alcohol price increases in the fSU (295), which may suggest public support for policies aimed at reducing alcohol generally.

In order to motivate governments and other organisations in the fSU that are unaware of the demographic consequences of alcohol or wary of revenue losses from reduced consumption, evidence of mortality attributable to alcohol, as well as of the direct costs to society due to treatment of alcohol-related disease and indirect costs from lost productivity, is needed. This evidence has been compiled for Russia (296-299), and is thought to have contributed to the Russian government's decision to implement a range of measures, since 2006, to reduce alcohol consumption. An evaluation of these policies is in progress but initial evidence suggests that they have been effective (300).

8.5.2 Social capital

The findings of this thesis also point to social aspects of the community that might be addressed through policy or other programmatic interventions. In the quantitative analysis,

active civic engagement, and, specifically, active trade union membership, was associated with hazardous alcohol consumption. My qualitative research suggested that this association may be driven, in part, by social solidarity among co-workers in occupational subcultures where alcohol is normalized and used as a means of expressing this solidarity. The potential for social networks, and the norms transmitted by them, to have a negative impact on education and health behaviours such as smoking and weight management has been described by others (199, 226, 301, 302). This does not preclude, of course, the potential for these social networks to have a positive influence on health behaviours. In the interviews conducted for my qualitative research, I learned that engagement in sport and family activities may 'protect' some railway workers from the prevailing norms of the co-worker social circle. I also learned that all formal social activities at UNR are planned by the trade union, but currently tend to consist mostly of birthday celebrations and occasional retreats to nearby recreational destinations. As such, the trade union may play a role in altering occupational norms by organising workplace events that support community engagement through non-alcohol-related activities such as sports or other outings that include workers' families. Evidence from other regions points to the positive effect of workplace interventions aimed at improving dietary habits (258), especially when family members were included (260).

Social isolation, both at the level of the individual and the community, was also associated with hazardous alcohol consumption in the fSU. Further qualitative evidence of the mechanisms via which isolation and hazardous alcohol consumption are linked in this region is required. However, it is possible that, here too, interventions that promote community engagement in socially-isolated communities, through, for example, arts and cultural activities (303), may play a valuable role. The feasibility of measuring the impact of such interventions through a randomized controlled trial (RCT) has been shown (304). Evidence from a currently on-going randomized-controlled trial of community engagement

interventions to improve health behaviours and mental well-being in the UK will provide valuable lessons for intervention planning in other countries (304).

8.6 Areas for further research

Throughout this thesis I have noted areas where further research is needed in order to better understand the social determinants of hazardous alcohol consumption in the fSU and to design interventions targeted at this behaviour. In this section I will discuss in more detail three areas that I believe would particularly benefit from more research, based on the gaps in the literature observed in the fSU, the findings from my quantitative and qualitative analyses and evidence from studies outside the fSU. These areas are: i) the effect of alcohol price, availability, accessibility and advertising on consumption within individual fSU countries, using a refined community profile tool; ii) the mechanisms via which indicators of social capital impact on alcohol consumption; and iii) the economic burden of hazardous alcohol consumption, both at the household level and at the national level.

8.6.1 The effect of community characteristics within individual countries

There are clear advantages to using multi-country data, in particular, that they provide a large sample size and increased power to observe statistical differences, and country of residence was adjusted for in all statistical models. The analysis of multi-country data conducted for this thesis identified alcohol-related community characteristics that have not been previously addressed in research in the fSU and which may have an effect on alcohol consumption in the region. However, as discussed in Chapter 1 and Chapter 5 (Research Paper 2), there is considerable heterogeneity among countries of the fSU in terms of alcohol consumption and alcohol policy. The effect of formal alcohol outlet density or 24-hour availability in formal outlets may vary depending on how prevalent informal sources of alcohol are in a given country. It is also possible that the effect of advertising may vary depending on the population groups at which the advertising is targeted in each country (for example, Russia has seen an increase in marketing of alcohol aimed at women in recent

years (305)). In addition, there is evidence of significant regional variation in terms of alcohol consumption (132, 134) and alcohol-related mortality (244) within individual countries of the fSU. As such, country-specific data collection and analysis would serve to further our understanding of the relationship between alcohol-related community characteristics and consumption behaviour and inform policies that would be effective at the national level. Within this country-specific research, an investigation of possible interaction effects between community factors and various socio-demographic variables may improve our understanding of the ways in which these factors may differentially influence different population groups.

8.6.2 The mechanisms via which social capital affects alcohol consumption

This thesis found that individual-level social isolation and community-level social isolation, mistrust and civic engagement were all positively associated with hazardous alcohol consumption. The qualitative research undertaken for this thesis suggested one potential pathway via which social capital, as measured by trade union membership, might have an effect on alcohol consumption. Specifically, the findings of this thesis were that civic engagement, specifically in trade unions, may indeed represent a 'connection between individuals' from which 'norms of reciprocity and trustworthiness' arise (199, p.19), but that drinking may serve as a means for establishing or maintaining this connection. In this way, social capital may have a *negative* impact on health via the sense of obligation and pressure to conform that it fosters. The potential for social capital to have a negative impact is a phenomenon that has been previously identified (199, 226, 227, 306), but is not often considered in social capital research (278). Further qualitative research, complemented by quantitative methods such as path analysis, might serve to improve our understanding of the pathways via which other elements of social capital affect health behaviours.

Additionally, both quantitative and qualitative research that seeks to capture the *nature* of social networks would be valuable. Earlier scholars of social capital have distinguished

between *Putnamesque* civic organisations and *Olsonian* civic organisations and proposed that these might affect members' social capital differently (277). While the former encourage members to accumulate social capital and pursue common goals without imposing negative externalities, the latter are characterised by an uneven distribution of power and resources (277, 307). Others have hypothesised that organisations that foster generalized mistrust of non-members may also impact negatively on health (208, 209). Furthermore, recent studies have suggested that the effect of social capital on health may vary depending on whether it is 'bonding', 'bridging' or 'linking' (228). Bonding social capital is derived from relationships with people who are similar to one another (for e.g. in terms of socio-demographic or socio-economic characteristics), while bridging social capital is derived from relationships with people who are at the same level in a hierarchy, but who are dissimilar. Linking social capital is derived from relationships among dissimilar people at different levels of a hierarchy. As noted in Research Paper 3, I was not able to explore the different impacts of these types of social capital on hazardous alcohol consumption in my quantitative data analysis, but survey questions that attempt to distinguish between them have been used in other studies (228, 308) and should be included in future research in the fSU. Further qualitative research would also provide insight as to whether the indicators commonly used to operationalise social capital are appropriate for the fSU context.

8.6.3 The economic burden of hazardous alcohol consumption

The findings of this thesis regarding the association between alcohol accessibility and advertising and hazardous alcohol consumption are consistent with extensive research from other regions (72). As shown in Table 1.1, of the nine countries included in this thesis, only Kazakhstan has policies that target advertising, outlet density, price and availability (70). Evidence of the demographic consequences of alcohol consumption may be one valuable tool in advocating for stronger policies that address these factors. However, more evidence on the economic burden caused by hazardous alcohol consumption, both at the household and national levels, may also be useful for motivating governments who are concerned about

potential lost revenues from reduced alcohol sales. A recent study of the economic burden of alcohol dependence in Europe found that the treatment costs of a single alcohol-dependent patient range from €1591 - €7702 per hospitalization and the annual total direct cost of alcohol dependence accounts for 0.04 - 0.31% of an individual country's gross domestic product (309). Evidence of the economic burden caused by alcohol consumption in fSU countries specifically, as well as evidence from these countries of the cost-effectiveness of policy interventions aimed at regulating advertising, accessibility, price and availability, would be an invaluable tool for mobilizing policy makers.

8.7 Conclusion

In this thesis I sought to identify and address the gap in research on the social determinants of alcohol consumption in the fSU, and I focused specifically on alcohol-related physical aspects of the community, as well as social capital. The findings from this thesis suggest that i) there is a gap in research on social factors and alcohol consumption in the fSU, and, in particular, on community-level factors; ii) alcohol advertising and outlet density may act in concert to create an 'alcogenic' environment that is associated with hazardous alcohol consumption in the fSU (price and availability might also have shown an association were data on the informal sale of homemade alcohol and surrogate alcohol available); iii) some elements of social capital (individual-level social isolation, community-level social isolation, mistrust and civic engagement) are associated with hazardous alcohol consumption in the fSU; and iv) the association between community average engagement in one type of civic organisation (i.e. trade union membership) and hazardous alcohol consumption in the fSU may be due to a strong sense of social solidarity between co-workers in the same union and the use of drinking occasions as a means of expressing this solidarity. These findings have been used in the development of a new framework for understanding the relationship between social factors and alcohol consumption, and to recommend directions for future research and policy.

APPENDICES

Appendix 1: Survey questions used to determine EHD

I am now going to ask you a series of questions about your drinking of alcohol. These questions are about the past year, unless otherwise specified.

1. How often do you drink alcoholic drinks of any type?

*Every day/4-5 times per week/2-3times per week/once per week/ 1-2 times per month/once in 2-3 months/less often/never/do not know/refuse to answer**

*If responds once in 2-3 months or less skip to next section.

2. How often, on average, do you drink industrially produced spirits, such as vodka, cognac, whiskey, etc.?

*Every day/4-5 times per week/2-3times per week/once per week/ 1-2 times per month/once in 2-3 months/less often/never/do not know/refuse to answer**

* If responds once in 2-3 months or less skip to Question 4.

3. How much strong spirits do you usually drink on one occasion?

_____ *grams (-1:don't know; -2: refuse)*

4. How often do you drink beer?

*Every day/4-5 times per week/2-3times per week/once per week/ 1-2 times per month/once in 2-3 months/less often/never/do not know/refuse to answer**

* If responds once in 2-3 months or less skip to Question 6.

5. How much beer do you usually drink on one occasion?

_____ *litres (98: don't know; 99: refuse)*

6. How often do you usually drink industrially produced wine or champagne?

*Every day/4-5 times per week/2-3times per week/once per week/ 1-2 times per month/once in 2-3 months/less often/never/do not know/refuse to answer**

* If responds once in 2-3 months or less skip to next section.

7. How much industrially produced wine/champagne do you drink on one occasion?

_____ *grams (-1:don't know; -2: refuse)*

Appendix 2: Outcome measures used in studies included in systematic review, by author and category

		Measure				
	Author	**Frequency**	**Amount**	**Frq.& amt. combined**	**Alcohol use disorder**	**Alcohol dependency**
1	Bobak et al., 1999	>1 time per month	>25cl more than once per month			
2	Bromet, et al., 2005				DSM-IV defined alcohol disorder (with or without dependence)	
3	Carlson & Vagero, 1998			≥ 160g of pure alcohol/week		
4	Cockerham, et al., 2002	≥4 /week	any quantity of alcohol			
5	Cockerham et al., 2004	≥2 /week	≥100g/sitting			
6	Cockerham et al., 2006a	≥2 /week	≥100g/sitting			
7	Cockerham et al., 2006b	≥2 /week	≥100g/sitting			
8	Cook et al., 2011				alcohol consumption and problems as defined by AUDIT questionnaire	
9	Jukkala et al., 2008		men: ≥ 80g of ethanol per occasion; women: ≥			

			60g of ethanol			
10	Helasoja et al., 2007		men≥15 alcohol portions/week; women ≥5 alcohol portions/week			
11	Hinote, B.P. et al., 2009	daily or more				
12	Malyutina et al., 2004			at least 80g of ethanol for men, at least 60 g or ethanol for women at least once a month		
13	McKee et al., 2000	at least once/week				
14	Pakriev et al., 1998					Composite International Diagnostic Interview 1:1
15	Palosuo et al., 2000	frequency of intoxication				
16	Parna et al., 2010	at least once/week				
17	Perlman et al., 2003	several times a week				
18	Perlman, 2010		any quantity of samogon (home-distilled spirits) drinking	>80g of samogon or vodka, ≥ weekly		
19	Pomerleau, et al., 2008			2 L or more of beer or 750g or more of		

				wine or 200g or more of strong spirits on one occasion		
20	Puska et al., 2003	men ≥1 time per week; women ≥ 2-3 times per month				
21	Rojas et al., 2008			among men who consumed alcohol at least once a week, those who consumed more than 19.19 cl of pure alcohol on one day of the weekend		
22	Saburova et al., 2011				alcohol-related death (as reported by proxy informant)	
23	Tomkins et al., 2007	ever consumed surrogates drank spirits daily vs. less frequently		had been on zapoi (extended period of drunkenness during which participant withdraws from normal life)	had a hangover frequently	
24	Treisman, 2010	at least once a week during previous 30 days		≥80g of vodka, home brew or other hard liquor in 1 day		
25	Van Gundy et al., 2005			Alcohol use index (score from 2-9 based on frequency		

				and amount of alcohol consumption)		
26	Webb et al., 2005			men: ≥ 80g of ethanol in a typical drinking day or ≥ 60 3-4 days/week or ≥ 40 g nearly every day; women: ≥ 60g of ethanol in a typical drinking day or ≥ 45 3-4 days/week or ≥ 30 g nearly every day		

Appendix 3: Significant results of each reviewed study, by type of independent variable

	Paper/Location/Study type/Sample	Outcome measure	Significant Independent Variables	**OR (95% CI)** *Unless otherwise stated* *p<0.05,**p<0.01,***p<0.001
	Demographic characteristics			
1	**Bromet et al., 2005**/ Ukraine/Cross-sectional (World Mental Health Survey (WMH))/ 1791 men (m), 2934 women (w); Ages: 18+	DSM-IV defined alcohol disorder (with or without dependence)	Female gender	**0.08** (0.06-0.11)***
			Age 25-34 (vs. 50+)	**2.29** (1.64-3.21)*
			Russian-speaking (vs. Ukrainian)	**1.38** (1.06-1.79)*
			No longer married <55	**1.94** (1.31-2.86)**
			No longer married 55+	**0.17** (0.1-0.29)***
2	**Cockerham et al., 2002**/Russia/Cross-sectional data (1998) from Russian Longitudinal Monitoring Survey/8701 m&w; Age 18+	Any alcohol consumption	Male gender	**2.43** (2.19-2.68)***
			Age (1 year increase)	**0.99** (0.99-1.00)***
			Married	**1.34** (1.21-1.50)***
		Frequent alcohol consumption (≥4/week)	Male gender	**5.72** (3.53-9.26)***
			Age (1 year increase)	**1.02** (1.00-1.03)**
3	**Cockerham et al., 2004**/Kazakhstan, Kyrgystan/Cross-sectional (Living Conditions, Lifestyles and Health Study (LLH))/ Kazakhstan: 2000 m&w, Kyrgystan: 2000 m&w; Ages: 18+	Frequent drinking (≥2 /week)	*Kazakhstan*	
			Male gender	**6.84** (4.21-11.10)***
			Age (1 year increase)	**0.98** (0.96-0.99)***
			Russian ethnicity	**0.51** (0.30-0.85)**
			Muslim	**0.48** (0.29-0.80)**
			Kyrgyzstan	
			Male gender	**5.44** (2.42-12.25)***
			Kazakhstan &Kyrgyzstan combined	
			Male gender	**6.33** (4.18-9.58)***

			Age (1 year increase)	**0.98** (0.97-0.99)***
			Russian ethnicity	**0.60** (0.37-0.98)*
			Muslim	**0.48** (0.30-0.77)**
		Heavy vodka drinker (≥100g/sitting)	*Kazakhstan*	
			Male gender	**17.70** (4.05-77.32)***
				0.94 (0.89-0.99)*
			Age (1 year increase)	
			Kyrgyzstan	**2.20** (1.04-4.64)*
			Male gender	
			Kazakhstan & Kyrgyzstan combined	**3.52** (1.52-6.81)***
			Male gender	**0.97** (0.95-1.00)*
			Age (1 year increase)	
4	**Cockerham et al., 2006a**/Belarus, Kazakhstan, Russia, Ukraine/Cross-sectional (LLH)/ Belarus: 2000 m&w, Kazakhstan: 2000 m&w, Russia: 4006 m&w, Ukraine: 2400 m&w; Ages: 18+	Frequent drinking (≥2 /week)	*Males*	
			Married	**0.67** (0.50-0.91)**
			Females	
			Age 35-59 (vs. 18-34)	**0.48** (0.25-0.93)*
			Age 60+ (vs. 18-34)	**0.12** (0.3-0.48)**
		Habitual vodka drinker (>100g/sitting)	*Males*	
			Age 60+ (vs. 18-34)	**0.45** (0.23-0.92)*
5	**Cockerham et al., 2006b**/Belarus, Russia,Ukraine/Cross-sectional (LLH)/ Belarus: 2000 m&w; Russia: 4006 m&w; Ukraine:	Frequent drinking (≥2 /week)	Male gender	**9.60** (6.65-13.84)***
			Age (1 year increase)	**0.98** (0.98-0.99)***
			Married	**0.67**(0.51-0.88)**

	2400 m&w; Ages: 18+	Heavy vodka drinker (≥100g/sitting)	Male gender	**4.05** (2.68-6.12)***
			Age (1 year increase)	**0.98** (0.96-0.99)**
6	**Cook et al., 2011**/ Ishevsk, Russia/Cross-sectional/1005 m; Ages 25-59	Hazardous alcohol consumption (as measured by AUDIT)		*Regression coefficient* (p for linear trend = 0.03)
			Age	**0.68** (0.11-1.24)
				0.23 (-0.06-0.51)
			Age 25-29	**0.12** (-0.13-0.38)
			Age 30-34	**0.08** (-0.16-0.31)
			Age 35-39	**-0.10** (-0.30-0.10)
			Age 40-44	**0.02**(-0.17-0.20)
			Age 45-49	reference
			Age 50-54	
			Age 55-59	(p for linear trend = 0.001)
		Alcohol-related problems (as measured by AUDIT)	Age	**0.52** (-0.08-1.13)
				0.37 (0.06-0.68)
			Age 25-29	**0.29** (-0.02-0.57)
			Age 30-34	**0.31** (0.05-0.57)
			Age 35-39	**0.18** (-0.04-0.40)
			Age 40-44	**0.10** (-0.11-0.30)
			Age 45-49	reference
			Age 50-54	
			Age 55-59	
7	**Jukkala et al., 2008**/Moscow/Cross-sectional/ 1190 m&w; Ages: 18+	Binge drinking (men: ≥ 80g of ethanol per occasion; women: ≥ 60g of ethanol per occasion)	*Females*	**0.31** (0.18-0.56)***
			Married/co-habiting	**0.31** (0.15-0.66)**

8	**Helasoja et al., 2007**/Estonia, Latvia, Lithuania/Cross-sectional (5 surveys between 1994-2002)/ Estonia: 2650 m, 3621 w Latvia: 2665 m, 3441 w, Lithuania: 3571 m, 4395 w; Ages: 20+	Heavy drinking (men≥15 alcohol portions/week; women ≥5 alcohol portions/week	*Males* *Estonia:* Age 50-64 (vs. 20-34) *Latvia* Age 50-64 (vs. 20-34) *Lithuania* Age 50-64 (vs. 20-34) Divorced or widowed *Females* *Estonia:* Age 35-49 (vs. 20-34) Age 50-64 (vs. 20-34) *Latvia:* Age 50-64 (vs. 20-34) *Lithuania* Age 35-49 (vs. 20-34) Age 50-64 (vs. 20-34)	 **0.52** (0.37-0.75)*** **0.51** (0.36-0.73)*** **0.44** (0.32-0.62)*** **1.41** (1.00-1.98)*** **0.68** (0.51-0.89)*** **0.41**(0.29-0.57)*** **0.33**(0.24-0.44)*** **0.78** (0.63-0.98)*** **0.35** (0.26-0.48)***
		Binge drinking (men ≥6 portions/occasion at least once/week; women ≥6 portions/occasion at least once/month)	*Males* *Estonia:* Single/divorced/widowed *Females* *Estonia:* Age 50-64 *Latvia:* Age 50-64	 **1.77** (1.24-2.52)** **0.51** (0.31-0.83)* **0.39** (0.28-0.54)***

			Lithuania:	
			Age 39-49	**0.67** (0.50-0.89)**
			Age 50-64	**0.53** (0.39-0.76)**
9	**Hinote, B.P. et al., 2009**/ Armenia, Belarus,Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Ukraine/ Cross-sectional (LLH)/10.454 w; Ages: 18+	Frequent alcohol consumption (daily or more)	Armenian (vs.Russian)	**0.34** (0.24-0.47)***
			Georgian	**0.22** (0.14-0.35)***
			Kazakh	**0.53** (0.35-0.78)**
			Kyrgyz	**0.14** (0.08-0.25)***
			Moldovan/Romanian	**1.64** (1.28-2.10)***
			Other	**0.56** (0.42-0.76)***
			Age 35-59 (vs. 18-34)	**0.61** (0.52-0.72)***
			Age 60+ (vs. 18-34)	**0.21** (0.16-0.28)***
			Married (vs. unmarried/divorced/widowed)	**0.84** (0.72-0.98)*
		Frequent wine consumption (daily or more)	Armenian	**0.28** (0.16-0.47)***
			Kazakh	**0.24** (0.12-0.49)***
			Kyrgyz	**0.24** (0.12-0.48)***
			Romanian/Moldovan	**0.34** (0.21-0.56)***
			Age 35-59 (vs. 18-34)	**0.40** (0.32-0.49)***
			Age 60+ (vs. 18-34)	**0.10** (0.06-0.18)***
			Married (vs. unmarried/divorced/widowed)	**0.81** (0.66-0.99)*
		Frequent beer consumption (daily or more)		**2.07** (1.44-2.98)***
			Belarusian	**2.79** (1.63-4.78)***
			Georgian	**0.17** (0.04-0.70)*
			Kyrgyz	**7.69** (5.57-10.62)***
				1.80 (1.28-2.55)***

			Moldovan/Romanian Ukrainian	
10	**McKee et al., 2000**/Estonia, Latvia, Lithuania/ Cross-sectional/Estonia: 901 m, 1109 w, Latvia: 1055 m, 1203 w, Lithuania: 979 m, 1160w; Ages: 19-64	Frequency of alcohol consumption (at least once/week)	*Males* *Estonia:* Age 50-64 (vs.19-34) Russian nationality (vs. native) 'Other' nationality (vs. native) *Latvia:* Age 50-64 (vs. 19-34) *Lithuania:* Age 35-49 (vs. 19-34) Age 50-64 (vs. 19-34) 'Other' nationality (vs. native) *Females* *Estonia:* Age 35-49 (vs. 19-34) Age 50-64 (vs. 19-34) Russian nationality (vs. native) 'Other' nationality (vs. native) *Latvia:* Age 50-64 (vs. 19-34) *Lithuania:* Age 35-49 (vs. 19-34) Age 50-64 (vs. 19-34) Russian nationality (vs. native)	 **0.37** (0.25-0.54) **0.51** (0.36-0.71) **0.43** (0.24-0.77) **0.52** (0.38-0.73) **0.69** (0.50-0.95) **0.41** (0.28-0.59) **1.77** (1.03-3.05) **0.67** (0.49-0.91) **0.18** (0.11-0.29) **0.57** (0.39-0.81) **0.40** (0.19-0.85) **0.25** (0.13-0.47) **0.63** (0.41-0.93) **0.32** (0.19-0.55) **2.34** (1.32-4.14)

11	**Parna et al., 2010**/Estonia/Cross-sectional/ 4239 m, 6101 w; Ages: 25-64	Consumption of any type of alcohol at least once a week	*Males*	
			Age 35-44 (vs. 25-34)	**1.44** (1.13-1.83)
			Widowed	**0.41** (0.20-0.84
			Ethnic minority	**0.53** (0.44-0.63)
			Study year	
			2002	**0.75** (0.56-1.00)
			2004	**1.39** (1.08-1.80)
			2006	**0.64** (0.50-0.83)
			Females	
			Age 35-44 (vs. 25-34)	**1.38** (1.10-1.74)
			Age 55-64 (vs. 25-34)	**0.60** (0.45-0.80)
			Divorced/separated	**0.77** (0.60-1.00)
			Widowed	**0.65** (0.43-0.99)
			Study year	
			2002	**0.60** (0.45-0.80)
			2006	**0.46** (0.36-0.59)
12	**Pomerleau, et al. 2008**/ Armenia, Belarus, Georgia, Kazakhstan, Kyrgystan, Moldova, Russia, Ukraine/Cross-sectional (LLH)/ 18, 428 m&w; Ages: 18+	Episodic heavy drinking (2 L or more of beer or 750g or more of wine or 200g or more of strong spirits on one occasion)	*Males*	
			Age 30-39 (vs. 18-29)	**1.22** (1.04-1.44)***
			Age 40-49 (vs. 18-29)	**1.36** (1.16-1.59)***
			Age 60+ (vs. 18-29)	**0.58** (0.49-0.69)***
			Single (vs. Married)	**0.78** (0.65-0.95)**
			Females	
			Age 50-59 (vs. 18-29)	**0.43** (0.27-0.68)***
			Age 60+ (vs. 18-29)	**0.12** (0.07-0.21)***
			Single (vs. Married)	**1.75** (1.21-2.53)**
			Separated/divorced/widowed	**1.73** (1.27-2.36)**

13	**Puska et al., 2003**/Estonia, Lithuania/ Cross-sectional (1994, 1996, 1998)/ Estonia: 1676 m, 2132 w, Lithuania: 2515 m, 3201 w; Ages: 20-64	Frequent strong alcohol consumption (men ≥1 time per week; women ≥ 2-3 times per month)	*Males* *Estonia:* Age 30-49 (vs. 20-34) *Lithuania:* Age 30-49 (vs. 20-34) Study year (1998 vs. 1994) *Females* *Estonia:* Age 50-64 (vs. 20-34) *Lithuania:* Age 30-49 (vs. 20-34) Age 50-64 (vs. 20-34)	 **1.51** (1.17-1.94) **1.42** (1.15-1.75) **0.80** (0.64-1.00) **0.47** (0.37-0.61)*** **0.62** (0.51-0.74) **0.35** (0.28-0.45)***
14	**Van Gundy et al., 2005**/ Moscow/Cross-sectional/380 m, 424 w; Ages: 18-60	Alcohol use index (score from 2-9 based on frequency and amount of alcohol consumed)	 Female gender	*Regression coefficient* **-1.576*****
15	**Webb et al., 2005**/Ukraine/Cross-sectional (WMH)/ 2126 m, 2499 w; Ages: 18+	Heavy alcohol use (men: ≥ 80g of ethanol in a typical drinking day or ≥ 60 3-4 days/week or ≥ 40 g nearly every day; women: ≥ 60g of ethanol in a typical drinking day or ≥ 45 3-4 days/week or ≥ 30 g nearly every day)	*Males* Age 26-34 (vs. 18-25) Age 35-54 (vs. 18-25) Parent of a child *Females* Age 35-54 (vs. 18-25) Age 55+ (vs. 18-25)	 **1.7** (1.1-2.4)** **1.4** (1.1-2.0)* **1.5** (1.1-2.0)* **0.6** (0.4-0.8)*** **0.1** (0.1-0.2)***
	Socio-economic variables			

1	**Bobak et al., 1999**/Russia/Cross-sectional (New Russia Barometer Survey (NRB))/ 731 m, 868 w; Ages: 18+	Drink alcohol >1 time per month	*Males* Unemployed	 **1.93** (1.14-3.26)*
		Drink ≥0.25l of vodka more than once a month	*Males* Unemployed	 **2.19** (1.24-3.87)**
2	**Bromet, et al., 2005**/ Ukraine/Cross-sectional (WMH)/ 1791 m, 2934 w; Ages: 18+	DSM-IV defined alcohol disorder (with or without dependence)	Primary education (vs. Higher) Secondary education (vs. Higher) Unemployed Homemaker Student Retired Inadequate financial status (vs. adequate) Very inadequate financial status	**0.45** (0.30-0.69)*** **1.92** (1.44-2.57)*** **1.34** (1.00-1.78)* **0.38** (0.22-0.66)*** **0.44** (0.22-0.85)* **0.35**(0.27-0.45)*** **0.64** (0.50-0.84)** **0.50** (0.37-0.67)***
3	**Carlson, P. & Vagero, D**./ Taganrog, Russia/Cross-sectional/ 1079 m, 1293 w; Ages: 25-54	Heavy drinking (≥ 160g of pure alcohol/week)	*Males* Specialized secondary education (vs. Higher) Common secondary (vs. Higher) Incomplete secondary (vs. Higher) Lowest 33% income (vs. Highest 33%) Normal, peaceful family relations (vs. Good) Strained, nervous Quarrels, conflicts	 **1.66** (1.09-2.54) **1.69** (1.06.2.68) **2.49** (1.42-4.35) **0.67** (0.47-0.97) **1.48** (1.05-2.09) **2.53** (1.60-4.00) **5.68** (2.31-13.98)
4	**Cockerham et al., 2002**/Russia/Cross-sectional data (1998) from Russian Longitudinal Monitoring	Any alcohol consumption	Education (increase in category) Income (increase in category) Employed	**1.13** (1.10-1.16)*** **1.25** (1.19-1.32)*** **1.78** (1.59-1.98)***

	Survey/8701 m&w; Age 18+			
5	**Cockerham et al., 2004**/Kazakhstan, Kyrgystan/Cross-sectional (Living Conditions, Lifestyles and Health Study (LLH))/ Kazakhstan: 2000 m&w, Kyrgystan: 2000 m&w; Ages: 18+	Heavy vodka drinker (≥100g/sitting)	*Kazakhstan & Kyrgyzstan combined* Occupation (increase in 'skill' level)	 **0.68** (0.50-0.94)*
6	**Cockerham et al., 2006a**/Belarus, Kazakhstan, Russia, Ukraine/Cross-sectional (LLH)/ Belarus: 2000 m&w, Kazakhstan: 2000 m&w, Russia: 4006 m&w, Ukraine: 2400 m&w; Ages: 18+	Frequent drinking (≥2 /week)	*Females* Secondary vocational education (vs.Primary) Disposable income just enough for food & clothing (vs. not enough for nutrition)	 **0.34** (0.15-0.81)* **0.33** (0.14-0.75)**
7	**Cockerham et al., 2006b**/Belarus, Russia,Ukraine/Cross-sectional (LLH)/ Belarus: 2000 m&w; Russia: 4006 m&w; Ukraine: 2400 m&w; Ages: 18+	Frequent drinking (≥2 /week)	Manager/Professional	**0.58** (0.36-0.95)*
8	**Cook et al., 2011**/ Ishevsk, Russia/Cross-sectional/1005 m; Ages 25-59	Hazardous alcohol consumption (as measured by AUDIT)	 Employment In regular paid employment In irregular paid employment	*Regression coefficient* (p for heterogeneity = 0.001) reference **0.03** (-0.29-0.35) **0.59** (0.26-0.91)

			Unemployed seeking work	**-0.27** (-0.55--0.01)
			Unemployed not seeking work	**-0.47** (-1.21-0.28)
			Other	
		Alcohol-related problems (as measured by AUDIT)	Employment	(p for heterogeneity = 0.003)
				reference
			In regular paid employment	**0.11** (-0.23-0.44)
			In irregular paid employment	**0.66** (0.31-1.00)
			Unemployed seeking work	**-0.11** (0.43-0.20)
			Unemployed not seeking work	**0.34** (-1.21-0.54)
			Other	
9	**Jukkala et al., 2008**/Moscow/Cross-sectional/ 1190 m&w; Ages: 18+	Binge drinking (men: ≥ 80g of ethanol per occasion; women: ≥ 60g of ethanol per occasion)	*Males*	
			2-4 economic problems (vs.0-1)	**1.67** (1.06-2.63)*
			Secondary education (vs. High)	**1.86** (1.15-3.02)*
			Females	
			Secondary education (vs. High)	**2.15** (1.03-4.50)*
			Married/co-habiting	**0.31** (0.15-0.66)**
10	**Helasoja et al., 2007**/Estonia, Latvia, Lithuania/Cross-sectional (5 surveys between 1994-2002)/ Estonia: 2650 m, 3621 w, Latvia: 2665 m, 3441 w, Lithuania: 3571 m, 4395 w; Ages: 20+	Heavy drinking (men≥15 alcohol portions/week; women ≥5 alcohol portions/week	*Males*	
			Latvia:	
			Intermediate education (vs. High)	**1.43** (1.00-2.02)
			Low education (vs. High)	**1.50** (1.00-2.26)
			Females	
			Estonia:	
			Low education (vs. High)	**0.60**(0.38-0.92)*

			Latvia:	
			Intermediate education (vs. High)	**1.41** (1.09-1.82)*
			Low education (vs. High)	**1.60**(1.13-2.26)*
			Lithuania:	
			Low education (vs. High)	**0.60** (0.40-0.91)**
		Binge drinking (men ≥6 portions/occasion at least once/week; women ≥6 portions/occasion at least once/month)	*Males*	
			Estonia:	
			Intermediate Education (vs. High)	**1.68** (1.11-2.54)**
			Latvia:	
			Intermediate Education (vs. High)	**1.66 (**1.20-2.29)**
			Low education (vs. High)	**1.75**(1.20-2.55)**
			Females	
			Estonia:	
			Low education (vs. High)	**2.09** (1.09-4.01)
			Latvia:	
			Intermediate Education (vs. High)	**1.54** (1.14-2.09)**
			Low education (vs. High)	**2.05** (1.36-3.10)**
			Lithuania:	
			Low education (vs. High)	**1.60** (1.01-2.54)
11	**Hinote, B.P. et al., 2009**/ Armenia, Belarus,Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Ukraine/ Cross-sectional (LLH)/10,454 w; Ages: 18+	Frequent alcohol consumption (daily or more)	Income enough to buy tv/fridge but not car/flat (vs income not enough for nutrition)	**2.35** (1.81-3.04)***
			Income enough to purchase expensive goods	**2.63** (1.67-4.15)***
			Occupation 'other/none' (vs. skilled worker)	**0.77** (0.59-1.00)*

		Frequent beer consumption (daily or more)	Income enough to buy tv/fridge but not car/flat	**2.03** (1.42-2.90)***
			Agricultural/unskilled worker	**0.57** (0.39-0.83)**
			Manager/professional	**0.67** (0.48-0.93)*
		Frequent wine consumption (daily or more)	Income enough to buy tv/fridge but not car/flat	**2.16** (1.48-3.15)***
			Income enough to purchase expensive goods	**2.59** (1.36-4.95)**
			No education/Primary/Unfinished 2ndary (vs.2ndary)	**1.60** (1.05-2.43)*
			Agricultural/unskilled worker	**1.82** (1.24-2.67)**
12	**McKee et al., 2000**/Estonia, Latvia, Lithuania/ Cross-sectional/Estonia: 901 m, 1109 w, Latvia: 1055 m, 1203 w, Lithuania: 979 m, 1160w; Ages: 19-64	Frequency of alcohol consumption (at least once/week)	*Males*	
			Latvia:	
			Medium education (vs. low)	**0.59** (0.40-0.87)
			Medium income (vs. very low)	**1.88** (1.20-2.95)
			Lithuania:	
			High education (vs. low)	**1.48** (1.01-2.17)
			High income (vs. very low)	**1.52** (1.02-2.27)
			Females	
			Estonia:	
			High income (vs. very low)	**2.33** (1.31-4.15)
			Latvia:	
			Medium income (vs. very low)	**2.15** (1.03-4.47)
			High income (vs. very low)	**5.33** (2.44-11.61)
			Lithuania:	

			High income (vs. very low)	**3.07** (1.90-4.96)
13	**Parna et al., 2010**/Estonia/Cross-sectional/4239 m, 6101 w; Ages: 25-64	Consumption of any type of alcohol at least once a week	*Females* Secondary education (vs. Higher)	 **0.81** (0.67-0.98)
14	**Pomerleau, et al. 2008**/Armenia, Belarus, Georgia, Kazakhstan, Kyrgystan, Moldova, Russia, Ukraine/ Cross-sectional (LLH)/ 18, 428 m&w; Ages: 18+	Episodic heavy drinking (2 L or more of beer or 750g or more of wine or 200g or more of strong spirits on one occasion)	*Males* Unemployed and cannot find work *Females* 'Average' economic situation (vs. 'bad/very bad')	 **0.79** (0.67-0.93)** **0.74** (0.56-0.97)
15	**Rojas et al., 2008**/Taganrog, Russia/ Cross-sectional/523 m; Ages: 20-78	Binge drinking (among men who consumed alcohol at least once a week, those who consumed more than 19.19 cl of pure alcohol on one day of the weekend)	3 or more problems (vs. 0) on poverty index (abstention from activities, borrowing, etc.)	**7.66** (1.02-57.59)
16	**Tomkins et al., 2007**/Ishevsk, Russia/Cross-sectional/1750 m; Ages: 25-54	Ever consumed surrogates	Education: incomplete secondary or less Unemployed (non-invalid, non-ill) Neither car nor central heating (vs both)	**7.7** (3.2-18.5)*** **7.1** (4.7-10.7)*** **3.6** (1.8-7.1)***
		Had been on zapoi (extended period of drunkenness during which participant withdraws from normal life)	Education: incomplete secondary or less Unemployed (non-invalid, non-ill) Neither car nor central heating (vs both)	**5.2** (2.3-11.8)*** **8.2** (5.6-11.9)*** **2.0** (1.1-3.7)***
		Had a hangover frequently	Education: incomplete secondary or less Unemployed (non-invalid, non-ill) Neither car nor central heating (vs	**3.7** (1.8-7.4)*** **3.7** (2.5-5.3)***

			both)	
				1.9 (1.1-3.2)**
			Unemployed (non-invalid, non-ill)	
		Drank spirits daily (vs. less frequently)		**4.0** (2.2-7.2)***
17	**Saburova et al., 2011**/Ishevsk, Russia/Qualitative Cross-sectional/proxy informants of 19 dead men aged 25-54	Alcohol related death (as reported by proxy informant)	Unstable employment	
			Culture of drinking in workplace (peer pressure, using alcohol as remuneration)	
18	**Webb et al., 2005**/Ukraine/Cross-sectional (WMH)/ 2126 m, 2499 w; Ages:18+	Heavy alcohol use (men: ≥ 80g of ethanol in a typical drinking day or ≥ 60 3-4 days/week or ≥ 40 g nearly every day; women: ≥ 60g of ethanol in a typical drinking day or ≥ 45 3-4 days/week or ≥ 30 g nearly every day)	*Males*	
			Unemployed (vs. out of labour force)	**1.9** (1.2-3.1)**
			Employed (vs. out of labour force)	**1.7** (1.0-2.7)*
			Females	
			Unemployed (vs. out of labour force)	**2.2** (1.2-3.9) *
			Employed (vs. out of labour force)	**1.6** (1.0-2.5) *
	Psycho-social and health-related variables			
1	**Bobak et al., 1999**/Russia/Cross-sectional (NRB)/731 m, 868 w; Ages: 18+	Drink alcohol >1 time per month	*Males*	
			Smoker	**1.88** (1.37-2.57)***
			Females	
			Smoker	**3.57** (2.18-5.84)***
			Poor self-rated health	**0.26** (0.08-0.8)*
		Drink ≥0.25l of vodka more than once a month	*Males*	
			Smoker	**2.16** (1.51-3.09)***

			Very poor self-rated health	**4.84** (1.17-20.0)*
			Females	
			Smoker	**10.0** (4.29-23.6)***
2	**Cockerham et al., 2002**/Russia/Cross-sectional data (1998) from Russian Longitudinal Monitoring Survey/8701 m&w; Age 18+	Any alcohol consumption	Pro-socialist (vs Anti-socialist)	**0.72** (0.65-0.80)***
		Frequent alcohol consumption (≥4/week)	Pro-socialist (vs Anti-socialist)	**1.48** (1.03-2.13)*
3	**Cockerham et al., 2006a**/Belarus, Kazakhstan, Russia, Ukraine/Cross-sectional (LLH)/ Belarus: 2000 m&w, Kazakhstan: 2000 m&w, Russia: 4006 m&w, Ukraine: 2400 m&w; Ages: 18+		*Males*	
		Frequent drinking (≥2 /week)	Distress (measured by a set of 12 psychological symptoms)	**1.09** (1.04-1.14)***
4	**Cockerham et al., 2006b**/Belarus, Russia, Ukraine/Cross-sectional (LLH)/ Belarus: 2000 m&w; Russia: 4006 m&w; Ukraine: 2400 m&w; Ages: 18+	Heavy vodka drinker (≥100g/sitting)	Pro-communist ideology	**1.65** (1.09-2.5)*
5	**Hinote, B.P. et al., 2009**/ Armenia, Belarus,Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Ukraine/ Cross-sectional (LLH)/10.454 w; Ages: 18+	Frequent alcohol consumption (daily or more)	3-6 symptoms of psychological distress (vs 0-2)	**1.23** (1.03-1.46)*
			Disagree with communist political ideology	**1.41** (1.14-1.74)**
		Frequent beer consumption (daily or more)	Disagree with communist political ideology	

		Frequent wine consumption (daily or more)	Disagree with communist political ideology	**1.33** (1.01-1.74)* **1.64** (1.19-2.27)**
6	**Jukkala et al., 2008**/Moscow/Cross-sectional/ 1190 m&w; Ages: 18+	Binge drinking (men: ≥ 80g of ethanol per occasion; women: ≥ 60g of ethanol per occasion)	*Females* Regular contact with friends	**2.16** (1.02-4.60)*
7	**Perlman et al., 2003**/Russia/Cross-sectional/731 m, 868 w; Ages: 18+	Regular drinking (drinking alcohol several times a week)	*Males* Agreement with the statement: "Keeping healthy depends on things I can do myself" " There are certain things I can do for myself to reduce the risk of a heart attack"	 **0.50** (0.29-0.85) **0.47** (0.27-0.83)
8	**Pomerleau, et al. 2008**/Armenia, Belarus, Georgia, Kazakhstan, Kyrgystan, Moldova, Russia, Ukraine/Cross-sectional (LLH)/ 2000 m&w from each country; Ages: 18+	Episodic heavy drinking (2 L or more of beer or 750g or more of wine or 200g or more of strong spirits on one occasion)	*Males* Agree with the statement: "we could live better if the Communist system would be restored" Current smoker Weekly drinker Frequent drinker 'Quite good' perceived health 'Bad' perceived health	 **1.14** (1.01-1.29)* **2.60** (2.31-2.93)*** **58.26** (45.76-74.19)*** **74.30** (56.55-97.62)*** **1.16** (1.02-1.33)*** **0.57** (0.45-0.74)*** **6.57** (5.01-8.62)***

			Females	**75.93** (48.96-117.76)***
			Current smoker	
			Weekly or frequent drinker	
9	**Van Gundy et al., 2005**/Moscow/Cross-sectional/380 m, 424 w; Ages: 18-60	Alcohol use index (score from 2-9 based on frequency and amount of alcohol consumption)		*Regression coefficient*
			Masculinity (identification with Masculine traits)	**-0.541***
			Female x Masculine (interaction of female gender with masculine traits)	**0.808****
	Contextual variables			
1	**Cockerham et al., 2004**/Kazakhstan, Kyrgystan/Cross-sectional (Living Conditions, Lifestyles and Health Study (LLH))/ Kazakhstan: 2000 m&w, Kyrgystan: 2000 m&w; Ages: 18+	Frequent drinking (≥2 /week)	*Kazakhstan & Kyrgyzstan combined*	
			Kazakhstan	**2.19** (1.46-3.3)***
		Heavy vodka drinker (≥100g/sitting)	*Kazakhstan & Kyrgyzstan combined*	
			Kazakhstan	**2.79** (1.34-5.77)**
2	**Cockerham et al., 2006b**/Belarus, Kazakhstan, Russia, Ukraine/Cross-sectional (LLH)/ Belarus: 2000 m&w, Kazakhstan: 2000 m&w, Russia: 4006 m&w, Ukraine: 2400 m&w; Ages: 18+	Frequent drinking (≥2 /week)	*Males*	
			Kazakhstan	**0.49** (0.32-0.77) **
		Habitual vodka drinker (>100g/sitting)	*Males*	
			Kazakhstan	**4.11** (1.42-11.90)**
			Ukraine	**0.48** (0.29-0.81)**
			Females	

			Ukraine	**0.41**(0.19-0.88)*
3	**Cockerham et al., 2006a**/Belarus, Russia,Ukraine/Cross-sectional (LLH)/ Belarus: 2000 m&w; Russia: 4006 m&w; Ukraine: 2400 m&w; Ages: 18+	Frequent drinking (≥2 /week)	Belarus	**1.37** (1.01-1.86)*
		Heavy vodka drinker (≥100g/sitting)	Ukraine	**0.47** (0.31-0.71)***
4	**Helasoja et al., 2007**/Estonia, Latvia, Lithuania/Cross-sectional (5 surveys between 1994-2002)/ Estonia: 2650 m, 3621 w Latvia: 2665 m, 3441 w, Lithuania: 3571 m, 4395 w; Ages: 20+	Heavy drinking (men≥15 alcohol portions/week; women ≥5 alcohol portions/week	*Males* *Latvia:* Level of urbanisation (Towns) *Females* *Estonia:* Level of urbanisation (Towns) *Latvia:* Level of urbanisation (Villages) *Lithuania:* Level of urbanisation (Towns)	 **0.74** (0.58-0.95)* **0.56** (0.44-0.71)*** **0.70**(0.54-0.89)** **0.79** (0.63-1.00)
		Binge drinking (men ≥6 portions/occasion at least once/week; women ≥6 portions/occasion at least once/month)	*Females* *Latvia:* Level of urbanisation (Villages)	 **0.74** (0.55-0.99)
5	**Pomerleau, et al. 2008**/Armenia, Belarus, Georgia, Kazakhstan, Kyrgystan, Moldova, Russia, Ukraine/Cross-sectional (LLH)/ 2000 m&w from each country; Ages: 18+	Episodic heavy drinking (2 L or more of beer or 750g or more of wine or 200g or more of strong spirits on one occasion)	*Males* Armenia (vs. Russia) Kyrgystan (vs. Russia) Moldova (vs. Russia) *Females*	 **0.45** (0.36-0.56)*** **0.26** (0.20-0.33)*** **0.35** (0.28-0.43)***

			Armenia (vs. Russia)	**0.10** (0.04-0.24)***
			Georgia (vs. Russia)	**0.43** (0.26-0.70)***
			Kyrgystan (vs. Russia)	**0.35** (0.21-0.57)***
			Moldova (vs. Russia)	**0.33** (0.19-0.57)***
			Ukraine (vs. Russia)	**0.56** (0.37-0.86)***
6	**Puska et al., 2003**/Estonia, Lithuania/ Cross-sectional (1994, 1996, 1998)/ Estonia: 1676 m, 2132 w, Lithuania: 2515 m, 3201 w; Ages: 20-64	Frequent strong alcohol consumption (men ≥1 time per week; women ≥ 2-3 times per month)	*Females*	
			Estonia:	
			Place of residence: village (vs. city)	**0.76** (0.61-0.96)
			Lithuania:	
			Place of residence: town (vs. city)	**0.66** (0.54-0.81)***
			Place of residence: village (vs. city)	**0.66** (0.54-0.81)***
7	**Webb et al., 2005**/Ukraine/Cross-sectional (WMH)/ 2126 m, 2499 w; Ages: 18+	Heavy alcohol use (men: ≥ 80g of ethanol in a typical drinking day or ≥ 60 3-4 days/week or ≥ 40 g nearly every day; women: ≥ 60g of ethanol in a typical drinking day or ≥ 45 3-4 days/week or ≥ 30 g nearly every day)	*Males*	
			Southeast region of Ukraine	**1.4** (1.1-1.9)*
			Females	
			Southeast region of Ukraine	**2.2** (1.4-3.5)**

Appendix 4: Prevalence estimates reported in included studies, by type of independent variable

	Paper/Location/Study type/Sample	**Outcome measure**	**Independent Variables**	**Prevalence of outcome (%)** *(CI or SE if reported)* *p<0.05,**p<0.01,***p<0.001
	Demographic characteristics			
1	**Malyutina et al., 2004**/ Novosibirsk, Russia/ Cross-sectional (WHO MONICA Study) (1994-1995)/ 1526 m, 1510 w; Ages:25-64	Age-adjusted prevalence of drinking alcohol at least 2 times/week	Males Females *Males* Marital Status Married Single Divorced Widowed	**16.1** **1.5** (p for heterogeneity = 0.02) **15.9** **6.3** **21.6** **29.0**
2	**Pakriev et al., 1998**/ Udmurtia, Russia/ Cross-sectional/487 m, 368 w; Ages: 18-65	Alcohol Dependence (based on Composite International Diagnostic Interview 1:1)	*Males* Age (years)*** 18-29 30-39 40-49 50-65 Marital Status** Married Divorced	**69.3** (2.9)*** **46.1** (7.8) **78.2** (4.5) **80.7** (4.2) **66.7** (7.5) **72.6** (3.0) **77.8** (15.7)

			Never married	**48.1** (10.1)
			Females	**3.7** (4.4)***
			Age (years)*	
			18-29	**2.2** (8.5)
			30-39	**2.3** (7.5)
			40-49	**9.3** (9.7)
			50-65	**2.6** (11.3)
3	**Perlman, 2010**/ Russia/Cross-sectional prevalence data from Russian Longitudinal Monitoring Survey (RLMS)/4142 m, 5678 w (in 2004, most recent reported year of data collection); Ages 18+	Frequent, heavy spirit drinking (>80g of samogon (home distilled spirits) or vodka, ≥ weekly)	*Males* *Age* 18-39 40-59 60+ *Females* *Age* 18-39 40-59 60+	*In 2004(most recent reported year)* **14.5** (13.6-15.5) **15.8** (14.8-16.9) **11.7** (10.0-13.5) **1.8** (1.4-2.2) **1.3** (1.1-1.6) **0.8** (0.7-0.9)
		Drinking samogon, any quantity	*Males* *Age* 18-39 40-59 60+	 **9.9** (8.5-11.2) **12.7** (11.3-14) **16.1** (14.0-18.2)

			Females *Age* 18-39 40-59 60+	 **2.6** (2.0-3.1) **3.6** (3.1-4.2) **2.6** (2.4-2.8)
4	**Treisman, D. 2010**/ Russia/Cross-sectional data from RLMS/10499 m&w (in 2002, most recent reported year of data collection); Ages 20+	Frequent drinking (drinking alcohol at least once a week during previous 30 days) Bingeing (drinking ≥80g of vodka, home brew or other hard liquor in 1 day)	Males Females Over 50 years 20-50 years Males Females Over 50 years 20-50 years	**41** **13** **18** **32** **40** **16** **28** **40**
	Socio-economic variables			
1	**Malyutina et al., 2004**/ Novosibirsk, Russia/ Cross-sectional (WHO MONICA Study) (1994-1995)/ 1526 m, 1510 w; Ages:25-64	Age-adjusted prevalence of drinking alcohol at least 2 times/week Binge drinking (at least 80g of ethanol for men, at least 60 g or ethanol for women) at least once a month	 *Males* Education Primary Secondary Higher secondary University *Males*	*Prevalence (%)* (p for trend = 0.03) **17.2** **18.0** **17.6** **11.2**

			Education	(p for trend = <0.001)
			Primary	**56.5**
			Secondary	**52.3**
			Higher secondary	**52.0**
			University	**41.2**
			Females	
			Education	(p for trend = <0.001)
			Primary	**12.3**
			Secondary	**13.1**
			Higher secondary	**9.23**
			University	**1.46**
2	**Pakriev et al., 1998**/ Udmurtia, Russia/ Cross-sectional/487 m, 368 w; Ages: 18-65	Alcohol Dependence (based on Composite International Diagnostic Interview 1:1)		*Prevalence % (SE)*
			Males	
			Occupational Status*	
			Worker	**73.4** (3.1)
			Employee	**57.1** (9.4)
			Retired	**57.1** (12.4)
			Unemployed	**76.9** (13.3)
			Females	
			Education**	
			Higher	**0.0** (0.0)
			Secondary	**3.0** (5.4)
			Lower secondary	**10.1** (10.7)
			Occupational Status***	
			Worker	**9.3** (11.9)
			Employee	**0.0** (0.0)

			Retired Unemployed	**1.8** (13.3) **4.0** (19.6)
3	**Perlman, 2010**/ Russia/Cross-sectional prevalence data from RLMS/4142 m, 5678 w (in 2004, most recent reported year of data collection); Ages 18+	Frequent, heavy spirit drinking (>80g of samogon (home distilled spirits) or vodka, ≥ weekly)	*Males* *Education* Incomplete 2ndary Complete 2ndary Higher *Females* *Education* Incomplete 2ndary Complete 2ndary Higher	*In 2004(most recent reported year)* **17.4** (16.3-18.6) **13.6** (12.6-14.5) **10.9** (9.9-11.9) **2.9** (2.7-3.2) **1.3** (1.0-1.6) **0.9** (0.8-1.1)
		Drinking samogon, any quantity	*Males* *Education* Incomplete 2ndary Complete 2ndary Higher *Females* *Education* Incomplete 2ndary Complete 2ndary Higher	 **19** (17.3-20.7) **11.8** (10.6-13.0) **6.0** (4.6-7.5) **5.0** (4.7-5.3) **2.9** (2.3-3.5) **1.5** (1.2-1.8)

4	**Treisman, D. 2010**/ Russia/Cross-sectional data from RLMS/10499 m&w (in 2002, most recent reported year of data collection); Ages 20+	Frequent drinking (drinking alcohol at least once a week during previous 30 days)	Highest third income Middle third income Lowest third income	**24** **13** **13**
		Bingeing (drinking ≥80g of vodka, home brew or other hard liquor in 1 day)	Highest third income Middle third income Lowest third income	**42** **27** **17**
	Psycho-social and health-related variables			
1	**Treisman, D. 2010**/ Russia/Cross-sectional data from RLMS/10499 m&w (in 2002, most recent reported year of data collection); Ages 20+	Frequent drinking (drinking alcohol at least once a week during previous 30 days)	Completely satisfied with present life Completely dissatisfied with present life Very worried about losing job Not worried at all about losing job Cannot cope with problems Can cope with problems Feel helpless to face life problems Do not feel helpless to face life problems	**25** **22** **28** **37** **17** **29** **15**
		Bingeing (drinking ≥80g of vodka, home brew or other hard liquor in 1 day)	Completely satisfied with present life Completely dissatisfied with present life Very worried about losing job Not worried at all about losing job	**33** **28** **33**

			Cannot cope with problems Can cope with problems Feel helpless to face life problems Do not feel helpless to face life problems	**42** **42** **21** **34** **21** **35**
	Contextual variables			
1	**Perlman, 2010**/ Russia/Cross-sectional prevalence data from RLMS/4142 m, 5678 w (in 2004, most recent reported year of data collection); Ages 18+	Frequent, heavy spirit drinking (>80g of samogon (home distilled spirits) or vodka, ≥ weekly) Drinking samogon, any quantity	*Males* *Area* Urban Rural Moscow/St. Petersburg *Females* *Area* Urban Rural Moscow/St. Petersburg *Males* *Area* Urban	*In 2004(most recent reported year)* **13.5** (12.8-14.2) **14.3** (13.2-15.4) **11.2** (9.2-13.3) **1.3** (1.2-1.5) **1.5** (1.3-1.6) **1.2** (0.8-1.5) **10.3** (9.7-10.9) **18.3** (17.3-19.4)

			Rural Moscow/St. Petersburg *Females* *Area* Urban Rural Moscow/St. Petersburg	**2.8** (1.6-4.0) **2.2** (2.0-2.3) **5.6** (5.2-6.0) 0
2	**Treisman, D. 2010**/ Russia/Cross-sectional data from RLMS/10499 m&w (in 2002, most recent reported year of data collection); Ages 20+	Frequent drinking (drinking alcohol at least once a week during previous 30 days) Bingeing (drinking ≥80g of vodka, home brew or other hard liquor in 1 day)	City/town/urban settlement Countryside City/town/urban settlement Countryside	**27** **20** **27** **25**

Appendix 5: Community Observation Form used in the HITT study, 2010

COMMUNITY PROFILE DESCRIPTIVE FORM
IN THE FRAMEWORKS OF THE RESEARCH PROJECT
HEALTH IN TRANSITION

Part A

Name of the Country

1 = Armenia
2 = Azerbaijan
3 = Belarus
4 = Georgia
5 = Kazakhstan
6 = Kyrgyzstan
7 = Moldova
8 = Russia
9 = Ukraine

Name of the oblast_____

Name of the settlement_____

Code for primary sampling Unit : |_____|_____|_____|
(provided by the national head of the fieldworks)
If you are collecting information on a town or a village, please draw by hand a rough map of the surrounding area, indicating the approximate distance to the nearest large towns and cities.

Part B

There are various types of houses in the table. Please take photographs of up to four types of homes that you meet most often in this route of the mass-scale survey, and record the degree of their prevalence, where:
1. All the houses are of this type on the route.
2. The majority of houses are of this type.
3. The houses of this type are just a few.
4. There are single houses of this type.

	5.1 Type of home	5.2. Their prevalence degree				5.3 File name of photograph
1	Multi-storey apartment block	1	2	3	4	
2	Brick or concrete house with multiple families living in it	1	2	3	4	
3	Brick or concrete house with single family living in it	1	2	3	4	
4	Wooden house with multiple families living in it	1	2	3	4	
5	Wooden house with single family living in it	1	2	3	4	
6	Other	1	2	3	4	

What is the average cost of buying the following types of apartments/ houses? (Obtain costs for used housing at least 5 or more years old)
1 room apartment Cost_____ National currency units (e.g. roubles)
3 room apartment Cost_____ National currency units (e.g. roubles)
Average, by the cost, house for one family Cost_____ National currency units (e.g. roubles)

What types of roads predominate in this community?
All roads have paved surfaces 1
Most roads have paved surfaces 2
Most roads are dirt or gravel 3
All roads are dirt or gravel 4

Please take no more than 3 photographs of roads of various types, that you see in the community. If all the roads of the same type, take photographs of the road parts of different quality.

	File name of photograph
A	
B	
C	

What is the degree of accessibility of the following facilities for the people living in this community (part of the settlement)?

	Facility	It is a no more than 15-20 minutes walking distance	No, within an easy walk, but accessible within up to 30 minutes by car or public transport	One needs to go more than 30 minutes by car or public transport
A	Public park/ recreational area	1	2	3
B	State-run primary school	1	2	3
C	Private primary school	1	2	3
D	State-run high school	1	2	3
E	Private high school	1	2	3
F	Post office	1	2	3
G	Bank	1	2	3
H	Public library	1	2	3
J	Movie Theatre	1	2	3
K	Police station	1	2	3
L	State-owned sporting ground	1	2	3
M	Hospital	1	2	3
N	Policlinic, ambulance station, feldsher's station etc.	1	2	3
O	Private doctor's office (for adults)	1	2	3
P	Private doctor's office (for children)	1	2	3

Q	Pharmacy	1	2	3
R	University	1	2	3
S	Fast food outlets (e.g. McDonalds, Pizzeria, Kentucky Fried Chicken, cheburechnaya, belyashnaya)	1	2	3
T	A social welfare office for old people and peoples with disabilities	1	2	3
U	canteens, cafeterias, or other establishments where poor people could receive food for free	1	2	3

What kinds of communications does a household average for this part of the settlement use? (Mark all that apply)

		Yes	No
A	Fixed line telephone in the home	1	2
B	Mobile telephone	1	2
C	Fixed line telephone in the public, state institution, e.g. at a post office	1	2
D	Internet access at home	1	2
E	Internet access in the public, state institution, e.g. at a post office	1	2

What type of television programs would an average household watch in this neighbourhood? (Mark all that apply)

		Yes	No
A	Local television stations	1	2
B	Foreign television stations (from the ex-USSR countries)	1	2
C	From what neighbouring country?		
D	Foreign television stations (from other European countries and the USA)	1	2

Country codes:

1 = Armenia
2 = Azerbaijan
3 = Belarus
4 = Georgia
5 = Kazakhstan
6 = Kyrgyzstan
7 = Moldova
8 = Russia
9 = Ukraine

Approximately what proportion of homes in this part of the settlement have the following facilities?

	Facility	None	Less than 50%	More than 50% but not all	All
A	Mains electricity	1	2	3	4
B	Water supply	1	2	3	4
C	Hot water supply from central facility	1	2	3	4
D	Water heaters	1	2	3	4
E	Central steam heating	1	2	3	4
F	Garbage and waste collection by local authorities	1	2	3	4

Are laws prohibiting smoking in public places enforced?

Strongly enforced	1
Somewhat enforced	2
Not enforced	3
There are no such laws in the country	9

Are there any places where you can buy alcohol 24 hours in the day? (Mark all that apply)

Shops	1
Kiosks	2
A person on the street	3
Someone's private house	4

Part C. Observation walk

Date of community observation walk?
Day ☐☐/ Month ☐☐/ Year 2010

Time of observation walk? ☐☐: ☐☐ am/ pm

Location of start point of observation walk
1 = Central busy intersection
2 = Supermarket or a department store
3 = Market place
4 = Public building (post office, bus station etc.)
Specify, please _____

Length of walk? _____kilometres

Take photos from the start point of your observation walk (4 photos North, South, East, West)

A. Photo 1 file name_____ direction_____

B. Photo 2 file name_____ direction_____

C. Photo 3 file name_____ direction_____

D. Photo 4 file name_____ direction_____

Which best describes the completeness of sidewalks on your walking route?

Complete sidewalks on both sides	1
Complete sidewalk on one side	2
Partial sidewalk on either one or both sides	3
No sidewalk >>>> skip to Q 22	4

Take photos of the best and the worst sidewalks you see on your route

A. File name of the best sidewalk _____

B. File name of the worst sidewalk _____

Is any of the following present on your walking route? (mark all that apply)

Traffic lights 1
Pedestrian bridges 2
Pedestrian underpasses 3
Other marked pedestrian crossing points (with no traffic lights) 4

What portion of your walking route has street lighting?

All the route has lighting 1
Most part of the route 2
Lesser part of the route 3
No street lighting 4

Count the number of advertisement you see and mark down in each category.
(Advertisements include that on billboards, pasted on shop windows, bus shelters or other locations that is easily visible from the street.)

Advertisement/ sign	Tally	Total number
Cigarette/ tobacco product		
Alcohol (wine)		
Alcohol (beer)		
Alcohol (spirits)		
Fast food (such as burgers, fries – fried potatoes, fried fish, chebureki, belyashi etc.)		
Snacks: Sweets, chocolate, biscuits, crisps, dentils etc.		
Sweet fizzy carbonated drinks		
Sweet drinks (juices, except for the tomato juice)		
Signs that prohibit smoking		

Count the number of shops/ vendors/ outlets you see that sell the following and mark down in each category.

Outlets	Tally	Total number
Vending machine (cigarettes)		
Vending machine (Sweet drinks)		
Vending machine (sweets or chocolates)		

Shops or other outlets selling cigarettes		
Shops or other outlets selling sweets, biscuits or crisps		
Shops or other outlets selling alcohol		
Shops or other outlets selling fruit & vegetables		
Restaurants and cafes (local food)		
Restaurants and cafes (international food)		

On your walk, did you see anywhere that sold cigarettes singly?
Yes 1
No 2

What was the most commonly advertised brand of cigarettes advertised along your walk? (enter "0" if you saw no cigarette advertisements)
_____

Take photographs of a typical cigarette advertisement and a display of cigarettes on sale in a shop or kiosk

a. Advertisement: File name: _____

b. Display: File name: _____

Collect the costs of the following items.
Record the cost of the cheapest and most expensive type of each. If only one type available mark the cost in the first column under cheapest type and note '0' in the second column. If item is not available at all note '0' in all columns.

	Product	Cost of cheapest item	Code of Store at which cost obtained	Cost of most expensive item	Code of Store at which cost obtained
A	Apples (1kg)				
B	Oranges (1kg)				
C	Bananas (1kg)				
D	Pears (1kg)				
E	Carrots (1kg)				
F	Tomatoes (1kg)				
G	Potatoes (1kg)				
H	Cabbage (1kg)				
I	Liquid milk (1 litre)				
J	Low fat milk (1%-1,5%) (1 litre)				
K	Hard cheese (1kg)				

L	Margarine (a pack of 250 g)				
M	Vegetable oil (1litre)				
N	1 loaf white bread				
O	White rice (1kg)				
P	Egg (10 eggs)				
Q	Chicken (1 kg)				
R	Pork (1kg)				
S	Beef (1kg)				
T	Fish (1kg)				
U	Sugary fizzy drink (e.g. Coca cola/ Pepsi) (1 litre)				
V	Coca cola light/ Pepsi light (1 litre)				
W	Chocolate (100g)				
X	Cigarettes (without filter) (1 pack of 20 cigarettes)				
Y	Cigarettes, (with filter) (1 pack of 20 cigarettes)				
Z	Vodka (0.5L)				
AA	Bottled beer (0.5L)				
AB	Mineral water (1L)				
AC	Spirit-containing liquids for cosmetic or medical purposes (Yason, Tojan etc) (0.25 L)				

Store types codes:

Supermarket	1
Fruit and vegetable store	2
Marketplace	3
Small food shop	4
Tobacco shop	5
Alcohol shop	6
Kiosk	7
Other	8

Appendix 6: Correlation matrix of community factors

	24-h sale	Beer ads	Spirit ads	Wine ads	Vodka cost	Beer cost	Outlet density
24-h sale	1.0000						
Beer ads	-0.0425	1.0000					
Spirit ads	-0.1483	0.4495	1.0000				
Wine ads	0.0284	0.2451	0.4819	1.0000			
Vodka cost	0.0167	0.0448	0.0089	-0.0463	1.0000		
Beer cost	0.0173	0.3062	0.0482	0.0009	0.2332	1.0000	
Outlet density	0.0712	0.3329	0.1600	0.1039	-0.0663	0.0597	1.0000

Appendix 7: Association between community factors and hazardous alcohol consumption, HITT 2010

	CAGE			EHD		
	OR	CI	P-value	OR	CI	P-value
24-h sale (yes vs. no)	1.14	0.71-1.86	0.584	1.52	0.92-2.49	0.100
Beer ads (continuous, 0-45) converted to quartiles)	1.00	0.79-1.26	0.990	0.94	0.76-1.15	0.564
Spirit ads (continuous, 0-13) converted to quartiles)	1.20	0.99-1.45	0.067	1.19	0.97-1.47	0.101
Wine ads (continuous, 0-26) converted to quartiles)	1.04	0.88-1.25	0.626	0.99	0.82-1.21	0.958
Vodka cost (as a ratio of milk, converted to quartiles)	0.83	0.36-1.94	0.675	1.47	0.61-3.57	0.393
Beer cost (as a ratio of milk, converted to quartiles)	0.80	0.34-1.89	0.611	0.58	0.20-1.67	0.310
Outlet density (continuous, 0-30) converted to quartiles)	1.10	0.91-1.34	0.329	0.88	0.73-1.05	0.152

Adjusted for gender, age, education, marital status, occupation, smoking status, household economic status, place of residence (i.e. urban vs. rural), religion (i.e. Muslim vs. not) and country

Appendix 8: Mean factor score by country

Country	Mean factor score	SE
Armenia	0.150	0.059
Azerbaijan	-0.571	0.034
Belarus	-0.700	0.020
Georgia	0.380	0.045
Kazakhstan	-0.184	0.064
Kyrgyzstan	-0.202	0.062
Moldova	-1.24	0.041
Russia	0.020	0.027
Ukraine	0.445	0.053

Appendix 9: Social capital indicator questions and response options, HITT survey 2010

Social capital indicator	Survey question	Response options
Social isolation	*How often do you feel lonely?*	*1-Often; 2-Sometimes; 3-Rarely; 4- Never*
Active civic engagement	*i) Which of the following are you a member of?* *ii) Are you an active member of this organisation?*	*1-Church or religious organisation; 2-Sport or recreation organisation; 3-Art, music or education organisation; 4-Trade union; 5-Political party; 6-Professional association; 7-Charitable organisation; 8-Residents, neighbourhood organisation; 9-Non-governmental organisation; 10-Youth association; 11-Women's organisation;12-Other voluntary organisation; 13-Not a member of any organisation*
Help in a crisis	*Is there anyone who you can really count on to help you out in a crisis/in your most difficult moments?*	*1-Yes; 2-No*
Interpersonal trust	*What is the degree to which you agree with the statement that a majority of people can be trusted?*	*10-point scale where 10='definitely agree' and 1= 'absolutely disagree'.*

Appendix 10: Topic guide for semi-structured interviews

Interviewer: Hello my name is _____ . Thank you very much for agreeing to participate in this interview.

As you were told, we are here today from the School of Sociology at Kharkiv National University and we're interested in better understanding health and health behaviour among individuals in former Soviet countries, so the information we get from talking to you will be very valuable. This interview will be only very loosely structured so please feel free to go into as much detail as you'd like.

As you've also been told, your interview will be recorded but your identity will be kept strictly confidential so you should be encouraged to speak freely. You are also free to stop the interview at any time or refuse to answer any questions.

Are you ready for me to start recording?

(1) Individual information:

1. I'd like to start by getting to know you a little. Can you tell me a little about yourself and your work?

Prompts
- Can you tell me about your work here?
- What does your job involve?
- Does your work change week to week? How was it this week?
- Who do you work with?
- How closely do you work with others?
- What do you like/dislike about your job?
- How long have you worked at this job?
- How did you start working here?

2. Can you tell me about your relationships with your co-workers?

Prompts
- Are you friends with any of your co-workers?
- How important are your relationships with your co-workers?

(2) 'Group'-related social life

1. Now can you tell me a little about what you do after work?

Prompts
- Aside from family who do you normally socialize with?
- What do you normally do?
- When was the last time that you socialized with your co-workers?
- Can you tell me about it?

If drinking does not come up ask directly whether there is drinking involved
- When socializing, do your drink together?

When drinking has come up, probe for more information
- Does everybody drink? Are there exceptions

- Do you feel you have to drink as much or as regularly as everybody else?
- Is there somebody who drinks the most in your group? The least?
- How do you feel about that?
- How does the group feel about that?

(3) Social life outside of the 'group'

1. Now can you tell me a little about your life outside of work?

Prompts
- Do you socialize with family and friends outside of work?
- What do you normally do?
- When was the last time that you socialized with your friends or family outside of work?
- Can you tell me about it?

If drinking does not come up ask directly whether there is drinking involved
- When socializing, do your drink together?

When drinking has come up, probe for more information
- Does everybody drink? Are there exceptions
- Do you feel you have to drink as much or as regularly as everybody else?
- Is there somebody who drinks the most among your family/friends? The least?
- How do you feel about that?
- How do your family/friends feel about that?

(4) Perceptions of drinking

1. Now that we've talked a little about alcohol, can you tell me about your own thoughts on drinking?

Prompts
- Does alcohol affect your health/money/work/family situation in anyway?
- Would you like to drink more or less than you do or are you happy as you are? Why?
- Do you have concerns about others' drinking? Why? What can be done?
- Do you think the levels of drinking at work are acceptable or do you think they should change? Why or why not? If yes, what could be done?
- What do others think?
- What about at home?

These are all the questions that I have for now. Is there anything else you would like to bring up or ask about before we finish the interview? Are there any issues that I missed that you think are important?

REFERENCES

1. Dostoyevsky F. The Brothers Karamazov. New York: Harper; 1960.

2. Nemstov A. A Contemporary History of Alcohol in Russia. Huddinge, Sweden: Södertörns högskola; 2011.

3. Vågerö D. Alexandr Nemtsov's pioneering work on alcohol in modern Soviet and Russian history. A contemporary history of alcohol in Russia. Huddinge, Sweden: Södertörns högskola; 2011.

4. Nemtsov A. Russia: Alcohol yesterday and today. Addiction. 2005 Feb;100(2):146-9. PubMed PMID: 15679743.

5. McKee M. Alcohol in Russia. Alcohol and alcoholism. 1999 Nov-Dec;34(6):824-9. PubMed PMID: 10659717.

6. Stickley A, Razvodovsky Y, McKee M. Alcohol mortality in Russia: A historical perspective. Public health. 2009 Jan;123(1):20-6. PubMed PMID: 19084882.

7. Treml VG. Soviet and Russian statistics on alcohol consumption and abuse. In: Bobadilla L, Costello CA, Mitchell F, editors. Premature detah in the new independent states. Washington: National Academy Press; 1997.

8. Levels of Consumption: Recorded adult per capita consumption, from 1961, Total by country [Internet]. WHO. 2013 [cited 22 July 2013]. Available from: http://apps.who.int/gho/data/node.main.A1025?lang=en&showonly=GISAH.

9. Zaigraev GG, V. MA. Aktual'nye voprosy bor'by s samogonovareniem (Current issues in the struggle with samogon production). Moscow: Znanie; 1990.

10. Sheregi FE. *Prichiny i sotsial'nye posledstviya p'yanstva* [Causes and social consequences of drunkenness]. Sotsiologicheskie Issledovaniya. 1986;2:144-52.

11. Treml VG, Rutgers Center of Alcohol Studies. Alcohol in the USSR: A statistical study. Durham, N.C.: Duke University Press; 1982. xiii, 103 p. p.

12. White S. Russia goes dry: Alcohol, state and society. Cambridge: Cambridge University Press; 1996.

13. Nemtsov AV. Alcohol-related harm and alcohol consumption in Moscow before, during and after a major anti-alcohol campaign. Addiction. 1998 Oct;93(10):1501-10. PubMed PMID: 9926554.

14. Nemtsov AV. Estimates of total alcohol consumption in Russia, 1980-1994. Drug and alcohol dependence. 2000 Feb 1;58(1-2):133-42. PubMed PMID: 10669064.

15. Nemstov A. Uroven realnogo potrebleniya alkogol'ya v Rossiyskoii Federatsii. Sotsial`naya i Klinicheskaya Psikhiatriya 1992;2(46-53).

16. Bhattacharya J, Gathmann C, Miller G. The Gorbachev anti-alcohol campaign and Russia's mortality crisis. NBER working paper no. 185892012 14 June 2013. Available from: http://www.nber.org/papers/w18589.

17. Nemtsov A. Alcohol consumption level in Russia: a viewpoint on monitoring health conditions in the Russian Federation (RLMS). Addiction. 2003 Mar;98(3):369-70. PubMed PMID: 12603237. Epub 2003/02/27. eng.

18. Leifman H. The six-country survey of the European comparative alcohol study: Comparing patterns and assessing validity. Contemporary Drug Problems. 2002;29:477-500.

19. World Health Organization. Global status report on alcohol and health. Geneva: WHO; 2011. xii, 286p. p.

20. Rehm J, Ashley MJ, Room R, Single E, Bondy S, Ferrence R, et al. On the emerging paradigm of drinking patterns and their social and health consequences. Addiction. 1996 Nov;91(11):1615-21. PubMed PMID: 8972920.

21. Rehm J, Gmel G, Room R, Frick U. Average volume of alcohol consumption, drinking patterns and related burden of mortality in young people in established market economies of Europe. European addiction research. 2001 Aug;7(3):148-51. PubMed PMID: 11509845.

22. Rehm J, Monteiro M, Room R, Gmel G, Jernigan D, Frick U, et al. Steps towards constructing a global comparative risk analysis for alcohol consumption: Determining indicators and empirical weights for patterns of drinking, deciding about theoretical minimum, and dealing with different consequences. European addiction research. 2001 Aug;7(3):138-47. PubMed PMID: 11509844.

23. Pomerleau J, McKee M, Rose R, Haerpfer CW, Rotman D, Tumanov S. Hazardous alcohol drinking in the former Soviet Union: A cross-sectional study of eight countries. Alcohol and alcoholism. 2008 May-Jun;43(3):351-9. PubMed PMID: 18245818. Epub 2008/02/05. eng.

24. McKee M, Britton A. The positive relationship between alcohol and heart disease in eastern Europe: Potential physiological mechanisms. Journal of the Royal Society of Medicine. 1998;91(8):402-7.

25. Leon DA, Saburova L, Tomkins S, Andreev E, Kiryanov N, McKee M, et al. Hazardous alcohol drinking and premature mortality in Russia: A population based case-control study. Lancet. 2007 Jun 16;369(9578):2001-9. PubMed PMID: 17574092.

26. Gmel G, Rehm J, Kuntsche G. Heavy episodic drinking in Europe, definitions, epdemiology, and consequences. Sucht. 2003;49:105-16.

27. Brainerd E, Cutler DM. Autopsy on an Empire: Understanding mortality in Russia and the former Soviet Union. Cambridge, MA: National Bureau of Economic Research, 2004.

28. Leon DA, Chenet L, Shkolnikov VM, Zakharov S, Shapiro J, Rakhmanova G, et al. Huge variation in Russian mortality rates 1984-94: Artefact, alcohol, or what? Lancet. 1997 Aug 9;350(9075):383-8. PubMed PMID: 9259651.

29. Shkolnikov VM, Andreev EM, Leon DA, McKee M, Meslé F, Vallin J. Mortality reversal in Russia: The story so far. Hygiea Internationalis. 2004;4(4):29-80.

30. Zaridze D, Maximovitch D, Lazarev A, Igitov V, Boroda A, Boreham J, et al. Alcohol poisoning is a main determinant of recent mortality trends in Russia: Evidence from a detailed analysis of mortality statistics and autopsies. International journal of epidemiology. 2009 Feb;38(1):143-53. PubMed PMID: 18775875.

31. Leon DA. Trends in European life expectancy: A salutary view. International journal of epidemiology. 2011 Apr;40(2):271-7. PubMed PMID: 21415000.

32. McKee M, Leon DA. Social transition and substance abuse. Addiction. 2005 Sep;100(9):1205-9. PubMed PMID: 16128702.

33. Leon DA, Shkolnikov VM. Social stress and the Russian mortality crisis. JAMA : the journal of the American Medical Association. 1998 Mar 11;279(10):790-1. PubMed PMID: 9508158.

34. Shapiro J. The Russian mortality crisis and its causes. In: Aslund A, editor. Russian economic reform at risk. London: Pinter; 1995.

35. Cornia A, Paniccia R. The demographic impact of sudden impoverishment: Easter Europe durin gthe 1089-94 transition. 1995. In: UNICEF Innocenti Occasional Papers [Internet]. Florence, Italy: UNICEFEconomic Policy Studies.

36. Stuckler D, King L, McKee M. Mass privatisation and the post-communist mortality crisis: A cross-national analysis. Lancet. 2009 Jan 31;373(9661):399-407. PubMed PMID: 19150132. Epub 2009/01/20. eng.

37. Walberg P, McKee M, Shkolnikov V, Chenet L, Leon DA. Economic change, crime, and mortality crisis in Russia: Regional analysis. BMJ. 1998 Aug 1;317(7154):312-8. PubMed PMID: 9685275. Pubmed Central PMCID: 28623. Epub 1998/07/31. eng.

38. Marmot M, Wilkinson RG. Social determinants of health. Oxford: Oxford University Press; 1999.

39. Rhodes T. Risk environments and drug harms: A social science for harm reduction approach. Int J Drug Policy. 2009 May;20(3):193-201. PubMed PMID: 19147339. Epub 2009/01/17. eng.

40. Reilly RG, McKee M. 'Decipio': Examining Virchow in the context of modern 'democracy'. Public health. 2012 Apr;126(4):303-7. PubMed PMID: 22361438.

41. Canada Department of National Health and Welfare, Lalonde M. A new perspective on the health of Canadians; a working document. Ottawa: 1974.

42. World Health Organization. Declaration of Alma-Ata. Geneva: WHO; 1978.

43. Department of Health and Social Services. Inequalities in health: Report of a research working group (The Black Report). London: DHSS; 1979.

44. Whitehead M, Dahlgren G. What can be done about inequalities in health? Lancet. 1991 Oct 26;338(8774):1059-63. PubMed PMID: 1681366.

45. Marmot M. Social determinants of health inequalities. Lancet. 2005 Mar 19-25;365(9464):1099-104. PubMed PMID: 15781105.

46. Marmot MG. The status syndrome : how social standing affects our health and longevity. 1st American ed. New York: Times Books; 2004. 319 p. p.

47. Krieger N. Theories for social epidemiology in the 21st century: An ecosocial perspective. International journal of epidemiology. 2001 Aug;30(4):668-77. PubMed PMID: 11511581.

48. Rose GA. The strategy of preventive medicine. Oxford: Oxford University Press; 1992. xii, 138 p. p.

49. Galea S, Hall C, Kaplan GA. Social epidemiology and complex system dynamic modelling as applied to health behaviour and drug use research. Int J Drug Policy. 2009 May;20(3):209-16. PubMed PMID: 18930649. Pubmed Central PMCID: 2782722.

50. McMichael AJ. Prisoners of the proximate: loosening the constraints on epidemiology in an age of change. Am J Epidemiol. 1999 May 15;149(10):887-97. PubMed PMID: 10342797. Epub 1999/05/26. eng.

51. Glass TA, McAtee MJ. Behavioral science at the crossroads in public health: Extending horizons, envisioning the future. Soc Sci Med. 2006 Apr;62(7):1650-71. PubMed PMID: 16198467. Epub 2005/10/04. eng.

52. Galea S, Nandi A, Vlahov D. The social epidemiology of substance use. Epidemiol Rev. 2004;26:36-52. PubMed PMID: 15234946. Epub 2004/07/06. eng.

53. Kuo M, Wechsler H, Greenberg P, Lee H. The marketing of alcohol to college students: The role of low prices and special promotions. Am J Prev Med. 2003 Oct;25(3):204-11. PubMed PMID: 14507526. Epub 2003/09/26. eng.

54. Kwate NO, Meyer IH. Association between residential exposure to outdoor alcohol advertising and problem drinking among African American women in New York City. Am J

Public Health. 2009 Feb;99(2):228-30. PubMed PMID: 19059857. Pubmed Central PMCID: 2622787. Epub 2008/12/09. eng.

55. Kleinschmidt I, Hills M, Elliott P. Smoking behaviour can be predicted by neighbourhood deprivation measures. J Epidemiol Community Health. 1995 Dec;49 Suppl 2:S72-7. PubMed PMID: 8594138. Pubmed Central PMCID: 1060880. Epub 1995/12/01. eng.

56. Barrientos-Gutierrez T, Gimeno D, Mangione TW, Harrist RB, Amick BC. Drinking social norms and drinking behaviours: a multilevel analysis of 137 workgroups in 16 worksites. Occupational and environmental medicine. 2007 Sep;64(9):602-8. PubMed PMID: 17525095. Pubmed Central PMCID: 2092559.

57. Lambert SF, Brown TL, Phillips CM, Ialongo NS. The relationship between perceptions of neighborhood characteristics and substance use among urban African American adolescents. Am J Community Psychol. 2004 Dec;34(3-4):205-18. PubMed PMID: 15663207. Epub 2005/01/25. eng.

58. Beyers JM, Toumbourou JW, Catalano RF, Arthur MW, Hawkins JD. A cross-national comparison of risk and protective factors for adolescent substance use: The United States and Australia. Journal of Adolescent Health. 2004;35:3-16.

59. Weitzman ER, Kawachi I. Giving means receiving: The protective effect of social capital on binge drinking on college campuses. Am J Public Health. 2000 Dec;90(12):1936-9. PubMed PMID: 11111272. Pubmed Central PMCID: 1446447. Epub 2000/12/09. eng.

60. Putnam RD. Bowling Alone, Revisited. Responsive Community. 1995 Spr;5(2):18-33. PubMed PMID: ISI:A1995QT20300004. English.

61. Chuang YC, Chuang KY. Gender differences in relationships between social capital and individual smoking and drinking behavior in Taiwan. Soc Sci Med. 2008 Oct;67(8):1321-30. PubMed PMID: ISI:000260200800013. English.

62. Carpiano RM. Neighborhood social capital and adult health: An empirical test of a Bourdieu-based model. Health & place. 2007 Sep;13(3):639-55. PubMed PMID: 17084655. Epub 2006/11/07. eng.

63. Babor T. Alcohol: No ordinary commodity. Research and public policy. Oxford: Oxford University Press; 2010.

64. World Health Organization. Global strategy to reduce the harmful use of alcohol. Geneva: WHO; 2010.

65. McKee M. Substance use and social and economic transition. International Journal of Drug Policy. 2002;13:453-9.

66. Palosuo H. Health-related lifestyles and alienation in Moscow and Helsinki. Soc Sci Med. 2000;51(9):1325-41.

67. Cockerham WC, Hinote BP, Abbott P. Psychological distress, gender, and health lifestyles in Belarus, Kazakhstan, Russia, and Ukraine. Soc Sci Med. 2006;63(9):2381-94.

68. Bobak M, Pikhart H, Hertzman C, Rose R, Marmot M. Socioeconomic factors, perceived control and self-reported health in Russia. A cross-sectional survey. Soc Sci Med. 1998 Jul;47(2):269-79. PubMed PMID: 9720645. Epub 1998/08/28. eng.

69. Alcohol control database [Internet]. WHO. 2013 [cited 22 October 2013]. Available from: http://data.euro.who.int/alcohol/.

70. World Health Organization. Management of substance abuse: Country profiles Geneva: WHO; 2011 [17 Oct. 2013]. Available from: http://www.who.int/substance_abuse/publications/global_alcohol_report/profiles/en/.

71. Chikritzhs T, Catalonao P, Pascal R. Predicting alcohol-related harms from licensed outlet density: a feasibility study. . National Drug Law Enforcement Fund [Internet]. 2007 12 October 2013; (Series No 28). Available from: http://www.ndlerf.gov.au/pub/Monograph_28.pdf.

72. Anderson P, de Bruijn A, Angus K, Gordon R, Hastings G. Impact of alcohol advertising and media exposure on adolescent alcohol use: A systematic review of longitudinal studies. Alcohol and alcoholism. 2009 May-Jun;44(3):229-43. PubMed PMID: 19144976.

73. Gallet CA. The demand for alcohol: A meta-analysis of elasticities. Australian Journal of Agricultural and Resource Economics. 2007;51(2):121-35.

74. Anderson P, Baumberg B. Alcohol in Europe : a public perspective : a report for the European Commission. London: Institute of Alcohol Studies; 2006.

75. Fogarty J. The nature of the demand for alcohol: Understanding elasticity. British Food Journal. 2006;108:316-32.

76. Meier P. Modelling the potential impact of pricing and promotion Policy Model Version 2008 (1-1)2008 12 October 2013. Available from: http://www.dh.gov.uk/en/Publichealth/Healthimprovement/Alcoholmisuse/DH_4001740.

77. Cook PJ. Paying the tab: the economics of alcohol policy. Princeton: Princeton University Press; 2007. xiii, 262 p. p.

78. Kennedy BP, Kawachi I. The role of social capital in the Russian mortality crisis. World Development. 1998;26(11):2029-43.

79. Ewing J, Rouse B. Identifying the hidden alcoholic. 29th International Congress on Alcohol and Drug Dependence; Sydney1970.

80. Dhalla S, Kopec JA. The CAGE questionnaire for alcohol misuse: a review of reliability and validity studies. Clinical and investigative medicine Medecine clinique et experimentale. 2007;30(1):33-41. PubMed PMID: 17716538. Epub 2007/08/25. eng.

81. Mayfield D, McLeod G, Hall P. The CAGE questionnaire: validation of a new alcoholism screening instrument. The American journal of psychiatry. 1974 Oct;131(10):1121-3. PubMed PMID: 4416585. Epub 1974/10/01. eng.

82. Bernadt MW, Mumford J, Taylor C, Smith B, Murray RM. Comparison of questionnaire and laboratory tests in the detection of excessive drinking and alcoholism. Lancet. 1982 Feb 6;1(8267):325-8. PubMed PMID: 6120322. Epub 1982/02/06. eng.

83. Mason J. Qualitative researching. 2nd ed. London: Sage Publications; 2002. viii, 223 p. p.

84. Mason J. Mixing methods in a qualitatively driven way. Qualitative Research. 2006;6:9-25.

85. Schwandt TA. Dictionary of qualitative inquiry. 2nd ed. ed. Thousand Oaks, CA: Sage Publications; 2001.

86. Green J, Thorogood N. Qualitative methods for health research. London: Sage Publications; 2004.

87. Hammersley M. What is wrong with ethnography? : Methodological explorations. London: Routledge; 1992.

88. Lincoln YS, Guba EG. Naturalistic inquiry. Beverly Hills, Calif.: Sage Publications; 1985.

89. Mays N, Pope C. Qualitative research in health care. Assessing quality in qualitative research. BMJ. 2000 Jan 1;320(7226):50-2. PubMed PMID: 10617534. Pubmed Central PMCID: 1117321.

90. Finlay L. "Outing" the researcher: The provenance, process, and practice of reflexivity. Qualitative health research. 2002 Apr;12(4):531-45. PubMed PMID: 11939252.

91. Creswell JW. Qualitative inquiry and research design : choosing among five traditions. Thousand Oaks, CA: Sage Publications; 1998.

92. Sanderson CJ. Analytical models for decision-making. Maidenhead, UK: Open University Press; 2006.

93. Dahlgren G, Whitehead M. Policies and strategies to promote social equity in health. Copenhagen: WHO, 1991.

94. Solar O, Irwin A. A conceptual framework for action on the social determinants of health. Commission on the Social Determinants of Health; Geneva: WHO; 2007.

95. Commission on Social Determinants of Health. Closing the gap in a generation: Health equity through action on the social determinants of health. Final Report of the Commission on Social Determinants of Health. Geneva: WHO, 2008.

96. Kaplan GA. What is the role of the social environment in understanding inequalities in health? Ann N Y Acad Sci. 1999;896:116-9. PubMed PMID: 10681892. Epub 2000/02/22. eng.

97. Galea S, Ahern J, Vlahov D. Contextual determinants of drug use risk behavior: A theoretic framework. J Urban Health. 2003 Dec;80(4 Suppl 3):iii50-8. PubMed PMID: 14713671. Epub 2004/01/10. eng.

98. Dika SL, Singh K. Applications of social capital in educational literature: A critical synthesis. Review of Educational Research. 2002;72(1):31-60.

99. Bryden A, Roberts B, McKee M, Petticrew M. A systematic review of the influence on alcohol use of community level availability and marketing of alcohol. Health & place. 2012 Mar;18(2):349-57. PubMed PMID: 22154843.

100. Taylor AL, Chaloupka FJ, Guindon E, Corbett M. The impact of trade liberalization on tobacco consumption. In: Jha P, Chaloupka F, editors. Tobacco control in developing countries. Oxford: Oxford University Press; 2000. p. 343-64.

101. Pollack HA, Reuter P. Welfare receipt and substance-abuse treatment among low-income mothers: The impact of welfare reform. Am J Public Health. 2006 Nov;96(11):2024-31. PubMed PMID: 17018836. Pubmed Central PMCID: 1751816.

102. Heath AC, Martin NG. Genetic influences on alcohol consumption patterns and problem drinking: Results from the Australian NH&MRC twin panel follow-up survey. Ann N Y Acad Sci. 1994 Feb 28;708:72-85. PubMed PMID: 8154691.

103. Toth R, Fiatal S, Petrovski B, McKee M, Adany R. Combined effect of ADH1B RS1229984, RS2066702 and ADH1C RS1693482/ RS698 alleles on alcoholism and chronic liver diseases. Disease markers. 2011;31(5):267-77. PubMed PMID: 22048268.

104. Toth R, Pocsai Z, Fiatal S, Szeles G, Kardos L, Petrovski B, et al. ADH1B*2 allele is protective against alcoholism but not chronic liver disease in the Hungarian population. Addiction. 2010 May;105(5):891-6. PubMed PMID: 20219057.

105. Shkolnikov V, McKee M, Leon DA. Changes in life expectancy in Russia in the mid-1990s. Lancet. 2001 Mar 24;357(9260):917-21. PubMed PMID: 11289348. Epub 2001/04/06. eng.

106. World Health Organization. The World Health Report. Reducing Risks, Promoting Healthy Life. Geneva: World Health Organization, 2002.

107. Malyutina S, Bobak M, Kurilovitch S, Gafarov V, Simonova G, Nikitin Y, et al. Relation between heavy and binge drinking and all-cause and cardiovascular mortality in Novosibirsk, Russia: a prospective cohort study. Lancet. 2002 Nov 9;360(9344):1448-54. PubMed PMID: 12433511. Epub 2002/11/16. eng.

108. Stickley A, Leinsalu M, Andreev E, Razvodovsky Y, Vagero D, McKee M. Alcohol poisoning in Russia and the countries in the European part of the former Soviet Union, 1970

2002. Eur J Public Health. 2007 Oct;17(5):444-9. PubMed PMID: 17327281. Epub 2007/03/01. eng.

109. Room R, Jernigan D, Carlini-Marlatt B, Gureye O, Mäkelä K, Marshall M, et al. Alcohol in Developing Societies: A Public Health Approach. Geneva: World Health Organization; 2002.

110. Bobak M, Marmot M. East-West mortality divide and its potential explanations: proposed research agenda. BMJ. 1996 Feb 17;312(7028):421-5. PubMed PMID: 8601115. Pubmed Central PMCID: 2350098. Epub 1996/02/17. eng.

111. Shkolnikov V, Cornia G, Leon D, Mesle F. Causes of the Russian mortality crisis: Evidence and interpretations. World Development. 1998;26(11):1995-2011.

112. Bobak M, Pikhart H, Rose R, Hertzman C, Marmot M. Socioeconomic factors, material inequalities, and perceived control in self-rated health: cross-sectional data from seven post-communist countries. Soc Sci Med. 2000 Nov;51(9):1343-50. PubMed PMID: 11037221. Epub 2000/10/19. eng.

113. Thundal KL, Granbom S, Allebeck P. Women's alcohol dependence and abuse: the relation to social network and leisure time. Scand J Public Health. 1999 Mar;27(1):30-7. PubMed PMID: 10847668. Epub 2000/06/10. eng.

114. Dawson DA. The link between family history and early onset alcoholism: earlier initiation of drinking or more rapid development of dependence? J Stud Alcohol. 2000 Sep;61(5):637-46. PubMed PMID: 11022800. Epub 2000/10/07. eng.

115. Bernstein KT, Galea S, Ahern J, Tracy M, Vlahov D. The built environment and alcohol consumption in urban neighborhoods. Drug and alcohol dependence. 2007 Dec 1;91(2-3):244-52. PubMed PMID: 17644274. Epub 2007/07/24. eng.

116. Rose R. Russia as an hour-glass society: A constitution without citizens. East European Constitutional Review. 1995;4(3):34-42.

117. Rhodes T, Ball A, Stimson GV, Kobyshcha Y, Fitch C, Pokrovsky V, et al. HIV infection associated with drug injecting in the newly independent states, eastern Europe: the social and economic context of epidemics. Addiction. 1999 Sep;94(9):1323-36. PubMed PMID: 10615718. Epub 2000/01/01. eng.

118. Nicholson A, Bobak M, Murphy M, Rose R, Marmot M. Socio-economic influences on self-rated health in Russian men and women--a life course approach. Soc Sci Med. 2005 Dec;61(11):2345-54. PubMed PMID: 16140447. Epub 2005/09/06. eng.

119. Roberts B, Stickley A, Petticrew M, McKee M. The influence of concern about crime on levels of psychological distress in the former Soviet Union. J Epidemiol Community Health. 2012 May;66(5):433-9. PubMed PMID: 21036783. Epub 2010/11/03. eng.

120. von Elm E, Altman DG, Egger M, Pocock SJ, Gotzsche PC, Vandenbroucke JP. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE)

statement: guidelines for reporting observational studies. Lancet. 2007 Oct 20;370(9596):1453-7. PubMed PMID: 18064739. Epub 2007/12/08. eng.

121. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007 Dec;19(6):349-57. PubMed PMID: 17872937. Epub 2007/09/18. eng.

122. Liberati A, Altman DG, Tetzlaff J, Mulrow C, Gotzsche PC, Ioannidis JP, et al. The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: explanation and elaboration. BMJ. 2009;339:b2700. PubMed PMID: 19622552. Pubmed Central PMCID: 2714672. Epub 2009/07/23. eng.

123. Carlson P, Vågerö D. The social pattern of heavy drinking in Russia during transition: Evidence from Taganrog. European Journal of Public Health. 1998;8(4):280-5.

124. Pakriev S, Vasar V, Aluoja A, Shlik J. Prevalence of ICD-10 harmful use of alcohol and alcohol dependence among the rural population in Udmurtia. Alcohol & Alcoholism. 1998;33(3):255-64.

125. Bobak M, McKee M, Rose R, Marmot M. Alcohol consumption in a national sample of the Russian population. Addiction. 1999 Jun;94(6):857-66. PubMed PMID: 10665075.

126. McKee M, Pomerleau J, Robertson A, Pudule I, Grinberga D, Kadziauskiene K, et al. Alcohol consumption in the Baltic Republics. Journal of Epidemiology & Community Health. 2000;54(5):361-6.

127. Cockerham WC, Snead MC, Dewaal DF. Health lifestyles in Russia and the socialist heritage. J Health Soc Behav. 2002 Mar;43(1):42-55. PubMed PMID: 11949196. Epub 2002/04/16. eng.

128. Perlman F, Bobak M, Steptoe A, Rose R, Marmot M. Do health control beliefs predict behaviour in Russians? Preventive Medicine. 2003;37(2):73-81.

129. Puska P, Helasoja V, Prättälä R, Kasmel A, Klumbiene J. Health behaviour in Estonia, Finland and Lithuania 1994-1998. Standardized comparison. European Journal of Public Health. 2003;13(1):11-7.

130. Cockerham WC, Hinote BP, Abbott P, Haerpfer C. Health lifestyles in central Asia: the case of Kazakhstan and Kyrgyzstan. Social Science & Medicine. 2004;59(7):1409-21.

131. Malyutina S, Bobak M, Kurilovitch S, Nikitin Y, Marmot M. Trends in alcohol intake by education and marital status in urban population in Russia between the mid 1980s and the mid 1990s. Alcohol & Alcoholism. 2004;39(1):64-9.

132. Bromet EJ, Gluzman SF, Paniotto VI, Webb CP, Tintle NL, Zakhozha V, et al. Epidemiology of psychiatric and alcohol disorders in Ukraine: Findings from the Ukraine World Mental Health survey. Social Psychiatry & Psychiatric Epidemiology. 2005;40(9):681-90.

133. Van Gundy K, Schieman S, Kelley MS, Rebellon CJ. Gender role orientations and alcohol use among Moscow and Toronto adults. Social Science & Medicine. 2005;61(11):2317-30.

134. Webb CP, Bromet EJ, Gluzman S, Tintle NL, Schwartz JE, Kostyuchenko S, et al. Epidemiology of heavy alcohol use in Ukraine: Findings from the World Mental Health survey. Alcohol and alcoholism. 2005;40(4):327-35.

135. Helasoja V, Lahelma E, Prättälä R, Petkeviciene J, Pudule I, Tekkel M. The sociodemographic patterning of drinking and binge drinking in Estonia, Latvia, Lithuania and Finland, 1994-2002. BMC Public Health. 2007;7(241).

136. Tomkins S, Saburova L, Kiryanov N, Andreev E, McKee M, Shkolnikov V, et al. Prevalence and socio-economic distribution of hazardous patterns of alcohol drinking: study of alcohol consumption in men aged 25-54 years in Izhevsk, Russia. Addiction. 2007;102(4):544-53.

137. Jukkala T, Mäkinen IH, Kislitsyna O, Ferlander S, Vågerö D. Economic strain, social relations, gender, and binge drinking in Moscow. Social Science & Medicine. 2008;66(3):663-74.

138. Rojas Y, Stickley A, Carlson P. Too poor to binge? An examination of economic hardship and its relation to alcohol consumption patterns in Taganrog, Russia. Scandinavian Journal of Public Health. 2008;36(3):330-3.

139. Hinote BP, Cockerham WC, Abbott P. The specter of post-communism: Women and alcohol in eight post-Soviet states. Soc Sci Med. 2009 Apr;68(7):1254-62. PubMed PMID: 19233533. Epub 2009/02/24. eng.

140. Pärna K, Rahu K, Helakorpi S, Tekkel M. Alcohol consumption in Estonia and Finland: Finbalt survey 1994-2006. BMC Public Health. 2010;10(261).

141. Perlman FJ. Drinking in transition: trends in alcohol consumption in Russia 1994-2004. BMC Public Health. 2010;10:691. PubMed PMID: 21070625. Pubmed Central PMCID: 2997093. Epub 2010/11/13. eng.

142. Treisman D. Death and prices. Econ Transit. 2010;18(2):281-331. PubMed PMID: ISI:000274814800003. English.

143. Saburova L, Keenan K, Bobrova N, Leon DA, Elbourne D. Alcohol and fatal life trajectories in Russia: Understanding narrative accounts of premature male death in the family. BMC Public Health. 2011;11:481. PubMed PMID: 21689451. Pubmed Central PMCID: 3144462. Epub 2011/06/22. eng.

144. Cook S, De Stavola B, Saburova L, Kiryanov N, Vasiljev M, McCambridge J, et al. Socio-demographic predictors of dimensions of the AUDIT score in a population sample of working-age men in Izhevsk, Russia. Alcohol and alcoholism. 2011 Nov;46(6):702-8. PubMed PMID: 21727097. Pubmed Central PMCID: 3196365. Epub 2011/07/06. eng.

145. Cockerham WC, Hinote BP, Cockerham GB, Abbott P. Health lifestyles and political ideology in Belarus, Russia, and Ukraine. Soc Sci Med. 2006 Apr;62(7):1799-809. PubMed PMID: 16162381. Epub 2005/09/16. eng.

146. Saunders JB, Aasland OG, Babor TF, de la Fuente JR, Grant M. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO Collaborative Project on Early Detection of Persons with Harmful Alcohol Consumption--II. Addiction. 1993 Jun;88(6):791-804. PubMed PMID: 8329970. Epub 1993/06/01. eng.

147. Pomerleau J, McKee M, Rose R, Haerpfer CW, Rotman D, Tumanov S. Drinking in the Commonwealth of Independent States--evidence from eight countries. Addiction. 2005 Nov;100(11):1647-68. PubMed PMID: 16277626.

148. Perlman F, Bobak M. Assessing the contribution of unstable employment to mortality in posttransition Russia: prospective individual-level analyses from the Russian longitudinal monitoring survey. Am J Public Health. 2009 Oct;99(10):1818-25. PubMed PMID: 19696378. Pubmed Central PMCID: 2741509. Epub 2009/08/22. eng.

149. Rehm J, Baliunas D, Borges GL, Graham K, Irving H, Kehoe T, et al. The relation between different dimensions of alcohol consumption and burden of disease: an overview. Addiction. 2010 May;105(5):817-43. PubMed PMID: 20331573. Epub 2010/03/25. eng.

150. Ringmets I, Tuusov J, Lang K, Vali M, Parna K, Tonisson M, et al. Alcohol and premature death in Estonian men: A study of forensic autopsies using novel biomarkers and proxy informants. BMC Public Health. 2012;12:146. PubMed PMID: 22369510. Pubmed Central PMCID: 3328271.

151. d'Hombres B, Rocco L, Suhrcke M, Haerpfer C, McKee M. The influence of social capital on health in eight former Soviet countries: why does it differ? J Epidemiol Community Health. 2011 Jan;65(1):44-50. PubMed PMID: 19858542. Epub 2009/10/28. eng.

152. Beaglehole R, Jackson R. Alcohol, cardiovascular diseases and all causes of death: a review of the epidemiological evidence. Drug Alcohol Rev. 1992;11(3):275-89. PubMed PMID: 16840082. Epub 1992/01/01. eng.

153. Laatikainen T, Alho H, Vartiainen E, Jousilahti P, Sillanaukee P, Puska P. Self-reported alcohol consumption and association to carbohydrate-deficient transferrin and gamma-glutamyltransferase in a random sample of the general population in the Republic of Karelia, Russia and in North Karelia, Finland. Alcohol and alcoholism. 2002 May-Jun;37(3):282-8. PubMed PMID: 12003919. Epub 2002/05/11. eng.

154. Del Boca FK, Darkes J. The validity of self-reports of alcohol consumption: state of the science and challenges for research. Addiction. 2003 Dec;98 Suppl 2:1-12. PubMed PMID: 14984237. Epub 2004/02/27. eng.

155. Malyutina S, Bobak M, Kurilovitch S, Ryizova E, Nikitin Y, Marmot M. Alcohol consumption and binge drinking in Novosibirsk, Russia, 1985-95. Addiction. 2001 Jul;96(7):987-95. PubMed PMID: 11440608. Epub 2001/07/07. eng.

156. Michalak L, Trocki K. Alcohol and Islam: an overview. Contemporary Drug Problems. 2006;33:523-62.

157. Kemppainen U, Tossavainen K, Vartiainen E, Jokela V, Puska P, Pantelejev V, et al. Environmental factors as predictors of alcohol use among ninth-grade adolescents in Pitkaranta (Russian Karelia) and in eastern Finland. Scand J Public Health. 2008 Sep;36(7):769-77. PubMed PMID: 18684780. Epub 2008/08/08. eng.

158. Pärna K, Lang K, Raju K, Vali M, McKee M. A rapid situation assessment of the market for surrogate and illegal alcohols in Tallinn, Estonia. Int J Public Health. 2007;52(6):402-10. PubMed PMID: 18369003. Epub 2008/03/29. eng.

159. Lachenmeier DW, Rehm J, Gmel G. Surrogate alcohol: what do we know and where do we go? Alcohol Clin Exp Res. 2007 Oct;31(10):1613-24. PubMed PMID: 17681034. Epub 2007/08/08. eng.

160. Leon DA, Shkolnikov VM, McKee M. Alcohol and Russian mortality: a continuing crisis. Addiction. 2009 Oct;104(10):1630-6. PubMed PMID: 19681805. Epub 2009/08/18. eng.

161. Pärna K, Leon DA. Surrogate alcohol drinking in Estonia. Alcohol Clin Exp Res. 2011 Aug;35(8):1454-7. PubMed PMID: 21463339. Epub 2011/04/06. eng.

162. Kawachi I, Berkman LF. Neighborhoods and health. Oxford: Oxford University Press; 2003.

163. Berkman LF, Kawachi I. Social epidemiology. New York: Oxford University Press; 2000.

164. Swinburn B, Egger G, Raza F. Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. Prev Med. 1999 Dec;29(6 Pt 1):563-70. PubMed PMID: 10600438.

165. Swinburn B, Egger G. Preventive strategies against weight gain and obesity. Obesity reviews : an official journal of the International Association for the Study of Obesity. 2002 Nov;3(4):289-301. PubMed PMID: 12458974.

166. Hill JO, Wyatt HR, Reed GW, Peters JC. Obesity and the environment: where do we go from here? Science. 2003 Feb 7;299(5608):853-5. PubMed PMID: 12574618.

167. Papas MA, Alberg AJ, Ewing R, Helzlsouer KJ, Gary TL, Klassen AC. The built environment and obesity. Epidemiol Rev. 2007;29:129-43. PubMed PMID: 17533172.

168. Kirk SF, Penney TL, McHugh TL. Characterizing the obesogenic environment: The state of the evidence with directions for future research. Obesity reviews : an official journal of the International Association for the Study of Obesity. 2010 Feb;11(2):109-17. PubMed PMID: 19493302.

169. Hubbard AE, Ahern J, Fleischer NL, Van der Laan M, Lippman SA, Jewell N, et al. To GEE or not to GEE: comparing population average and mixed models for estimating the associations between neighborhood risk factors and health. Epidemiology. 2010 Jul;21(4):467-74. PubMed PMID: 20220526. Epub 2010/03/12. eng.

170. O'Campo P. Invited commentary: Advancing theory and methods for multilevel models of residential neighborhoods and health. Am J Epidemiol. 2003 Jan 1;157(1):9-13. PubMed PMID: 12505885.

171. Gruenewald PJ, Ponicki WR, Holder HD. The relationship of outlet densities to alcohol consumption: a time series cross-sectional analysis. Alcohol Clin Exp Res. 1993 Feb;17(1):38-47. PubMed PMID: 8452207.

172. van Oers JA, Garretsen HF. The geographic relationship between alcohol use, bars, liquor shops and traffic injuries in Rotterdam. J Stud Alcohol. 1993 Nov;54(6):739-44. PubMed PMID: 8271811.

173. Pollack CE, Cubbin C, Ahn D, Winkleby M. Neighbourhood deprivation and alcohol consumption: does the availability of alcohol play a role? International journal of epidemiology. 2005 Aug;34(4):772-80. PubMed PMID: 15737966.

174. Chaloupka FJ, Grossman M, Saffer H. The effects of price on alcohol consumption and alcohol-related problems. Alcohol research & health : the journal of the National Institute on Alcohol Abuse and Alcoholism. 2002;26(1):22-34. PubMed PMID: 12154648.

175. Babor T. Alcohol : no ordinary commodity : research and public policy. Oxford ; New York: Oxford University Press; 2003. xiv, 290 p. p.

176. Chenet L, Britton A, Kalediene R, Petrauskiene J. Daily variations in deaths in Lithuania: The possible contribution of binge drinking. International journal of epidemiology. 2001 Aug;30(4):743-8. PubMed PMID: 11511597. Epub 2001/08/21. eng.

177. Murphy A, Roberts B, Stickley A, McKee M. Social factors associated with alcohol consumption in the former Soviet Union: A systematic review. Alcohol and alcoholism. 2012 Nov-Dec;47(6):711-8. PubMed PMID: 22813540.

178. Neufeld M, Rehm J. Alcohol consumption and mortality in Russia since 2000: are there any changes following the alcohol policy changes starting in 2006? Alcohol and alcoholism. 2013 Mar-Apr;48(2):222-30. PubMed PMID: 23299570.

179. Balabanova D, Roberts B, Richardson E, Haerpfer C, McKee M. Health care reform in the former Soviet Union: beyond the transition. Health services research. 2012 Apr;47(2):840-64. PubMed PMID: 22092004.

180. Ewing JA. Detecting alcoholism. The CAGE questionnaire. JAMA : the journal of the American Medical Association. 1984 Oct 12;252(14):1905-7. PubMed PMID: 6471323.

181. Chow CK, Lock K, Madhavan M, Corsi DJ, Gilmore AB, Subramanian SV, et al. Environmental Profile of a Community's Health (EPOCH): An instrument to measure environmental determinants of cardiovascular health in five countries. PLoS One.

2010;5(12):e14294. PubMed PMID: 21170320. Pubmed Central PMCID: 3000812. Epub 2010/12/21. eng.

182. Henson RK, Roberts JK. Use of Exploratory Factor Analysis in Published Research: Common Errors and Some Comment on Improved Practice. Educational and Psychological Measurement. 2006;66(3):393-416.

183. Fabrigar LR, Wegener DT, MacCallum RC, Strahan EJ. Evaluating the use of exploratory factor analysis in psychological research. Psychological Methods. 1999;4:272-99.

184. Kaiser HF. The application of electronic computers to factor analysis. Educational and Psychological Measurement. 1960;20:141-51.

185. World Health Organization. Global status report : alcohol policy. Geneva: Abuse DoMHaS; 2004.

186. Khmel'nyts'ka O, Swift J. Beer in the Ukraine: a consumer choice criteria. International Journal of Emerging Markets. 2010;5:78-101.

187. Chen MJ, Grube JW, Gruenewald PJ. Community alcohol outlet density and underage drinking. Addiction. 2010 Feb;105(2):270-8. PubMed PMID: 20078485. Pubmed Central PMCID: 2810108.

188. Weitzman ER, Folkman A, Folkman MP, Wechsler H. The relationship of alcohol outlet density to heavy and frequent drinking and drinking-related problems among college students at eight universities. Health & place. 2003 Mar;9(1):1-6. PubMed PMID: 12609468.

189. Imbens GW, Angrist JD. Identification and estimation of local average treatment effects. Mount Scopus: Hebrew University of Jerusalem, Department of Economics; 1991.

190. Pearl J. Causality : models, reasoning, and inference. 2nd ed. ed. Cambridge: Cambridge University Press; 2000.

191. Norstrom T, Stickley A. Alcohol tax, consumption and mortality in tsarist Russia: Is a public health perspective applicable? Eur J Public Health. 2013 Apr;23(2):340-4. PubMed PMID: 22791368.

192. McKee M, Suzcs S, Sarvary A, Adany R, Kiryanov N, Saburova L, et al. The composition of surrogate alcohols consumed in Russia. Alcohol Clin Exp Res. 2005 Oct;29(10):1884-8. PubMed PMID: 16269919.

193. Rose R. How much does social capital add to individual health? A survey study of Russians. Soc Sci Med. 2000 Nov;51(9):1421-35. PubMed PMID: 11037227. Epub 2000/10/19. eng.

194. Rojas Y, Carlson P. The stratification of social capital and its consequences for self-rated health in Taganrog, Russia. Soc Sci Med. 2006 Jun;62(11):2732-41. PubMed PMID: 16343721. Epub 2005/12/14. eng.

195. d'Hombres B, Rocco L, Suhrcke M, McKee M. Does social capital determine health? Evidence from eight transition countries. Health economics. 2010 Jan;19(1):56-74. PubMed PMID: 19301350.

196. Carlson P. Self-perceived health in East and West Europe: Another European health divide. Soc Sci Med. 1998 May;46(10):1355-66. PubMed PMID: 9665566. Epub 1998/07/17. eng.

197. Hajdu P, McKee M, Bojan F. Changes in premature mortality differentials by marital status in Hungary and in England and Wales. Eur J Publ Health. 1995;5:259-64.

198. Watson P. Explaining rising mortality among men in eastern Europe. Soc Sci Med. 1995 Oct;41(7):923-34. PubMed PMID: 8545667. Epub 1995/10/01. eng.

199. Putnam RD. Bowling alone : the collapse and revival of American community. New York: Simon & Schuster; 2000. 541 p. p.

200. Coleman JS. Social capital in the creation of human capital. American Journal of Sociology. 1988;94:S95-120.

201. Dufur MJ, Parcel TL, Troutman KP. Does capital at home matter more than capital at school? Social capital effects on academic achievement. Research on Social Stratification and Mobility. 2013;31:1-21.

202. Boxman AW, DeGraaf PM, Flap HD. The impact of social and human capital on the income attainment of Dutch managers. Social Networks. 1991;13(1):51-73.

203. Huang X, Western M. Social networks and occupational attainment in Australia. Sociology. 2011;45(2):269-86.

204. Jacobs D, Tillie J. Introduction: social capital and political integration of migrants. Journal of Ethnic and Migration Studies. 2004;30(3):419-27.

205. Salmi V, Kivivuori J. The association between social capital and juvenile crime: The role of individual and structural factors. European Journal of Criminology. 2006;3(2):123-48.

206. World Bank. Overview: Social Capital: World Bank; 2011 [26 Oct. 2013]. Available from: http://go.worldbank.org/C0QTRW4QF0.

207. Yip W, Subramanian SV, Mitchell AD, Lee DT, Wang J, Kawachi I. Does social capital enhance health and well-being? Evidence from rural China. Soc Sci Med. 2007 Jan;64(1):35-49. PubMed PMID: 17029692.

208. Lindstrom M. Social capital and the miniaturization of community among daily and intermittent smokers: A population-based study. Prev Med. 2003 Feb;36(2):177-84. PubMed PMID: 12590993.

209. Lindstrom M. Social capital, the miniaturization of community and high alcohol consumption: a population-based study. Alcohol and alcoholism. 2005 Nov-Dec;40(6):556-62. PubMed PMID: 16087659.

210. Wilkinson RG. Unhealthy societies : the afflictions of inequality. London: Routledge; 1996.

211. Kawachi I, Berkman L. Social cohesion, social capital, and health. In: Berkman L, Kawachi I, editors. Social epidemiology. New York, NY: Oxford University Press; 2000. p. 174-90.

212. Poortinga W. Do health behaviors mediate the association between social capital and health? Preventive Medicine. 2006 Dec;43(6):488-93. PubMed PMID: ISI:000243285300012. English.

213. Mohan J, Twigg L, Barnard S, Jones K. Social capital, geography and health: a small-area analysis for England. Soc Sci Med. 2005 Mar;60(6):1267-83. PubMed PMID: 15626523.

214. Kawachi I, Kim D, Coutts A, Subramanian SV. Commentary: Reconciling the three accounts of social capital. International journal of epidemiology. 2004 Aug;33(4):682-90; discussion 700-4. PubMed PMID: 15282222. Epub 2004/07/30. eng.

215. Kawachi I, Kennedy BP, Glass R. Social capital and self-rated health: a contextual analysis. Am J Public Health. 1999 Aug;89(8):1187-93. PubMed PMID: 10432904. Pubmed Central PMCID: 1508687. Epub 1999/08/05. eng.

216. Harpham T, Grant E, Thomas E. Measuring social capital within health surveys: key issues. Health policy and planning. 2002 Mar;17(1):106-11. PubMed PMID: 11861592. Epub 2002/02/28. eng.

217. Goldstein H. Multilevel statistical models. 4th ed. Chichester, West Sussex: Wiley; 2011. xxi, 358 p. p.

218. Pevalin DJ, Rose D. Social capital for health: investigating the links between social capital and health using the British Household Panel Survey. London: Health Development Agency, 2002.

219. Andreev E, Pridemore WA, Shkolnikov VM, Antonova OI. An investigation of the growing number of deaths of unidentified people in Russia. Eur J Public Health. 2008 Jun;18(3):252-7. PubMed PMID: 18160388. Pubmed Central PMCID: 2612636. Epub 2007/12/28. eng.

220. Akerlind I, Hornquist JO. Loneliness and alcohol abuse: a review of evidences of an interplay. Soc Sci Med. 1992 Feb;34(4):405-14. PubMed PMID: 1566121. Epub 1992/02/01. eng.

221. Fergusson DM, Boden JM, Horwood LJ. Tests of causal links between alcohol abuse or dependence and major depression. Archives of general psychiatry. 2009 Mar;66(3):260-6. PubMed PMID: 19255375. Epub 2009/03/04. eng.

222. Holmes L. Crime, organised crime and corruption in post-communist Europe and the CIS. Communis Post-Commun. 2009 Jun;42(2):265-87. PubMed PMID: ISI:000267094900007. English.

223. Stickley A, Koyanagi A, Roberts B, Rotman D, McKee M. Criminal victimisation and health: examining the relation in nine countries of the former Soviet Union. Soc Sci Med. 2013 Aug;91:76-83. PubMed PMID: 23849241.

224. Kennedy BP, Kawachi I, Prothrow-Stith D, Lochner K, Gupta V. Social capital, income inequality, and firearm violent crime. Soc Sci Med. 1998 Jul;47(1):7-17. PubMed PMID: 9683374. Epub 1998/07/31. eng.

225. Fukuyama F. Trust : the social virtues and the creation of prosperity. New York: Free Press; 1995. xv, 457 p. p.

226. Portes A. Social capital: Its origins and application in modern sociology. Annual Review of Sociology. 1998:1-14.

227. Ferlander S. The importance of different forms of social capital for health. Acta Sociol. 2007 Jun;50(2):115-28. PubMed PMID: ISI:000247428600002. English.

228. Kim D, Subramanian SV, Kawachi I. Bonding versus bridging social capital and their associations with self rated health: a multilevel analysis of 40 US communities. J Epidemiol Community Health. 2006 Feb;60(2):116-22. PubMed PMID: 16415259. Pubmed Central PMCID: 2566138.

229. Baxter P, Jack S. Qualitative case study methodology: Study design and implementation for novice researchers The Qualitative Report. 2008;13(4):544-59.

230. Seale C. Quality in qualitative research. Qualitative Inquiry. 1999;5:465-78.

231. Kvale S, Brinkmann S. Interviews: Learning the craft of qualitative research interviewing (2nd ed.). Thousand Oaks, CA: Sage Publications; 2009.

232. Krasovsky K. Alcohol-related mortality in Ukraine. Drug Alcohol Rev. 2009 Jul;28(4):396-405. PubMed PMID: 19594794.

233. Shkolnikov V, Nemtsov A. The Anti-Alcohol Campaign and Variations in Russian Mortality. In: Bobadilla J, Costello C, Mitchell F, editors. Premature Death in the New Independent States. Washington, DC: National Academy Press; 1997.

234. McKee M, Shkolnikov V. Understanding the toll of premature death among men in eastern Europe. BMJ. 2001 Nov 3;323(7320):1051-5. PubMed PMID: 11691766. Pubmed Central PMCID: 1121549.

235. Tomkins S, Collier T, Oralov A, Saburova L, McKee M, Shkolnikov V, et al. Hazardous alcohol consumption is a major factor in male premature mortality in a typical Russian city: prospective cohort study 2003-2009. PLoS One. 2012;7(2):e30274. PubMed PMID: 22347371. Pubmed Central PMCID: 3275563. Epub 2012/02/22. eng.

236. Institute of Health Metrics and Evaluation. The Global Burden of Disease Study 2010: Country Profiles Seattle: IHME, University of Washington; 2013 [cited 2013 September 24, 2013].

237. Hinote BP, Webber GR. Drinking toward Manhood: Masculinity and Alcohol in the former USSR. Men and Masculinites. 2012;15(3):292-310.

238. Murphy A, Roberts B, Kenward MG, De Stavola BL, Stickley A, McKee M. Using multilevel data to estimate the effect of social capital on alcohol consumption in the former Soviet Union. Eur J Publ Health. (in press).

239. Godoy RA, Reyes-Garcia V, McDade T, Huanca T, Leonard WR, Tanner S, et al. Does village inequality in modern income harm the psyche? Anger, fear, sadness, and alcohol consumption in a pre-industrial society. Soc Sci Med. 2006 Jul;63(2):359-72. PubMed PMID: 16519979.

240. Davey J, Obst P, Sheehan M. It goes with the job: Officers insights into the impact of stress and culture within the policing occupation. Drugs: Education, Prevention and Policy. 2001;8:141-9.

241. Ames GM, Duke M, Moore RS, Cunradi CB. The Impact of Occupational Culture on Drinking Behavior of Young Adults in the U.S. Navy. Journal of Mixed Methods Research. 2009;3(2):129-50.

242. Popp SM. Alcohol use and occupational culture in the skilled building trades: An ethnographic study. ETD Collection for Wayne State University [Internet]. 1996. Available from: http://digitalcommons.wayne.edu/dissertations/AAI9715898.

243. Ames GM, Janes CR. Heavy and problem drinking in an American blue-collar population: implications for prevention. Soc Sci Med. 1987;25(8):949-60. PubMed PMID: 3686122.

244. Murphy A, Levchuk N, Stickley A, Roberts B, McKee M. A country divided? Regional variation in mortality in Ukraine. Int J Public Health. 2013 Mar 24. PubMed PMID: 23525667.

245. World Health Organization. Global status report on alcohol and health. Geneva: World Health Organization, 2011 9789241564151.

246. Institute of Health Metrics and Evaluation. The Global Burden of Disease Study 2010: Ukraine Country Profile Seattle: IHME, University of Washington; 2013 [cited 2013 September 24, 2013]. Available from: http://www.healthmetricsandevaluation.org/sites/default/files/country-profiles/GBD%20Country%20Report%20-%20Ukraine.pdf.

247. Samokhvalov AV, Pidkorytov VS, Linskiy IV, Minko OI, Minko OO, Rehm J, et al. Alcohol use and addiction services in Ukraine. International Psychiatry. 2009;6(1):5-7.

248. Curry LA, Nembhard IM, Bradley EH. Qualitative and mixed methods provide unique contributions to outcomes research. Circulation. 2009 Mar 17;119(10):1442-52. PubMed PMID: 19289649. Epub 2009/03/18. eng.

249. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology. 2006;3:77-101.

250. Sandefur RL, Laumann EO. A paradigm for social capital. Rationality and Society. 1998;10:481.

251. Lonkila M, Salmi A. The Russian work collective and migration. Europe-Asia Studies. 2005;57(5):681-703.

252. Ashwin S. Russian workers : the anatomy of patience. Manchester: Manchester University Press; 1999.

253. McKee R, Murphy A, Richardson E, Roberts B, Haerpfer C, McKee M. Do citizens of the former Soviet Union trust state institutions, and why? East European Politics. 2013.

254. Morris J. Moonlighting strangers met on the way: The nexus of informality and blue-collar sociality in Russia. In: Morris J, Polese A, editors. The post-socialist informal economy: Embedded practices and livelihoods. Oxford: Routledge; 2013.

255. Cosper R. Drinking as conformity; a critique of sociological literature on occupational differences in drinking. J Stud Alcohol. 1979 Sep;40(9):868-91. PubMed PMID: 513778.

256. Hitz D. Drunken sailors and others. Drinking problems in specific occupations. Quarterly journal of studies on alcohol. 1973 Jun;34(2):496-505. PubMed PMID: 4713838.

257. Alcohol Control Database: Ukraine country profile [Internet]. World Health Organization. 2013 [cited July 16, 2013].

258. Pomerleau J, Lock K, Knai C, McKee M. Interventions designed to increase adult fruit and vegetable intake can be effective: a systematic review of the literature. The Journal of nutrition. 2005 Oct;135(10):2486-95. PubMed PMID: 16177217.

259. To QG, Chen TT, Magnussen CG, To KG. Workplace physical activity interventions: A systematic review. American journal of health promotion : AJHP. 2013;27(6):e113-23. PubMed PMID: 23631453.

260. Sorensen G, Stoddard A, Peterson K, Cohen N, Hunt MK, Stein E, et al. Increasing fruit and vegetable consumption through worksites and families in the treatwell 5-a-day study. Am J Public Health. 1999 Jan;89(1):54-60. PubMed PMID: 9987465. Pubmed Central PMCID: 1508509.

261. Montemurro B, McClure B. Changing Gender Norms for Alcohol Consumption: Social Drinking and Lowered Inhibitions at Bachelorette Parties. Sex Roles. 2005;52(5-6):279-88.

262. de Visser RO, McDonnell EJ. 'That's OK. He's a guy': a mixed-methods study of gender double-standards for alcohol use. Psychology & health. 2012;27(5):618-39. PubMed PMID: 22149393.

263. de Visser RO, Smith J, Abraham C, Wheeler Z. Gender, alcohol and interventions2012 [27 Oct. 2013]. Available from: http://alcoholresearchuk.org/downloads/finalReports/FinalReport_0092.pdf.

264. Bourdieu P, Wacquant LcJD. An invitation to reflexive sociology. Chicago: University of Chicago Press; 1992.

265. Zakhari S, Li TK. Determinants of alcohol use and abuse: Impact of quantity and frequency patterns on liver disease. Hepatology. 2007;46(6):2032-9. PubMed PMID: 18046720.

266. Borders TF, Booth BM. Rural, suburban, and urban variations in alcohol consumption in the United States: Findings from the National Epidemiologic Survey on Alcohol and Related Conditions. The Journal of rural health : official journal of the American Rural Health Association and the National Rural Health Care Association. 2007 Autumn;23(4):314-21. PubMed PMID: 17868238.

267. Chadha SL, Gopinath N, Shekhawat S. Urban-rural differences in the prevalence of coronary heart disease and its risk factors in Delhi. Bulletin of the World Health Organization. 1997;75(1):31-8. PubMed PMID: 9141748. Pubmed Central PMCID: 2486981.

268. Simmons A, Mavoa HM, Bell AC, De Courten M, Schaaf D, Schultz J, et al. Creating community action plans for obesity prevention using the ANGELO (Analysis Grid for Elements Linked to Obesity) Framework. Health promotion international. 2009 Dec;24(4):311-24. PubMed PMID: 19759046. Pubmed Central PMCID: 2776999.

269. Cook S, Leon DA, Kiryanov N, Ploubidis GB, De Stavola BL. Alcohol-related dysfunction in working-age men in Izhevsk, Russia: An application of structural equation models to study the association with education. PLoS One. 2013;8(5):e63792. PubMed PMID: 23667673. Pubmed Central PMCID: 3648513.

270. Schmitz S, Adams R, Walsh C. The use of continuous data versus binary data in MTC models: A case study in rheumatoid arthritis. BMC medical research methodology. 2012;12:167. PubMed PMID: 23130635. Pubmed Central PMCID: 3576322.

271. Lahaut VM, Jansen HA, van de Mheen D, Garretsen HF. Non-response bias in a sample survey on alcohol consumption. Alcohol and alcoholism. 2002 May-Jun;37(3):256-60. PubMed PMID: 12003914.

272. Dawson DA. Methodological issues in measuring alcohol use. Alcohol research & health : the journal of the National Institute on Alcohol Abuse and Alcoholism. 2003;27(18-29).

273. Kaskutas LA, Graves K. An alternative to standard drinks as a measure of alcohol consumption. Journal of substance abuse. 2000;12(1-2):67-78. PubMed PMID: 11288475.

274. Gil A, Polikina O, Koroleva N, McKee M, Tomkins S, Leon DA. Availability and characteristics of nonbeverage alcohols sold in 17 Russian cities in 2007. Alcohol Clin Exp Res. 2009 Jan;33(1):79-85. PubMed PMID: 19018753.

275. Furstenberg F, Hughes M. Social capital and successful development among at risk youth. Journal of Marriage and Family. 1995;57:580-92.

276. Mohnen SM, Volker B, Flap H, Groenewegen PP. Health-related behavior as a mechanism behind the relationship between neighborhood social capital and individual health--a multilevel analysis. BMC Public Health. 2012;12:116. PubMed PMID: 22325740. Pubmed Central PMCID: 3347984.

277. Knack S, Keefer P. Does social capital have an economic impact? A cross-country investigation. Quarterly Journal of Economics. 1997;112(4):1252-88.

278. Farr J. Social Capital: A Conceptual History. Political Theory. 2004;32(1):6-33.

279. Durlauf S. On The Empirics of Social Capital. The Economic Journal. 2002;112(November):F459-F79.

280. Cacioppo JT, Hawkley LC. Social isolation and health, with an emphasis on underlying mechanisms. Perspectives in biology and medicine. 2003 Summer;46(3 Suppl):S39-52. PubMed PMID: 14563073.

281. Mehrabian A. Effect of emotional state on alcohol consumption. Psychological Reports. 1979;44:271-82.

282. Meisenhelder JB, Chandler EN. Prayer and health outcomes in church members. Alternative therapies in health and medicine. 2000 Jul;6(4):56-60. PubMed PMID: 10895514.

283. Frazer E. The problems of communitarian politics : unity and conflict. Oxford: Oxford University Press; 1999.

284. Cohen AP. The symbolic construction of community. Chichester, UK: Ellis Horwood; 1985.

285. Caughy MO, Leonard T, Beron K, Murdoch J. Defining neighborhood boundaries in studies of spatial dependence in child behavior problems. International journal of health geographics. 2013;12:24. PubMed PMID: 23642001. Pubmed Central PMCID: 3648484.

286. Guo J, Bhat C. Operationalizing the concept of neighborhood: Application to residential location choice analysis. Journal of Transport Geography. 2005;15(1):31-45

287. Krenn PJ, Titze S, Oja P, Jones A, Ogilvie D. Use of global positioning systems to study physical activity and the environment: A systematic review. Am J Prev Med. 2011 Nov;41(5):508-15. PubMed PMID: 22011423.

288. Charreire H, Mackenbach JD, Ouasti M, Lakerveld J, Compernolle S, Ben-Rebah M, et al. Using remote sensing to define environmental characteristics related to physical activity and dietary behaviours: A systematic review (the SPOTLIGHT project). Health & place. *in press*.

289. McKee M, Shkolnikov V, Leon DA. Alcohol is implicated in the fluctuations in cardiovascular disease in Russia since the 1980s. Annals of epidemiology. 2001 Jan;11(1):1-6. PubMed PMID: 11164113.

290. Wagenaar AC, Salois MJ, Komro KA. Effects of beverage alcohol price and tax levels on drinking: a meta-analysis of 1003 estimates from 112 studies. Addiction. 2009 Feb;104(2):179-90. PubMed PMID: 19149811.

291. Elder RW, Lawrence B, Ferguson A, Naimi TS, Brewer RD, Chattopadhyay SK, et al. The effectiveness of tax policy interventions for reducing excessive alcohol consumption and related harms. Am J Prev Med. 2010 Feb;38(2):217-29. PubMed PMID: 20117579. Pubmed Central PMCID: 3735171.

292. Cook PJ. Paying the tab: The economics of alcohol policy. Princeton: Princeton University Press; 2007. 262 p.

293. Gil A, Polikina O, Koroleva N, Leon DA, McKee M. Alcohol policy in a Russian region: a stakeholder analysis. Eur J Public Health. 2010 Oct;20(5):588-94. PubMed PMID: 20350932. Pubmed Central PMCID: 2943508.

294. Varvasovszky Z, McKee M. An analysis of alcohol policy in Hungary. Who is in charge? Addiction. 1998 Dec;93(12):1815-27. PubMed PMID: 9926570.

295. Roberts B, Stickley A, Murphy A, Kizilova K, Bryden A, Rotman D, et al. Patterns of public support for price increases on alcohol in the former Soviet Union. Alcohol and alcoholism. 2012 Jul-Aug;47(4):473-8. PubMed PMID: 22553046.

296. Marquez P, Suhrcke M, McKee M, Rocco L. Adult health in the Russian Federation: more than just a health problem. Health affairs. 2007 Jul-Aug;26(4):1040-51. PubMed PMID: 17630447.

297. Suhrcke M, Rocco L, McKee M. Health : a vital investment for economic development in eastern Europe and central Asia. [Copenhagen]: Who Regional Office; 2007.

298. Zaridze D, Brennan P, Boreham J, Boroda A, Karpov R, Lazarev A, et al. Alcohol and cause-specific mortality in Russia: a retrospective case-control study of 48,557 adult deaths. Lancet. 2009 Jun 27;373(9682):2201-14. PubMed PMID: 19560602. Pubmed Central PMCID: 2715218.

299. Committee on Social and Demographic Policy [Komissiya po sotsialnoi i demograficheskoi politike]. Alcohol abuse in the Russian Federation: social economic consequences and measures of counteraction [Zloupotreblenie alkogolem v Rossiiskoi Federatsii: sotsialno-ekonomicheskie posledtsviya] Moscow: Public Council of the Central Federal District of the Russian Federation [Doklad Obshestvennoi palati Rossiiskoi Federatsii], 2009.

300. Pridemore WA, Chamlin MB, Kaylen MT, Andreev E. The Effects of the 2006 Russian Alcohol Policy on Alcohol-Related Mortality: An Interrupted Time Series Analysis. Alcohol Clin Exp Res. 2013 Aug 16. PubMed PMID: 24033700.

301. Christakis NA, Fowler JH. Connected : the surprising power of our social networks and how they shape our lives. 1st ed. New York: Little, Brown and Co.; 2009. xiii, 338 p., 8 p. of plates p.

302. Yu G, Renton A, Schmidt E, Tobi P, Bertotti M, Watts P, et al. A multilevel analysis of the association between social networks and support on leisure time physical activity: evidence from 40 disadvantaged areas in London. Health & place. 2011 Sep;17(5):1023-9. PubMed PMID: 21784693.

303. Renton A, Phillips G, Daykin N, Yu G, Taylor K, Petticrew M. Think of your arteries: Arts participation, behavioural cardiovascular risk factors and mental well-being in deprived communities in London. Public health. 2012 Sep;126 Suppl 1:S57-64. PubMed PMID: 22766259. Pubmed Central PMCID: 3449238.

304. Phillips G, Renton A, Moore DG, Bottomley C, Schmidt E, Lais S, et al. The Well London program--a cluster randomized trial of community engagement for improving health behaviors and mental wellbeing: baseline survey results. Trials. 2012;13:105. PubMed PMID: 22769971. Pubmed Central PMCID: 3441284.

305. Marketing ECfMA. Women: The new market. 2008.

306. Durlauf S. The memberships theory of poverty: The role of group affiliations in determining socioeconomic outcomes. In: Danziger S, Haveman R, editors. Understanding Poverty in America. Cambridge: Harvard University Press; 2002. p. 265-84.

307. Fidrmuc J, Gerxhani K. Mind the gap! Social capital, East and West.2008. Available from: http://www.fidrmuc.net/research/SocialCapital.pdf.

308. The Roper Centre for Public Opinion Research. The social capital benchmark survey. Storrs, CT: TRCPOR, 2002.

309. Laramee P, Kusel J, Leonard S, Aubin HJ, Francois C, Daeppen JB. The economic burden of alcohol dependence in Europe. Alcohol and alcoholism. 2013 May-Jun;48(3):259-69. PubMed PMID: 23371284.