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by the coordination team (partner 01),
led by Prof. Christian Haerpfer, IHS, Austria

Abstract

This study provides the first comparative assessment of inequalities in access to health care in multiple countries of the former Soviet Union. The emerging model across the region is extremely diverse. Some countries (Belarus, Russia) have managed to maintain access for most people, while in others the situation is near to collapse (Armenia, Georgia). Access is most problematic in health systems characterised by high levels of payment for care and a breakdown of gate-keeping, although these are seen in countries facing major problems such as economic collapse and, in some, a legacy of civil war. There are substantial inequalities within each country and even where access remains adequate there are concerns about its sustainability.

For the three predominately Slavic nations, the decrease in longevity for males is part of a long-term trend stretching back nearly four decades. We know that the principal causes of the increased mortality are deaths from cardiovascular diseases and alcohol-related situations. The current challenge is to uncover the factors ultimately responsible for these causes. As noted, infectious diseases, environmental pollution, impoverishment, malnutrition, and medically avoidable deaths have been eliminated as major causal factors, leaving the respective contributions of stress and health lifestyles to be determined. These data clearly show that stress is not the principal cause of the premature mortality. Women are found to be exceedingly more stressed than men and, while stress undoubtedly makes their lives less pleasant and healthy, it is obviously not killing enough of them prematurely to overtake male mortality. These data also suggest that marriage may be an important barrier to stress for males.

As bad as the situation may be for females, the key to explaining the mortality crisis ultimately lies in male behavior. These data and several previously cited studies show that males drink and smoke far more than females and have less healthy diets. These lifestyle practices and their relationship to cardiovascular and alcohol-related mortality appear to be the most pervasive cause of premature male mortality. We suggest that the disposition of males to routinely engage in harmful health habits is primarily grounded in the normative behavior of males, rather than the stress they experience. These data show, for example, that heavy vodka drinkers do not suffer from insomnia, nor do they experience the other stress symptoms.

It may be that stress is not as strong a factor as expected in Russian male drinking because drinking eliminates its presence. This is not to say that stress does not underlie drinking, but that once drinking practices are established for an individual, drinking suppresses stress.

When men in the former socialist countries drank and smoked too much, these behaviors reflected a normative structure for male socializing. This situation suggests that it is the normative demands of a particular lifestyle that is largely responsible for the pattern of male drinking. As these normative drinking dispositions become routine and internalized by the habitus, they may be reproduced over generations by being constantly acted out. These dispositions originated in a traditional drinking style of overindulgence in Imperial Russia that later flourished under state socialism. The removal of religious constraints and the ready availability of cheap vodka as a major source of government tax revenue were important contributing factors.

While it might be argued there is always a choice to do otherwise, that is, to not drink or smoke, eat fatty foods, and not exercise, group norms can take precedence even though the choices they influence are ultimately punishing. We would argue that a similar process promotes negative

health lifestyles among males in the CIS countries in this study and that such lifestyles are primarily responsible for their abbreviated life spans.

However, it can be inferred from these data that the Muslim religion, which prohibits alcohol use and promotes healthy practices generally has played a major role in the more positive health lifestyles of the Kyrgyz. In fact, Muslims in Central Asia were significantly less likely to drink frequently and smoke. The effects of Russian ethnicity were weak, as being a resident of one or the other Central Asian country had greater explanatory power.

The strongest predictor variable overall was male sex, in that males had significantly more negative health lifestyle practices than females on most measures. The key variables in the negative health lifestyles of the former socialist countries in Russia and Eastern Europe were gender (male), age (middle-age) and class (working-class). These variables best identified the population group whose high mortality rates for heart disease and alcohol-related causes were most responsible for the sustained increased in premature deaths. Behind this downturn in longevity were highly negative health lifestyle practices resulting from dispositions toward behavior produced by a habitus specific to this particular group. Not only is male sex the single most powerful predictor of negative health practices, but age is important as well as younger middle-age respondents especially drink and smoke more. However, occupation was a significant variable in that persons in lower status jobs had the heaviest physical labor and worse diets. These findings were also present in the pooled data set, with the addition of lower status occupations being significantly related to heavy vodka drinking.

Finally, it is interesting to note that the country with the most poverty had the healthiest lifestyles. This is consistent with developments in Russia where the steep decrease in life expectancy in the early 1990s was not due to impoverishment, since the greatest rises in mortality were in the wealthiest regions of the country that experienced the smallest declines in household income.

The most important results in our study of health lifestyles in Ukraine are those pertaining to alcohol and smoking, along with self-reported health status. Behind this downturn in longevity, which a few Eastern European countries—showing more positive health lifestyles—have escaped, were highly negative health lifestyle practices that included excessive drinking and smoking. In comparing the Ukrainian situation to that of Russia, the question to be examined by this paper was whether or not the two countries are similar in such practices since they have similar patterns of life expectancy.

These data suggest this is indeed the case with respect to gender and to a lesser extent with class. Gender produced the most powerful outcomes in that Ukrainian males drank and smoked significantly more than females. Smoking, in particular, is something men, not women, do. But they also drink alcohol significantly more as well. It is therefore not surprising that males die at earlier ages from heart disease and alcohol-related problems in Ukraine as they do in Russia. Since the lower-ranked occupations in this study were unskilled/skilled workers, the results for occupation show working-class respondents with less positive health lifestyles than those in higher social strata as determined by occupational prestige. Age was not statistically significant on most measures, but this may have been due to the concentration of older respondents in the sample.

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1. EXECUTIVE SUMMARY

The health challenges in the region are considerable. Overall levels of health continue to lag well behind those in the west and, in some places, are continuing to deteriorate. Old threats, such as tuberculosis, are reappearing and new ones, such as smoking among women and HIV, are emerging for the first time. Some once functioning health care systems are disintegrating. But there are also many examples of success. Death rates from cardiovascular disease are falling rapidly in some countries. Transition-related increases in injury deaths are being brought under control. However, many of these successes owe more to wider societal changes, such as growing prosperity and opening of markets, than to specific public health policies. The public health infrastructure remains weak in many countries. Several needs are apparent. One is a greater number of people from a wide range of disciplines trained in modern public health. In some countries newly established schools of public health are already making a substantial contribution to this goal. However these individuals then need a secure career structure through which they can progress, which rewards them sufficiently to ensure their retention, and which gives them the opportunity to use their newly developed skills to develop and implement healthy public policies. It is this that is more often lacking. These changes will only come about if politicians recognise the need to improve the health of their population, recognising that some can and should be done. However the international community also has a role to play, in supporting these efforts through exchange programmes and by supporting the research on which effective policies can be based.

1.1. Nutrition patterns and health

The former Soviet Union is, with sub-Saharan Africa, one of only two major regions where life expectancy is currently declining. The Soviet health system, despite its many weaknesses, did achieve basic universal coverage. While some of the Soviet Union's successor countries, such as the three Baltic republics (not included in this study) are now experiencing sustained economic growth and falling mortality, elsewhere the situation has deteriorated considerably and the prospects for the future are poor, with the situation especially adverse in the Caucasus republics (Armenia and Georgia). Yet even where the system still seems to be functioning, as in Belarus, there are no grounds for complacency. While recognising the need for caution in interpreting economic statistics in this region, Belarus' gross national product per capita has fallen by almost two-thirds in a decade; it seems unlikely that its social protection systems can be sustained in the medium term. In Russia, where there has been a relatively successful (at least compared with other post-Soviet republics) transition to health insurance, some vulnerable groups remain without coverage. So far there has been relatively little research on how different groups have fared in the face of the changes to health systems in this region, with the notable exception of Russia. Yet many of these countries face similar problems and there is scope for shared learning. This study seeks to facilitate this process. It would appear that a significant proportion of the population is malnourished. Common sources of protein, including meat, fish, and cheese, were most commonly consumed extremely seldom (30.7%, 51.4%, and 41.6%, respectively). Furthermore, despite universal recommendations for a reduction in saturated fat intake to reduce the risk of CVD, animal fat and butter were consumed daily by the majority of the sample

(32.2% and 31.8%, respectively). Finally, fresh vegetables and fruit, which are sources of important micro-nutrients, were reportedly consumed 3 times per week or less by 60% and 73.4% of the sample, respectively. Furthermore, the condition and freshness of the fruit and vegetables is unknown, and may not have proper nutrients to benefit those who do consume them daily. These findings are consistent with research conducted by Parizkova (2000), which established that inadequate nutrition, malnutrition and poor nutrition are prevalent in the CIS populations. Furthermore, Parizkova has identified that through the period of transition during the last two decades, nutritional profiles and dietary practices in CIS have deteriorated.

In addition to poor nutrition, a large proportion of the sample reported poor living conditions. The survey did not provide a direct measure of living conditions. Rather, living conditions was inferred based on self-reported variables indicative of living conditions and, in a broader sense, socio-economic status. A significant percentage of the sample did not have a bathroom in their home (39.5%), did not have central heating (67.8%), and did not have hot water available in the home (59.6%). The reported material living conditions were very low, in that 59.6% indicated that the money they had was just enough to meet basic needs, while 22.7% said that the money was insufficient to meet basic needs. The majority of the sample had only 2 or 3 household technologies.

The high prevalence of poor nutrition and poor living conditions is explained by the relationships identified in the eight multiple linear regressions. Each model indicated that low material living conditions and few household technologies were consistently related to lower amounts of each diet variable consumed. This means that because a large proportion of people have poor living conditions, they are likely to also have poor nutrition. For example, the correlation coefficient for amount of meat consumed and material living conditions was -0.496 ($p<0.001$). Interestingly, this relationship is the smallest for the amount of animal fat consumed ($r= -0.135$, $p<0.001$). Thus, the consumption of animal fat is the diet variable least affected by the lower level of living conditions.

Considering the poor nutrition of the majority of the sample, one would expect a significant proportion of underweight individuals. However, in part 3, the health assessment data indicated that only 0.7% of the sample were underweight, while 54.4% were overweight or obese. This finding could be accounted for by the previous finding that animal fat is least affected by a lower level of living condition, and that the majority of the larger sample reportedly consumed animal fat daily (32.2%).

The health assessment data also illustrated that almost 36% of the sample had high diastolic blood pressure, and 34% had high systolic blood pressure. However, only 20.3% reported being treated for high blood pressure, suggesting that a significant proportion of high blood pressure goes untreated, perhaps due to a lack of health promotion or primary health care services. The finding of untreated high blood pressure is of concern, given that high blood pressure is a major risk factor for mortality from CVD.

One would therefore expect a relatively high incidence of CHD and stroke. However, there was a low incidence of chronic disease in the overall sample (2.4% heart attack, 1.4% stroke, 13.9% persisting high blood pressure, 2.2% diabetes, 21.1% stomach or digestive disorders, and 0.5% cancer other than of the lung). Of concern to the reliability and validity of the data, there is a discrepancy between the self-reported persisting high blood pressure rate (13.9%) in the overall sample, compared with the clinically determined rates of 36% and 34% for diastolic and systolic blood pressure, respectively.

The low chronic disease percentages may seem surprising at first glance, but it can be surmised that these low percentages may be the result of under-reporting, as well as high mortality rates from these chronic diseases (Basford et al., 2002). In other words, people may not be surviving these diseases, perhaps because of inadequate prevention and intervention. In addition, the lower life expectancies reported in CIS- nations (Basford et al., 2002) may mean that people are not living long enough to develop these chronic diseases, as they would in more affluent countries. This leads to important implications for future research and health policy, which will be discussed in the following section.

Although the variation in disease accounted for by each diet variable was small (<3.1%), highly significant logistic regression models that predicted disease from diet were developed. This could be

explained by the enormous power to detect a statistically significant difference due to the large sample size and the difficulty capturing the large variability inherent in a large sample. Of further concern was that 0% of chronic disease sufferers was correctly predicted by each model, due to the extremely small incidence of disease. To account for this statistical bias, an equal number of people who did not suffer from each of the chronic diseases were randomly selected. These new models resulted in overall prediction success rates ranging from 65.9% to 85.5%, and substantial increases in percentage of variability accounted for in each disease. This significant finding indicates that if there is a high base rate of a chronic disease in the population, diet is an important predictor of disease status, and should not be minimized by the low prediction success and variability accounted for in the original models.

Few consistent relationships between diet and disease state were identified. Decreased meat consumption was found to be related to an increased chance of having a heart attack, stroke, high blood pressure, and diabetes. Given that meat is often high in saturated fat, and that saturated fat is recognized as a risk factor for CVD (Department of Health, 1994), this relationship appears counterintuitive. However, recent research has recognized the need to consider habitat and socio-economic factors in the development of CVD (Daniels, 2002; Noakes et al., 1999). Specifically, self-reported material living conditions decreased with decreased meat consumption. Thus, it is reasonable to extrapolate that low socio-economic status results in a higher incidence of CVD.

Similar to the meat and disease relationship, decreased fruit consumption increased the chance of having a heart attack, stroke, high blood pressure, and stomach or digestive disorders. These findings support the general recommendation established by Thomas (2001b) that individuals should eat fruit daily to improve overall health and reduce the likelihood of chronic disease. However, a significant proportion (60%) of the sample from the CIS reportedly consumed fruit 3 times per week or less, with 18.1% consuming fruit extremely seldom. It is important to increase the availability of fresh fruit and ensure equal access to this important source of nutrition to reduce morbidity and mortality from chronic disease.

Decreased consumption of fish was found to decrease the chances of having a heart attack or stroke. This contradicts evidence that the oils in fish protect people from CVD and the recommendation that 30g of fish be consumed to reduce the risk of mortality from CVD by 50% (Kroumhout et al., 1995). It is plausible that a third confounding variable accounts for this counterintuitive relationship. More than 80% of the sample reportedly consumed fish one time per week or less and decreased fish consumption has already been noted to be associated with poor living conditions. Given this, one would expect that decreased fish consumption would increase the chances of heart attack and stroke. Further research investigating possible reasons for this relationship is needed.

Further support for the idea that it is not solely diet that affords protection from chronic disease, but rather socio-economic status is provided by the variations in incidence of chronic disease in the countries. Consistently, Georgia, Kazakhstan, and Kyrgyzstan demonstrated lower rates of chronic disease, while Byelorussia, Russia, and Ukraine had higher rates than the total sample. However, no consistent diet patterns were able to explain the discrepancies based on the observed relationships between diet components and disease state. For example, if diet accounted for the difference in heart attack rates between the two sets of countries, one would expect those with low heart attack rates to consume more meat, but this is not identified in the cross-tabulation analysis. Therefore, other factors, like poverty rates should be examined to establish why some countries appear healthier than others.

1.2. Smoking and health

The LLH surveys of over 18,000 individuals provide important new data on the prevalence of smoking in eight countries that represent more than four-fifths of the population of the former Soviet Union. For some countries they provide the first accurate, country-wide data on smoking prevalence. Importantly they provide some of the first truly comparative data for countries of the FSU other than the Baltic states. Response rates were relatively high and the samples broadly representative of their study populations, indicating the generalisability of the findings. However, the surveys were based on

self-reported smoking status with no independent biochemical validation and may thus have been affected by reporting bias. Although there is some concern that self reported smoking status may under-estimate smoking and the amount smoked, studies in the west suggest it is a sensitive and specific measure and that interviewer-administered questionnaires provide more accurate responses than self-completed questionnaires. The only study in the FSU that addresses this issue found that among those claiming to be non-smokers, 13% (48/368) of women and 17% (12/375) of men in rural north west Russia were, according to blood cotinine levels, likely to be smokers compared with only 2% of each gender in Finland. Given the far lower prevalence of smoking among women this had a disproportionately large impact on the reported female smoking prevalence. Although this suggests that prevalence may be underestimated in women in areas where smoking is still culturally unacceptable, our questionnaires were administered by interviewers in the respondents' homes rather than self-completed as in this survey, thus making it harder for respondents to deny smoking.

Finally our surveys did not measure use of tobacco other than cigarettes. Although the use of smokeless tobacco is fairly common in some parts of Azerbaijan, Tajikistan and Turkmenistan, and chewing tobacco is used in some southern parts of Kyrgyzstan, cigarettes are the main form of tobacco used here and in all other countries surveyed.

The study confirms that male smoking rates in this region are among the highest in the world with rates over 50% seen in all countries surveyed except Moldova and reaching 60% or more in Armenia, Kazakhstan and Russia. Elsewhere in Europe rates over 50% are only seen in Turkey (51%) and Slovakia (56%) and worldwide less than 20 countries are reported as having rates over 60%. In men the lower prevalence of current smokers and higher prevalence of never and ex-smokers in those over 60 is likely to reflect the disproportionate number of premature deaths among current smokers compared with never and ex-smokers, although there is also known to be a cohort effect in the FSU with those who were teenagers between 1945 and 1953 carrying forward a lower rate of smoking as cigarettes, like other consumer goods, were in short supply in the period of post-war austerity under Stalin.

Compared with male smoking patterns, smoking in women is far less common, varies more between countries and has a different age-specific pattern. Although ever smoking rates are under 4% in the over 60s in all eight countries, in the four countries with the highest female smoking rates (Belarus, Kazakhstan, Russia and Ukraine), smoking is now significantly more common in the younger generations with risk ratios between the youngest and oldest age-groups of 12.2 to 37.3 compared with 1 to 5.5 in the other four countries.

Findings from this survey are comparable with those from previous surveys for all countries except Kyrgyzstan where the only recent source quotes a 60% male and 12% female smoking prevalence in adults aged 15-64 in 1997 but this was a casual sample of clinic attendees in the capital Bishkek (personal correspondence Chinara Bekbasarova) and is therefore likely to overestimate prevalence particularly in women. In Georgia, previous reports come from small surveys in Tbilisi which cannot be directly compared with our results. The limited comparative data for Armenia and Moldova are dated between 1998 and 2001 and suggest there have been little if any changes in smoking prevalence. Previous data for Kazakhstan are also limited but suggest a small increase from the 60% and 7% prevalence rates recorded in men and women respectively in 1996. More data are available for the remaining three countries. In Belarus rates in men have been hovering around 52% to 55% for some time, while rates in women have climbed steadily from under 5% in the mid 1990s to a maximum of 12% in this survey. Data for Russia as whole suggest that prevalence in men has risen from approximately 40-50% in the 1970s and 1980s to around 60% in the 1990s with little change since, whilst in women rates have risen from around 10% in the early 1990s to 15% now. Pre-transition data on women are confined to Moscow or other areas and whilst not directly comparable suggest that rates have been rising since the 1970s but most notably through the 1990s. Similarly in Ukraine historical data for Kiev show a steady rise in smoking among women from the mid 1970s to 1990s while male smoking rates barely changed, hovering around 50%. More recent national data suggest male smoking then rose slightly to reach approximately 57% by the turn of the century, suggesting that our rate of 52.5% could represent a downturn although further data will be needed to confirm this. In women, the only nationally comparative data is our previous survey which found a

rate of 10% in 2000. Although other surveys found rates of 14% in 2000 and 2001, the difference is likely to be accounted for by their slightly younger age sample.

Between gender and inter-country differences in smoking prevalence are reflected in other smoking habits. Men are more likely than women to start smoking when young, smoke more heavily and be nicotine dependent. Two groupings of countries appear to emerge from the between country comparisons - Belarus, Kazakhstan, Russia and Ukraine on one hand and Armenia, Georgia, Kyrgyzstan and Moldova on the other. In addition to having higher female smoking rates and more pronounced age specific trends, the former group tend to have lower ages of smoking uptake (particularly when compared with Armenia, Georgia and Moldova) and more marked gender differences in the number of cigarettes smoked per day and levels of nicotine dependency.

The between country differences observed in this study suggest that smoking patterns in Armenia, Georgia, Moldova and Kyrgyzstan are more traditional than those in Belarus, Kazakhstan, Russia and Ukraine. This could be explained by the differing degree of TTC penetration in these countries. The Moldovan industry remains a state owned monopoly and although the Georgian and Armenian industries were privatised, this occurred late (post 1997) and none of the major TTCs invested directly. Kazakhstan, Russia and Ukraine by contrast saw major investments from most of the major tobacco companies in the early 1990s onwards. Belarus which retains a state owned monopoly and Kyrgyzstan, where the German manufacturer Reemtsma invested would therefore appear to be exceptions. In Belarus however, the state manufacturer has only a 40% market share, with an additional 40% made up of smuggled and counterfeit brands. The importance the TTCs attach to this illegal market is illustrated in the fact that, despite having little official market share, British American Tobacco (BAT) and Philip Morris have the highest outdoor advertising expenditure and the ninth and tenth highest television advertising expenditures of all companies in Belarus. As in Ukraine and Russia, tobacco is the product most heavily advertised outdoors and in Belarus the fourth most advertised product on television (there are now restrictions on television advertising in Ukraine and Russia). It is clear therefore that with continuing (if so far fruitless) discussion of a possible reunification with Russia, the TTCs treat Belarus as an important extension of the Russian market. Compared with the other countries in which the TTCs invested, investments in Kyrgyzstan came later (1998) and gave Reemtsma a manufacturing monopoly. However, Kyrgyzstan also differs from Belarus, Kazakhstan, Ukraine and Russia through its lower level of development and industrialisation and its larger rural and Muslim populations. The multivariable analysis shows that when urbanicity, socio-economic factors and religion are accounted for, as one might expect, the differences in female smoking rates between Kyrgyzstan and Kazakhstan, Belarus and Ukraine disappear although those with Russia remain.

The survey findings, combined with data on disease burden, confirm that the long-standing high smoking rates in men continue unabated. Amongst women, smoking in Armenia, Georgia, Kyrgyzstan and Moldova remains relatively uncommon and does not appear to have increased significantly as judged by rates in younger compared with older generations or by comparisons with previous data. By contrast female smoking in Belarus, Ukraine, Kazakhstan and Russia are higher, have increased from previous surveys and the age specific rates suggest an ongoing rise in younger generations. It is unlikely to be a coincidence that the higher rates are observed in countries with the most active TTC presence. Although between-country differences exist in the relative importance of each demographic and socio-economic determinant of smoking, common trends were observed with greater smoking rates among men who were more socially vulnerable and women living in more urbanised areas and thus being exposed to greater western influence.

Concerted and urgent efforts to improve tobacco control must be made throughout the FSU to curtail current smoking patterns and prevent any further rise in female smoking. Our results suggest that public health interventions targeted at the high-risk population subgroups could have the largest effect in preventing morbidity and premature mortality due to smoking. Detailed qualitative information on how smoking is perceived, why high-risk population sub-groups take up smoking and how they could be persuaded to stop would further enable policy makers to develop the most effective smoking prevention and cessation strategies for the region.

Male smoking rates vary among countries from 43.3-65.3%. Female smoking remains uncommon in Armenia, Georgia, Kyrgyzstan and Moldova (2.4-6.3%) but in Belarus, Ukraine, Kazakhstan and Russia rates are higher (9.3-15.5%). Men start smoking significantly younger than women, smoke more per day and are more likely to be nicotine dependent.

Age was a strong determinant of smoking throughout the region and in both genders, with elderly individuals being less likely to smoke. Men who were more socially disadvantaged (less educated, poorer economic situation, and/or less social support) were more likely to smoke. In women, living in larger urban areas was the strongest predictor of smoking. Divorced, separated or widowed women were also more likely to smoke than married women. In Kazakhstan and Kyrgyzstan, Muslim males and females smoked less frequently compared with other respondents. Male smoking rates in the selected countries are amongst the highest in the world and show no evidence of decline. Female smoking rates have increased from previous years and appear to reflect transnational tobacco company activity. Smoking is a major public health issue in the FSU particularly affecting socially vulnerable men and young women living in urbanised areas. Effective tobacco control strategies are urgently needed and could target these high risk groups.

1.3. Alcohol consumption and health

Between 11-34% of males and 26-71% of females reported never drinking alcohol. Wine was most commonly drunk in Moldova (particularly in older respondents) and to a lesser degree in Georgia. In Russia, Ukraine and Belarus spirits were most frequently consumed but beer intake was relatively high. In Kazakhstan, Kyrgyzstan and in Armenian males, spirits was the preferred alcoholic beverage. Beer was more frequently drunk by younger compared with older respondents. More frequent drinkers were more likely to believe that alcohol is a good way to mark special occasions, relax, and forget problems, and that it is advantageous for health.

The results of this study confirmed important regional variations in the types of alcoholic beverages consumed in eight countries of the FSU. It provides an important baseline for future comparisons as markets open to new products, as has been the case elsewhere in Europe.

During the past decades, there has been a convergence in alcohol consumption patterns in western European countries both in terms of the quantities consumed and types of drink chosen. Per capita alcohol consumption has generally decreased in the previously high consuming countries of southern Europe and increased in some northern countries thus leading to a change in the south/north ratio from 3.6 in 1950 to an estimated ratio of 1.4 in 2000. There is also a trend towards greater homogeneity in beer and wine drinking patterns in the European Union (EU) moving in the direction of a general beverage mix of around 50% beer, 35% wine and 15% spirits. Wine is being slowly replaced by beer in southern EU countries while it is increasing in popularity in northern European countries where it was not traditionally been consumed. Spirits consumption has also changed with a general reduction in intake in both the north and south of the EU and with changes in the types of spirits consumed. These new trends in drinking habits have been influenced by several factors including increased internationalisation and cultural cross-fertilisation, growth of multinational and transnational corporate enterprises, general economic conditions, aging of the population, increased public concern over problems related to alcohol misuse and health and lifestyle more generally, and changing government regulations and fiscal policies. It is likely that some of these factors, in addition to Gorbachev's anti-alcohol campaign and its legacy, as well as recent social and economic changes, also influenced drinking patterns in the FSU but the lack of earlier country-specific information on the amounts and types of alcoholic drinks consumed (except for Russia) and the acknowledged limitations of aggregate statistics on alcohol intake in the region preclude time trend analyses.

The FSU is a very diverse region in terms of ethnicity, culture and traditions and it cannot be assumed that vodka is the favourite alcoholic beverage in all countries. This is highlighted by the differences observed in the choice of preferred alcoholic drinks consumed by the respondents in this study. In Moldova, as in its neighbour Romania, wine is clearly the most commonly consumed type of alcoholic drinks both in terms of frequency and average amounts drunk. To a lesser degree, wine is

also a beverage of choice in the Transcaucasian republic of Georgia but not in Armenia where spirits are consumed frequently and in large quantities in males. In the Slavic republics of Russia, Ukraine and Belarus, which represent about 71% of the population of the FSU, alcohol is taken primarily as spirits, although the frequency of beer consumption is also relatively high. Finally, in the Central Asian republics of Kazakhstan and Kyrgyzstan (both with large Muslim communities, particularly in Kyrgyzstan), spirits also remain the most commonly used alcoholic beverage.

Although the LLH surveys do not allow for the assessment of time trends in the consumption of different alcoholic beverages in the FSU, a few differences in the frequency of beer, wine and spirits intakes among age groups support evidence from other sources suggesting that traditional habits might be changing in this region in parallel to changes seen in other parts of Europe. For example, beer appears to be more popular in younger respondents than in their older counterparts. This agrees with the evidence that beer sales are thriving in Russia mainly because younger consumers appreciate its lower alcohol content and find that drinking vodka is passé. The beer industry is indeed blooming in Russia as well as in other new independent states (NIS). During the late 1990s, beer production increased by 213% in Russia (1996-2001), 240% in Kazakhstan (1996-1998), 148% in Georgia (1996-1999), 138% in Ukraine (1996-2001), and 69% in Belarus (1996-2000). In Armenia, it increased by 1250% (from 37,000 hl in 1996 to 500,000 hl in 2001), a change that agrees with our observation that younger Armenian males choose beer more frequently than their older counterparts who are themselves more frequent drinkers of spirits than young Armenian males. These recent changes in the beer market in the region could have profound effects on the future drinking habits of the FSU.

Other generational differences are apparent in our data, particularly among young women. In the "spirit-consuming" countries Russia, Belarus and Ukraine, young women not only differ from their older counterpart in terms of beer consumption, but also with wine intake which they are more likely to consume at least weekly. On the contrary, young female, as well as male, respondents from the "wine-consuming" country Moldova appear to be abandoning the traditional wine and replacing it by beer.

Mean weekly alcohol intakes are an important source of information when comparing drinking habits among countries although they should not be over-interpreted as they are prone to reporting bias and need to be complemented by the proportion of abstainers in the population and by information on drinking pattern as the same mean consumption can have more detrimental effects in countries where heavy drinking in concentrated among fewer people. Estimating alcohol intake is well known to be problematic and survey respondents often tend to underestimate or distort their consumption. In countries where substantial drinking is common, we can assume that there may be less social stigma associated with reporting alcohol intake, at least in men.

In this study, the highest consumption of alcohol was observed in Belarus, Moldova and Russia; it was also in these countries that the proportion of abstainers was lowest, i.e., about 11-13% of males and 27-30% of females. The lowest intakes of alcohol were observed in Kyrgyzstan for males (31 grams/person.week) and in Armenia for females (8 grams/person.week), countries that also had a high proportion of males and females abstainers. In Russia, the proportion of male and female respondents who said they never drink alcohol was 11% and 27% respectively; however no distinction was made in the questionnaire between lifelong abstainers and ex-drinkers. The proportions observed tend to differ from results from previous surveys conducted in the mid-1990s which reported that approximately eight to nine percent of Russian men and between 35 and 51% of Russian women do not drink alcohol. These could represent real changes between 1994 and 2001, but the trend in males would contradict the observed reduction in the proportion of male abstainers observed between 1985 and 1995 in adults aged 25-64 years in Novosibirsk, a large industrial centre of western Siberia. Conversely, the Russia Longitudinal Monitoring Study (RLMS) suggested a very high proportion of male abstainers (29%) in 2001, the same year as the LLH surveys; however, underreporting of alcohol consumption in the RLMS has been suggested. In women, the reduction in the proportion of abstainers during the last 1990s would be consistent with the current pattern seen for smoking which is characterised by a rapid increase in the traditionally low prevalence of smoking, particularly in young women. Once more, however, the RLMS suggested a much higher rate of 54% of abstention in

women in 2001 which seems too conservative. Other surveys conducted in western Europe generally showed a lower prevalence of abstention in women compared with our findings. In the UK for example, only 11% of women aged 16 years and over in 1996 reported never drinking alcohol. In Finland, Germany, Ireland and Iceland, the proportion of female abstainers ranges from approximately 14% to 16%. In Sweden, there is a somewhat higher proportion of women who abstain from drinking alcohol (25%) compared with women from other Nordic countries, possibly due in part to the history of a strong temperance movement in that country. However, recent trends suggest that this is changing and that young women are developing more hazardous drinking patterns. Higher proportions of abstainers are observed in southern European wine drinking countries such as Spain (51%) and Portugal (49%), where wine is an integral part of the diet and drinking alcohol to intoxication is regarded as socially unacceptable. In parallel, we also observed the highest rates of abstention in women in countries where wine was most frequently consumed, i.e., Moldova (61%) and Georgia (71%). In men, the proportion of abstainers observed in Armenia, Georgia, Kazakhstan, Kyrgyzstan and Ukraine tended to be higher than what is seen in western Europe (range from 7% in the UK to 13% in Sweden). However, otherwise the respondents were generally representative of the survey population as the surveys' response rates were generally high and the distribution of the samples by sex, age, area of residence and nationality compared favourably with the distributions found in the general population. In addition, response rates for questions related to alcohol consumption were high (e.g., 99.95% for overall frequency of consumption; >99.8% for the frequency of beer, wine and spirits consumption).

The main motives cited by individuals for drinking alcohol are generally to cope with stress, be sociable, increase social confidence, and enjoy oneself. In this study respondents commonly stated that alcohol helps to relax and to forget problems, particularly among men and those who drink more frequently. The beliefs that alcohol can enhance confidence (help to communicate) and that it is important for enjoyment (good way to mark social occasions) was also widespread among drinkers. One important finding is the fact that about one in four respondents who drink alcohol at least occasionally (one in five in Belarus, Russia and Ukraine) believe that alcohol is advantageous for health. This suggests that public awareness of the possible risk of alcohol to one's health is not widespread in the region, or that people are in a state of denial. Indeed, few alcohol prevention programmes are yet in place and there is little evidence that alcohol, as a threat to health, is a serious policy concern in the region. This weakness, along with the acknowledged health and economic burden due to alcohol in this region, the continuing access to cheap legal and illegal home-made alcoholic beverages, and evidence suggesting an increasing trend in the proportion of young Russians drinking frequently and being drunk strongly suggest that alcohol consumption should be a priority on the public health agenda in the region. Policies aiming at preventing and reducing alcohol-related harm must take account of the context of increasing globalisation in alcohol drinking patterns, beliefs and attitudes in Europe.

These data are limited in that they reflect one point in time (late 2001)—some ten years after the collapse of the former Soviet Union. The effects of stress on mortality and health lifestyles would have been greatest during the turbulent 1992-94 transition period. The respondents in this sample have had a decade to adjust to the changes and, as noted, there have been some recent signs of economic improvement. Yet this is a period when life expectancy for both adult males and females is still declining in Belarus, Kazakhstan, Russia, and Ukraine. For the three predominately Slavic nations, the decrease in longevity for males is part of a long-term trend stretching back nearly four decades. So, if stress is operative, it would be chronic rather than acute and these data do not provide evidence of strong effects on men. There is also the possibility of response bias in that both men and women may feel stressed, but only women report it. However, there is no evidence to suggest that this is the case. There were 4,444 randomly selected males spread across four CIS countries in this study and the results were consistent by gender and region. No subset of this population appeared to over-report or under-report stress symptoms. We believe the findings are accurate and that women are especially disadvantaged in these four countries, with stress serving as a major indicator of their predicament.

We know that the principal causes of the increased mortality are deaths from cardiovascular diseases and alcohol-related situations. The current challenge is to uncover the factors ultimately responsible

for these causes. As noted, infectious diseases, environmental pollution, impoverishment, malnutrition, and medically avoidable deaths have been eliminated as major causal factors, leaving the respective contributions of stress and health lifestyles to be determined. These data clearly show that stress is not the principal cause of the premature mortality. Women are found to be exceedingly more stressed than men and, while stress undoubtedly makes their lives less pleasant and healthy, it is obviously not killing enough of them prematurely to overtake male mortality. These data also suggest that marriage may be an important barrier to stress for males.

As bad as the situation may be for females, the key to explaining the mortality crisis ultimately lies in male behavior. These data and several previously cited studies show that males drink and smoke far more than females and have less healthy diets. These lifestyle practices and their relationship to cardiovascular and alcohol-related mortality appear to be the most pervasive cause of premature male mortality. We suggest that the disposition of males to routinely engage in harmful health habits is primarily grounded in the normative behavior of males, rather than the stress they experience. These data show, for example, that heavy vodka drinkers do not suffer from insomnia, nor do they experience the other stress symptoms.

It may be that stress is not as strong a factor as expected in Russian male drinking because drinking eliminates its presence. This is not to say that stress does not underlie drinking, but that once drinking practices are established for an individual, drinking suppresses stress. As Boris Yeltsin (2002) explains in his memoirs, he learned "fairly early on …that alcohol was the only means to quickly get rid of stress" (p. 318). Therefore, it may be that heavy drinkers are not stressed because they drink heavily. Drinking may, in fact, promote feelings of well-being. This outcome is seen in a study in Moscow where some 40 percent of male respondents reported that alcohol makes them feel more optimistic about life (Mustonen 1997). This may be one reason that research by Bobak et al. (1999) found alcohol consumption in Russia to be spread rather uniformly among males and not related to material deprivation, economic or political change, or ratings of the economic situation.

When men in the former socialist countries drank and smoked too much, these behaviors reflected a normative structure for male socializing. As Yeltsin points out: "The traditional Russian lifestyle dictates that it's impossible not to drink at a birthday; it's impossible not to drink at a friend's wedding; it's impossible not to drink with your coworkers" (p. 318). As previously noted, this situation suggests that it is the normative demands of a particular lifestyle that is largely responsible for the pattern of male drinking. As these normative drinking dispositions become routine and internalized by the habitus, they may be reproduced over generations by being constantly acted out. Bourdieu (1984) explains that the dispositions produced by the habitus are not eternal, but they are durable. These dispositions originated in a traditional drinking style of overindulgence in Imperial Russia that later flourished under state socialism (Shkolnikov and Nemstov 1997). The removal of religious constraints and the ready availability of cheap vodka as a major source of government tax revenue were important contributing factors.

While it might be argued there is always a choice to do otherwise, that is, to not drink or smoke, eat fatty foods, and not exercise, group norms can take precedence even though the choices they influence are ultimately punishing. As Bourdieu (1984) explains, people may have control over their lifestyle choices, but not necessarily over the social and psychological conditions channeling those choices in a certain direction as opposed to others they might take. Bourdieu (1977), for example, describes how the dispositions of French working-class youth toward low educational attainment were transmitted intergenerationally through socialization and continued to produce self-defeating behavior. We would argue that a similar process promotes negative health lifestyles among males in the four CIS countries in this study and that such lifestyles are primarily responsible for the abbreviated life spans.

1.4. Influences on happiness

A series of OLS regression analyses were undertaken to test influences on happiness. To ascertain the extent to which each hypothesis was sufficient to explain variance in individual happiness, separate regressions were initially run with a bloc of indicators appropriate for each hypothesis. Each bloc regression identified some indicators as significant and some as insignificant or, given the massive size of the sample, as trivial in terms of Beta values, even though statistically significant. Trivial influences were dropped from the second stage that combined all influences in a single multiple regression analysis.

Multiple influences on happiness. The bloc regressions show that more than one hypothesis can explain a noteworthy proportion of variance in happiness--but not equally so. Happiness is most influenced by health (19.8 percent of the variance explained). It makes sense to speak of a sound mind in a sound body, for not only is an individual's general state of physical health important for happiness but also a person's sense of control over what happens in their lives and self confidence. Material conditions also register a substantial influence, explaining 14.1 percent of the variance in a bloc regression. The most important material influences are subjective satisfaction with the current household economic situation and objective material living standards, as indicated by a household's number of consumer goods. While the bloc regression for social capital registers a slightly better fit for happiness than does human capital, both are of secondary importance, explaining about half the variance that health can explain, and also less than material conditions.

The need for a multi-variate explanation of happiness is confirmed by combining the independent variables from the five bloc regressions into a single analysis. When this is done, the total variance explained rises to 28.8 percent. Net of the impact of material conditions, all three health indicators remain substantially important, and three of the four indicators of material conditions do so too. The relative importance of social capital is shown by five social capital influences remaining significant as against only one human capital influence. Taking individual-level variables into account further reduces the influence of context. It is particularly striking here that inflation, which is a pervasive influence affecting everyone in a money economy, fails to register any statistical significance as an influence on happiness in post-Soviet societies. In other words, how an individual responds to transformation is far more important for happiness (and much else) than the objective nature of a contextual stimulus.

Impact on happiness. The impact on happiness of each hypothesized bloc is reflected in the b values for the combined regression. Thus, if a person moved three steps upwards from the worst to the best self-assessed health, then the impact on their happiness, net of all other influences, would be an increase of 0.72 on the four-point happiness scale, bringing the average person towards the prospect of being very happy rather than fairly happy.

Altogether, the impact of both health and material conditions is large--and independent of each other. Being at the highest rather than the lowest level on all three health indicators boosts happiness by almost one full point, and the same is true for the four indicators of material circumstances. Although none of the social capital indicators shows as strong an influence on happiness as the most important material and health measures, net of all other influences, they collectively are capable of raising a person by almost seven-tenths of a point on the happiness scale. By contrast, age, education and gender have little impact and the same is true of context.

1.5. Influences on well-being

Since self-assessed health has the biggest statistical influence and impact on happiness, this re-opens the question: What is the relationship between the multiplicity of indicators that may be used to assess well-being? Since well-being is not a tightly defined word or concept, it can be argued that health, happiness and overall life satisfaction are simply three facets of the same construct. If this is the case, we would expect that adding health to the factor analysis of satisfaction indicators and happiness

would produce a single factor in which all three indicators loaded together. Such a result would suggest that the influence of health on happiness is largely spurious.

Health and happiness do load strongly together on the same factor (0.79 and 0.75), but these two components of well-being are independent of overall life satisfaction. Life satisfaction continues to load strongly with indicators of material conditions. In other words, health and happiness are not just an alternative form of material satisfaction. Since the happiness/health factor has only a minimally acceptable eigen value (1.1), the factor analysis leaves open the possibility that the relationship between happiness and health could be that of cause and effect rather than being two parts of the same underlying construct.

There is also the possibility that health is caused by material conditions. This assumption can be tested by running a regression in which health is the dependent variable. The evidence rejects this assumption. Age is by far the strongest influence on health. As people grow older their health deteriorates. Education and gender are also important influences. The poor health of women in the sample is due to the fact that women are grossly over-represented among the older population, because of high rates of early mortality among men. The bloc R2 for the three health indicators is 21.6 percent. Although material conditions are influential too, the bloc R2 is barely half that of health. The influence of social capital and of context is minor.

When all influences on health are combined in a multiple regression, the total amount of variance explained rises to 28.7 percent, but this increase is only seven percentage points more than the variance explained by the bloc regression for human capital The collective impact of human capital cannot be assessed, since education improves health substantially, while age reduces healthiness. Material conditions, particularly a person's current household economic situation, also has a substantial positive impact on health. Social capital is much less important for health (collective impact, 0.34) than for happiness (impact, 0.69).

To determine the extent to which happiness and health influence each other a two-stage Least Squares Regression was run . It confirms that there is an exchange of influence. Health has a Beta of .17, the largest of any significant influence on happiness. Likewise, happiness has the most influence on health (Beta: .21). The variance explained in each two-stage regression shows that there is a good fit, 28.7 percent for health and 23.4 percent for happiness.

Notwithstanding reciprocal influence, the causal model of health is substantially different from that for happiness. For health, age is the most important influence, whereas it fails to achieve significance for happiness. Moreover, the two other human capital indicators, gender and education, are also much more influential for health than for happiness. Material well-being is of slight importance for health by comparison with age; and both social capital and context are insignificant influences.

By contrast, the major influences on happiness are health and material well-being, and the Beta for current economic satisfaction is almost as large as that for health (0.15 and 0.17 respectively). In addition, social capital registers five significant influences and context has some influence too. Since the two-stage regression reduces to insignificance the influence of control of one's life and self-confidence on happiness, happiness may be a generic tag for social psychological and psychological influences on physical health. That these psychological indicators can influence happiness but age does not shows that while older people may find that their physical health is deteriorating, their psychological state may be holding steady or even improving as, with experience, they become more confident of themselves and of their ability to control their lives or, in post-Communist countries, to respond successfully to the shocks of transformation).

Differences in the causes of two major desiderata of human life show that health and happiness are not interchangeable indicators of well-being and welfare but rather each is distinctive, albeit overlapping, in importance to individuals.

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2. BACKGROUND AND OBJECTIVES OF THE PROJECT

2.1. Health conditions and health behaviours

2.1.1 Background

In the post-war period many aspects of life in western Europe changed beyond recognition. Advances in technology, innovative management methods, and expansion of markets created sustained economic growth and rising standards of living. Expanding international trade and growing disposable income brought many new opportunities, and with them major changes in lifestyle. The free flow of information, at ever faster speeds, brought new ways of thinking and an explosion of knowledge about the causes of health and disease.

In eastern Europe the situation was very different. During this period each of these countries shared in an experience that continues to have profound implications for the health of their populations and their ability to respond to them more than ten years after the Soviet Union has ceased to exist. The Soviet regime imposed physical barriers with the west, exemplified by the Berlin Wall, but it also created an equally important cultural divide.

However the Soviet bloc was also very diverse, politically, geographically and culturally. Some of the newly independent states that emerged from the Soviet Union in the 1990s had never previously existed as discrete entities, resulting from lines drawn on maps by Stalin in the 1920s with scant regard for national identities. Yet others, in central Europe, had achieved independence in the inter-war years, with democratic governments that were then quashed by the Red Army at the end of the Second World War. It spanned nine time zones, from Berlin in the middle of Europe to Vladivostock on the Pacific coast, and from Murmansk on the Arctic Ocean to Albania on the Mediterranean. And while, in some countries, such as Hungary or Poland, people were able to travel to the west to study or attend conferences, academics and policy-makers in the Soviet central Asian Republics and many parts of Russia were almost completely isolated.

Notwithstanding the enormous diversity between and within countries, some simplification is possible. Politically, the region divides into two parts; those countries that were part of the Soviet Union and those that were its satellites. These political divisions are mirrored, to a surprising extent, in patterns of health. Taking life expectancy at birth, with all its limitations, as a broad summary measure, both parts of the Soviet bloc had attained a level broadly similar to the average for western Europe by the mid 1960s. Soon after, however, things began to go wrong. While life expectancy in western Europe steadily increased, in the countries of central and eastern Europe (CCEE) outside the Soviet Union it stagnated so that, by 1990, it was six years behind that in the west. In the Soviet Union, in contrast, life expectancy actually deteriorated, falling by two years between 1970 and 1980. It then began a serious of unexpected fluctuations in which life expectancy improved dramatically in 1985 before falling back after 1987 and then accelerating downwards. This pattern was relatively

consistent across the 15 republics that made up the Soviet Union, the exceptions being the more traditional central Asian Republics and Georgia.

In the period since 1990, countries have taken different political pathways, a diversity that is also apparent in their patterns of health. The more "western" of the CCEE, such as Poland, the Czech Republic, and the former German Democratic Republic, have experienced rapid improvements in life expectancy while the more "eastern" ones, such as Romania and Bulgaria, are only now beginning to see some improvement.

In the countries of the former Soviet Union (FSU) the path followed by each country was initially much more consistent, with a rapid fall in life expectancy until 1994, followed by a recovery which, in some such as Russia and Ukraine, peaked in 1998. One of the few exceptions to this pattern was Belarus, which after 1994 continued on a downward path. Belarus also differs from its neighbours in retaining a model of government that is little changed from the Soviet period and so, in broad terms, might be considered as acting as a control, showing what may have happened in its neighbours had the Soviet Union not ceased to exist.

Even at this extremely superficial level it is apparent that the picture is complex. While it is obvious that the policies pursued by the Soviet regime, and the events following its collapse, had a profound impact on aggregate measures of mortality, this tells us nothing about how this has happened. What causes of death lie behind these changes? And what biological risk factors, and ultimately social factors, underlie them? Have all groups been equally affected or are some more protected from transition than others?

There are many reasons why we must answer these questions. The first is the need to reduce the sheer toll of human misery that underlies these statistics. High rates of premature death leave children orphaned and families impoverished. Disease and disability reduce productivity and act as a brake on economic development. As a result, countries fall into a vicious downward cycle, as low growth impacts on health and so on. Tragically, too many of those few individuals with the vision and ability to lead their countries out of this situation have themselves died prematurely.

The second reason is that lessons learned in this region have implications for populations elsewhere, who are often less visible either because they live on the margins of western societies or because they live in other middle income countries where the absence of valid vital registration systems means that they are effectively invisible. Despite its many drawbacks, the Soviet regime bequeathed to epidemiologists a high quality system of vital statistics. Some countries did conceal data at various times, either withholding data completely, as the Soviet Union did in the early 1980s, or "loosing" certain sensitive causes such as homicide, suicide and cirrhosis in non-specific categories, as occurred in the German Democratic Republic in the 1970s and 1980s. However, in all cases comprehensive data sets have now been reconstructed. The few remaining problems relate to coverage in some of the least developed parts of central Asia and to regions afflicted by war, in the Caucasus and the Balkans, where systems of vital registration systems have been weakened but, more importantly, where the scale of migration is largely unrecorded.

From the perspective of the researcher, the political events that took place in this region in the late twentieth century represent a series of enormous natural experiments where the health effects are discernible, at least in terms of mortality. As this chapter will show, these experiments have produced many important new insights into the mechanisms of disease, at all levels from the molecular to the social.

While the analogy should not be stretched too far, there is growing evidence that patterns of mortality seen in this region, in particular high death rates among young men from injuries, cardiovascular disease and alcohol-related causes, are also seen in some marginalised populations in the west. What limited information exists also suggests some parallels with middle income countries such as South Africa.

2.1.2 A conceptual framework

To try to make sense of the patterns of health in this region, this chapter will take a systems approach. The focus will be placed on countries of the FSU but some examples will also be taken from research performed in the CCEE. Soft systems theory offers a way of understanding phenomena that take place at many different levels, but which interact with each other and with the broader environment within which they exist. Individual systems exist within a hierarchy, with certain properties emerging at different levels. They are complex and adaptive, incorporating feedback mechanisms, both positive and negative. Understanding a complex system requires a broad range of disciplines and perspectives, each depending on the question being asked at the time.

To take a simple example, a human can be considered as a system. To function, the individual must be able to maintain an internal metabolic homeostasis. Understanding this requires knowledge of physiology and cellular function. They must also be able to interact appropriately with those around them, an understanding of which requires knowledge of psychology and sociology. All are important to provide an overall picture.

The application of this approach may be easier to understand in a more specific example. As already noted, nearly all of the Soviet republics experienced a dramatic increase in life expectancy in 1985 and, perhaps more surprisingly as they were by then all independent, a steep fall between 1991 and 1994. Several distinct, and apparently unrelated causes of death contributed to these changes, such as injuries and heart disease, but not cancer, indicating a phenomenon that must have its origins at a societal level, acting through multiple biological and social pathways. However, to understand how these societal changes led to such rapid fluctuations in heart disease, for example, it is necessary to look to epidemiology to identify who was affected and who not, and to physiology to determine the biological mechanisms involved.

To add to the complexity, however, another perspective is necessary, that of time. This is often obvious, although surprisingly often overlooked, for example by those who use regression models to seek a link between measures such as current smoking status and mortality. Thus, an individual death may reflect events that have just happened, as when someone is killed by a drunk driver, or events long in the past, as when someone dies from lung cancer in old age having first decided to start smoking when a teenager. However, an understanding of patterns of health in a population must also take account of the growing body of evidence linking circumstances in utero or in early childhood to health in later life.

Describing patterns of mortality

This section looks not only at current patterns of health but also at recent trends in countries of the FSU. A historical perspective is always important but it is especially so in this region as these trends have been extremely complex, with mortality from different causes and at different ages moving in different directions at different times. This complexity does, however, provide many clues as to their causes.

Mortality can be disaggregated in many ways. Looking first at gender, it is apparent that men have been especially vulnerable. In all industrialised countries men have a lower life expectancy than women but the gap is especially large in the FSU compared with countries of Central and Eastern Europe (CCEE) and western European countries.

Turning next to deaths at different ages, those among infants and young children have fallen steadily throughout the 1970s and 1980s, a decline that has accelerated in the 1990s. At the other extreme of life, death rates among the elderly are now generally higher than they were in 1990 in the FSU, although the difference is small in the three Baltic Republics. However the greatest impact has been on those in early middle age, with their deaths driving the large fluctuations in overall mortality.

These changes have led to a situation in which the overall death rate among middle-aged men is about four times higher in the FSU than in Western Europe. Among women the differences are somewhat smaller and do not exhibit the peak at middle age seen among men. Death rates at older ages among both men and women are about twice those in Western Europe.

The causes of death underlying these changes are inevitably extremely complex and the following description is, of necessity, a simplification. To understand the very different trends in the Soviet Union it is necessary to go back to events in 1985, when the Secretary General of the Communist party of the Soviet Union, Mikhail Gorbachev, implemented an initially highly effective and wide ranging anti-alcohol campaign. This led to an immediate improvement in life expectancy, due largely to a decline in cardiovascular diseases and injuries. Smaller contributions were made by a range of causes known to be associated with alcohol, including acute alcohol poisoning and pneumonia. Importantly, other major causes of death, such as cancer, were unaffected. In the subsequent large fluctuations in mortality the same causes have been implicated, pointing to a major role for alcohol in the changing pattern of mortality in the former Soviet Union. This issue is discussed in more detail below.

2.2. Causes of diseases

2.2.1 The immediate causes

Any attempt to prioritise challenges to health is subject to many caveats. Different approaches to measuring the burden of disease will give different results. But whatever method is used, a few specific causes emerge as major causes of the health gap with western Europe. These are injuries and violence, cardiovascular disease, cancer, and some alcohol-related diseases such as cirrhosis. There are also some diseases, such as those due to infection, which while numerically less important, also merit attention because of their intrinsic preventability.

2.2.2 Injuries and violence (external causes)

By 1997 the death rate from external causes was about four times higher in the FSU than in the west. While all causes of injury are more common in this region than in the west, the difference in road traffic accidents, which is 40% higher in the FSU, is relatively small. This contrasts with suicide, which is 2.7 times higher in the FSU. The gap is even wider for homicide, where the death rate in the FSU is 17.5 times higher than in the west. Other external causes of death that are very much more common in the east than the west are drowning and deaths in fires.

A systems approach helps to understand the reasons for these very high death rates. There are clearly some common factors, as death rates from suicide, homicide and unintentional injury are closely correlated over time and between places. However there are clearly many specific mechanisms involved in particular causes of death.

Alcohol emerges as one common factor. In Russia, where these deaths have received most attention, deaths from all groups of external causes correlate closely with deaths from alcohol poisoning. The role of alcohol in unintentional injuries is self-evident. Drunk drivers kill themselves and others while drunk pedestrians fall under cars. Intoxication is also associated with falls and house fires, which are more likely to be fatal if all those present are also drunk. In a series of autopsies conducted on men dying from external causes in a city in the Urals over 50% had blood alcohol concentrations consistent with at least moderate intoxication. However 42% of those committing suicide also showed evidence of intoxication. Homicides are more complex as more than one person is involved, but in another study in Russia that used both forensic reports and court proceedings a very high rate of intoxication was reported in both victims and perpetrators.

But recognising the importance of alcohol is only a first step. It is also important to understand why people drink to excess. In Russia the highest rates of deaths from external causes, of all types, have been in those areas experiencing the most rapid pace of social and economic change. As this factor is common to deaths from many causes it will be considered in more detail later in this chapter.

Death rates from unintentional injuries reflect many factors related to risk and its perception, and to the environment. In the FSU, there are few of the design features that enhance safety in the west. Regulations are inadequately enforced, an acceptance of poor construction standards leaves electrical wires exposed and uneven surfaces that increase the risk of falls, and play areas are potentially

hazardous. In many cases effective health care could save lives but it is either unavailable or of poor quality, especially in rural areas suffering from poor communications and transport infrastructure.

2.2.3 Cardiovascular disease

Deaths from cardiovascular disease are also much more common in eastern Europe than in the west. Trends in cardiovascular disease in the FSU have, however, presented epidemiologists with a puzzle. Research undertaken in the west has shown that the factors causing heart disease act over long periods of time. Rates generally do not change rapidly. In the FSU, in contrast, on several occasions death rates have changed substantially from one year to the next. However deaths from ischaemic heart disease in the FSU also differ in several other important respects from those in the west. Death rates are especially high among the young. Deaths are also more likely to be sudden, with many victims showing little evidence of coronary atheroma at post mortem. The conventional risk factors, such as smoking, lipid levels, and physical activity, identified in western epidemiological research, have little predictive value. There is also evidence of differences in biochemical mechanisms. Thus, high density lipoprotein (HDL) taken from samples of Russian blood has different effects on cholesterol metabolism in cultured fibroblasts than does HDL from American subjects.

These findings have stimulated a reassessment of the aetiology of ischaemic heart disease. The emphasis, in western epidemiology, on the role of lipids has distracted attention from the other elements of thrombosis, first described by Virchow over a century ago. As well as changes in blood flow these include changes in vascular endothelium, permitting lipid to accumulate, and changes in platelet and fibrinolytic activity, influencing the propensity of blood to clot. In particular there is growing evidence of the importance of vascular endothelial function. Eastern European diets are characterised not only by large quantities of fat but also by very low levels of fruit and vegetables. Correspondingly, antioxidant activity in blood, which is determined primarily by intake of micronutrients, is extremely low. The increased understanding of role of micronutrients in macrophage adhesion and cholesterol passage through arterial walls provides mechanisms by which this could cause heart disease. Interestingly, statins, which appear to be able to reduce cardiovascular events faster than would be expected from their effects on lipids, also act on vascular endothelial function. This may provide an explanation for the rapid reduction in cardiovascular deaths seen in some of the CCEE such as Poland and the Czech Republic, where there have also been considerable changes in diet.

However these mechanisms cannot explain all of the observed effects, and in particular the much higher rate of sudden cardiac death among young men. Here it is likely that alcohol is playing an important role. In all of northern Europe, but especially in Russia and its neighbours, alcohol is typically drunk as vodka and in binges, unlike the more steady consumption in southern and Western Europe. It was suspected that this might be linked with cardiovascular deaths following the observation in Moscow that such deaths increased at weekends, a finding later replicated in Glasgow, Scotland, where there is also a culture of weekend binge drinking. This is clearly incompatible with the known behaviour of traditional risk factors. Subsequent reanalysis of studies looking at the cardiovascular effects of alcohol consumption found clear evidence that episodic heavy drinking, identified in various ways including frequent hangovers or getting into trouble with the police or frequent absence from work for alcohol related disorders was consistently associated with a substantially increased risk of, especially, sudden cardiac death. These findings had, however, been overlooked in many reviews because the exposures did not fit easily into meta-analyses looking at average daily or weekly consumption. Other work has disentangled the physiological basis for these findings, showing very different responses of lipids, blood clotting and myocardial function to binge drinking and regular moderate consumption.

On the basis of what is known about the aetiology of cardiovascular disease in the west it is, however, unlikely that these explanations will be able to account for all of the changes that have been observed. Work from the Whitehall study, in particular, has highlighted the importance of psychosocial factors and there is also some evidence from this region to link stress and lack of control over events with cardiovascular disease.

2.2.4 Cancer

The word cancer covers a multitude of diseases, each with their own risk factors. Understanding of the mechanisms of carcinogenesis, and thus its causes, remains incomplete. However, at the risk of simplification, some cancers are caused by identifiable, specific, external agents. Examples include tobacco smoke and asbestos causing lung cancer, human papilloma virus and cervical cancer, and Helicobacter Pylori infection and stomach cancer. The incidence of these cancers reflects exposure to the agent in question, although obviously the host response is also important. Others can be linked not to external agents (at least in most cases) but to patterns of growth at various stages in life, which in turn are being linked, increasingly, to levels of substances such as sex hormones and growth factors, in particular insulin-like growth factor (IGF). Examples are breast and prostate cancer. These tend to be more common among those who were well nourished and grew rapidly in childhood. Finally, a few, such as familial breast and ovarian cancer, have a clear genetic aetiology. Inevitably, in many cases all three factors play some role, although one is likely to be dominant.

This brief review helps to explain trends in the common cancers in eastern Europe. Thus, rates of stomach cancer are falling, although they are still at much higher levels in the west. This is consistent with other evidence about rates of Helicobacter infection, which are largely determined by environmental conditions in infancy. Thus, globally, there is a close correlation between stomach cancer now and infant mortality 60 years ago, a factor that explains the otherwise anomalous position of Japan. Smoking has been extremely common among men in all of eastern Europe, possibly encouraged by a shared experience of military service as teenagers. Consequently, death rates from lung cancer among men are extremely high. Interestingly, death rates from lung cancer are presently falling in many former Soviet countries but cohort analysis shows that this will be short lived, reflecting transiently lower levels of commencing smoking in the austere period of the late 1940s and early 1950s.

In contrast, smoking has always been relatively uncommon among women. This is now changing, and female smoking rates, especially among young women in major cities, are increasing rapidly, encouraged by aggressive advertising by western tobacco companies. Consequently, lung cancer rates among women can soon be expected to start rising.

The policy response to tobacco has been, in general, very weak. The tobacco industry has been able to ignore health ministries with limited capacity that is stretched further by a focus on health care reform. Even where advertising is illegal, fines are often derisory.

Finally, cervical cancer is also somewhat more common than in the west, a finding that is unsurprising given the high rates of sexually transmitted diseases and, until recently, the difficulty in obtaining barrier contraceptives. Unfortunately, the few effective cervical screening programmes are rare exceptions and screening is often opportunistic, with little quality control, and generally ineffective.

Cancers that are related to growth in early life behave as might be expected. Both breast and prostate cancer rates are much lower than in the west but are increasing steadily, just as those that reflect adverse circumstances in childhood, such as stomach cancer, are declining. In fact, in European countries there is a strong negative correlation between the two types of cancer.

In summary, the pattern of cancer mortality in the FSU is complex and changing. In the future, it is likely that deaths from some types, such as stomach cancer, will continue to decline while others, such as breast and prostate, will come closer to those in the west.

2.2.5 Other alcohol-related diseases

Although alcohol is clearly important in explaining the high death rate from injuries and cardiovascular diseases in the FSU, there are several other more specifically alcohol-related diseases that merit attention. They include diseases associated directly and indirectly with alcohol consumption. The former includes acute alcohol poisoning and cirrhosis; the latter conditions such as stroke and pneumonia.

An important geographical division is apparent. High death rates from injuries, cardiovascular deaths, and acute alcohol poisoning are seen in countries with a predominantly vodka based drinking culture. Links with binge drinking are easily understandable. These countries also tend to have relatively low death rates from cirrhosis, possibly because death from other causes occurs before cirrhosis can develop. In contrast, in southern parts of the FSU and Balkan regions, in particular in a band stretching from Slovenia to Moldova, the acute effects of alcohol are less apparent (with the exception of deaths from traffic accidents) but deaths from cirrhosis are extremely common. The reason remains unclear. One possible explanation is the pattern of drinking, with many heavy drinkers beginning to drink from early morning. Another is a low level of dietary micro-nutrients from fruit and vegetables, which could otherwise provide some protective effect.

2.2.6 Infectious diseases

As in the west, acute infectious disease is no longer one of the leading causes of death although mortality rates remain higher than in western Europe, particularly in the Central Asian Republics. The Soviet regime was extremely successful in reducing the toll of mortality during the twentieth century. This reflected the high level political commitment to the task, following Lenin's famous statement in response to outbreaks of typhus that "If communism does not destroy the louse, the louse will destroy communism". The Soviet system was especially successful in reducing vaccine preventable diseases, in part because of its pervasive system of monitoring and use of compulsion, although a breakdown of control systems in some countries following independence has allowed them to re-emerge. In particular, there were several major outbreaks of diphtheria in the early 1990s. In contrast, the lack of investment in infrastructure, with many rural hospitals lacking hot water even in the early 1990s, meant that other aspects of infection control were poor. This was exacerbated by adherence to outdated concepts of disease transmission and surveillance. As a consequence, especially in the countries of the FSU, levels of nosocomial infection are high.

The other infectious diseases causing concern are sexually transmitted diseases (STDs), HIV and tuberculosis. Rates of STDs rose rapidly in many countries in the 1990s. They have since fallen although there are concerns as to whether this reflects a true reduction in incidence or a decline in notification, as treatment is increasingly being provided privately.

Rates of HIV infection are still low, in global terms, but are rising extremely quickly in many parts of the FSU. At present, spread is primarily due to needle sharing among addicts but the epidemic is beginning to move into the wider population by means of sexual spread.

Rates of tuberculosis have also increased markedly in the 1990s, with death rates returning to levels last seen in 1980. Rates are especially high among the large prison population, where conditions are highly conducive to rapid spread and where treatment is often inadequate. A matter of particular concern is the high rate of drug resistant disease. This raises many difficult issues, in particular concerns about the wisdom of releasing second line drugs into a situation where sensitivity testing is limited and adherence cannot be ensured.

Obviously, the co-existence of HIV and resistant tuberculosis poses enormous challenges for the future, and which have yet to elicit an effective response.

2.3. The underlying factors

One of the most striking features of mortality in the FSU is the way that men have been affected much more than women. This document argues that much of this can be explained in differences in lifestyle, in particular use of alcohol and tobacco. This is consistent with research on those rare populations where the gender gap in mortality is small. Such populations usually have particular religious beliefs that lead them to abstain from alcohol and tobacco.

However not all men have been affected equally by the communist system and the subsequent transition, Lifestyle choices are heavily influenced by social circumstances and they can only be understood fully by considering the context in which they are made.

The social forces driving trends in mortality in this region are still inadequately understood, although some parts of the picture are clear. Those groups that have been worst affected have been so as a result of increasing deaths from external causes and cardiovascular diseases. Consistent with the findings discussed earlier, while deaths from causes linked directly with alcohol have been numerically less important, they have shown the steepest social gradients.

Turning to who has been affected, the rise in mortality has been greatest in regions experiencing the most rapid pace of transition, as measured by gains and losses in employment, and where measures of social cohesion were weakest. The individuals most affected have been men, with low levels of education, low levels of social support (such as the unmarried) and low levels of control over their lives. Women, Watson has argued, may have had some degree of protection as they could find fulfilling roles within the home while men with low skills levels were confronted with a feeling of impotence in a hostile and unresponsive world.

Although the mechanisms are clearly different, research on the determinants of the spread of HIV has identified similar factors as important.

Other insights come from studies of self-perceived health, a measure known to correlate with subsequent mortality. A study in Ukraine found that social networks and control over life could, to some extent, ameliorate the impact of adverse social circumstances.

These findings paint a picture of societies in which young and middle-aged men in particular face a world of social and economic disruption that they are poorly prepared for. For many, the opportunities are constrained by low levels of education and a lack of social support. Poor nutrition and high rates of smoking have already reduced their chances of a long life but the easy availability of cheap alcohol provides a pathway to oblivion and then to premature death. The hazards of drunkenness are exacerbated in a society in which there are few on whom one can depend and where one is surrounded by a poorly maintained, hazard-ridden environment.

2.3.1 The contribution of health care

The preceding sections have looked at the reasons why diseases occur. This section looks at what happens next. There is now considerable evidence that timely and effective health care interventions have played an important role in reductions in mortality in western countries. For example, researchers in several countries have estimated that about 40% of the decline in cardiovascular deaths during the 1970s and 1980s could be attributed to improved access to effective health care.

Research using the concept of avoidable mortality, which measures deaths that should be avoided if effective and timely care is available, has suggested that about 25% of the mortality gap between east and west Europe between birth and age 75 could be attributed to inadequacies in medical care in 1988, with deaths from avoidable causes declining at a slower rate in the east than in the west. Collaborative research on cancer survival, undertaken by Europe's cancer registries, shows that east-west differences are persisting.

While evidence of the contribution of health care to population health remains fragmentary, three broad patterns can be discerned within the CCEE and the FSU. Some countries, most often those that have been most successful in achieving economic growth, have been able to reform their health care systems relatively successfully (the word "relative" is important as none, with the possible exception of the former German Democratic Republic where the system was completely replaced by the west German system, can be considered to have been a complete success). In others, mostly in the less developed parts of the FSU, while the basic infrastructure remains in place, some elements have effectively collapsed. In particular, there have been major problems with pharmaceutical supply. The third pattern is seen in those regions that have suffered from war and other conflict, where there has been widespread destruction of facilities and where what health care exists is often dependent on international development assistance.

While the specific impact of health care on measures of population health is often difficult to detect, there are several well-documented examples of where this has been identified, some of them originating from the CCEE.

A study applying the concept of avoidable mortality to the two parts of Germany and Poland suggested that improvements in medical care accounted for 15-20% of the overall mortality decline among men in the 1990s in Poland and the former German Democratic Republic. The impact of health care was greatest among infants and those aged over 55. The rapid improvement in mortality among young men with testicular cancer in the former German Democratic Republic has also been attributed to better care, specifically greater access to modern chemotherapeutic agents.

Research on neonatal mortality has sought to separate the impact of health care from broader social determinants, with the former assessed by birth-weight specific survival and the latter by the overall birth weight distribution. In both the Czech Republic and the former German Democratic Republic there have been considerable improvements in birth-weight specific mortality, and by implication, the quality of care. As a consequence, closing the remaining gap with the best performing western countries will require policies that address the social determinants of low birth-weight.

In the second group of countries the situation is much less satisfactory. It is likely that the increase in mortality among the elderly in some FSU countries is a consequence of a reduction in the quality of health care, especially as the increase is greatest, and more sustained, in countries such as Belarus where the economic situation is worst. However the main evidence is from work looking at deaths among young people with diabetes. This population is especially susceptible to a breakdown in the delivery of health care as, in the absence of a regular supply of insulin, they will simply die. Deaths from diabetes at ages under 50 increased about eight-fold in the 1990s in many former Soviet countries. A study that interviewed surviving relatives and other key informants in Ukraine found that young people who died from diabetes had been able to obtain insulin but, unlike the situation during the Soviet era, they had relied on whatever strength or duration of insulin that was available. Test strips and glucometers were virtually unavailable, except to those with contacts abroad, and most deaths were from renal failure, with no prospect of receiving dialysis or a transplant.

Although less well understood, there has been a similar increase in cerebrovascular mortality in the same countries that have seen an increase in mortality from diabetes, possibly suggesting a breakdown in the management of hypertension.

Unfortunately the collapse in vital registration systems that has accompanied the breakdown of health care delivery in areas beset by conflict means that there is very little information available but it is almost certain that, apart from the more obvious direct effects of war, there will have been a substantial increase in mortality among those with chronic diseases requiring long term treatment, including not only diabetes and hypertension but also conditions such as asthma and epilepsy.

2.3.2 The public health response

The health challenges in this region are enormous. While life expectancy is now improving in many countries, the gap with the west remains very large and, at the present rate of change, it will take many years to close. In other countries the situation is either static or even deteriorating, and while still relatively unimportant in terms of their contribution to overall mortality, the spectre of AIDS and tuberculosis are all too apparent. Even more visible is the explosion of cigarette advertisements, signifying the enormous efforts by the trans-national tobacco industry to increase smoking rates, especially among young women. So why has the public health response been so weak? An earlier analysis of the policy inaction on childhood injuries provides some clues.

One problem was that worsening health was invisible. Data on health trends presented to politicians is often limited to easily understood aggregate measures, such as life expectancy at birth. While this has the benefit of simplicity it obscures the complex nature of mortality.

A second was a lack of public health capacity. Organisations responsible for public health were typically weak. The Soviet model sanitary-epidemiological system had been very effective in tackling communicable disease in the post-war period but was unable to adapt to the challenge of non-communicable diseases. It could not identify the nature and scale of threats to the health of populations or to develop strategies to address them. As in many countries, a career in public health was somewhat less enticing than many of the alternatives, thus attracting many of the weakest graduates, a situation exacerbated by undergraduate specialisation in the USSR.

Public health functions can, of course, reside in many other settings, within government, academia, and non-governmental organisations. In many countries these functions were also weak or, in the case of non-governmental bodies, virtually non-existent. With a few exceptions, as in the Baltic Republics, statistical offices confined their activities to the minimum necessary to satisfy the reporting requirements of WHO. In some places the academic public health community was somewhat stronger, with several groups participating in WHO programmes such as MONICA and CINDI, but these were isolated examples.

There were, however, specific problems in the Soviet Union, where access to ideas developed elsewhere was extremely limited (the Baltic Republics were an exception as they were able to maintain contacts with the west, in the case of Estonia because of a close linguistic affinity with nearby Finland). Thus, Marxist-Leninist teaching was that many of the emerging threats to health were transient, attributable to the transition to communism, and thus expected to resolve spontaneously over time. A rejection of experimental methods, linked with an absence of effective peer-review and an extremely hierarchical academic structure, in which knowledge accumulated only with age, led to many ideas that had no scientific basis and which were often harmful. Many are the legacy of a Ukrainian agriculturalist, Trofim Lysenko. He rejected Mendelian ideas, arguing that change in plants arose from adaptation to changing circumstances within a few generations. He went further, dismissing the idea that chromosomes even existed, suggesting that their appearance was a simple artefact in the process of dying slides. This idea chimed with the Marxist concept of human malleability through social change. This, and his peasant origins, secured his ascent within the Soviet scientific community, a position reinforced by the imprisonment or execution of those who disagreed with him. His ideas also permeated health care, influencing the widely held belief that large numbers of children were weakened and thus unable to adapt to their environment, leading to the administration of frequent injections of substances that were medically ineffective but, given shortages of syringes and needles, potentially contaminated.

Bizarre beliefs also held away in other areas. The approach to infection control owed more to theories of miasma than to germs and modern methods of outbreak management were unknown. Several eminent physicians published extensively on the health consequences of biorhythms, in which, in their more extreme version, adult health was determined by the point in the sunspot cycle at which you were born. This work bears more than a passing resemblance to astrology.

Although Lysenko was eventually discredited in the 1960s, his views remained widely held for several decades and the academic culture that allowed him to thrive was the same in which many senior Soviet public health scientists were trained. While many of the particular beliefs that emerged from this system are now mainly of historical interest, their true legacy is one in which dissent and open debate, especially with those in senior positions, are often strongly discouraged. Vaclav Havel, the Czech President, contends that societies under Communism were permeated by a fear that mitigated against independent thought.

A third issue was a lack of clear ownership. No-one was responsible for broadly defined population health. Finally, effective public health interventions often require working across sectors. However the widespread use of highly centralised vertical programmes conspired against collaboration at local level and central government ministries guarded their responsibilities jealously. Thus, a study of alcohol policy in Hungary demonstrated a widespread recognition of the problem, a willingness to act, but policy fragmentation and a lack of mechanisms for concerted action.

The situation has changed substantially since 1990 but there are still many problems. A review of the Russian language literature on the determinants of trends in health in Russia found little evidence of awareness of relevant research published in western journals or of modern epidemiological methods. Analytic capacity remains weak. Many ministries of health have become even weaker than in the communist period. The Sanitary-epidemiological system has remained relatively untouched by the process of reform, partly reflecting the low priority placed on them by government but also their reluctance to adopt new ideas.

There are, however, some encouraging signs. New schools of public health, with staff who have received training abroad teaching modern public health concepts, have emerged in several countries.

The Open Society Institute has recently established a major development programme both to help established schools to develop further and to support the development of other nascent projects.

2.4. Research needs

The new institutions that are emerging can only become effective if they can draw on appropriate, locally relevant evidence on the causes of disease and the appropriate responses. As the preceding sections have shown, the many natural experiments that have taken place in eastern Europe have provided important new insights on the determinants of health and disease. They have, however, also illustrated some of the challenges facing researchers in this region.

Several of the insights relate to novel risk factors and disease mechanisms. Earlier work on, for example, the link between smoking and lung cancer, and cholesterol and heart disease, was grounded in a model drawn initially from the germ theory, and subsequently enshrined in a biomedical model of disease causation. In this model exposure of a susceptible host to a specific agent leads to the occurrence of disease. In each case the exposures studied were clearly defined and easy to measure and the causal pathways were easily understood. However it has long been recognised that these traditional risk factors have limited ability to explain the distribution of disease in a population or why death rates from ischaemic heart disease in Europe vary so much.

While tobacco and cholesterol are clearly important determinants of disease in eastern Europe, some of the other factors are much more problematic as they are often difficult to define or to measure. This is illustrated by the example of binge drinking. It is self-evident that those who binge may be unable to recall how much they drank. Furthermore, if the probability of death is related to the amount of time when the individual is severely intoxicated that a small change in the frequency of binging, say from once a month to once a week, will have a substantial impact on the probability of death. This will be very difficult to detect in a classical cohort study.

Dietary antioxidants create even more problems. Dietary questionnaires are known to be problematic and, like drinking pattern, may change substantially over the course of a study. However at least alcohol is a single compound of identifiable strength. In contrast, for example, the amount of Vitamin C can vary ten-fold among different types of apple, even before considering differences in the size of the apple. Vitamins and other non-nutrients also vary according to methods of storage and preparation, and even the season in which they fruit and vegetables were harvested. One solution might be to measure biomarkers but again these reflect levels at a single point in time, which can be especially misleading in societies in which a modern retail sector has not yet ensured access to year round supplies of products grown on the other side of the globe. Furthermore, several important biomarkers are highly labile and require extremely complex systems for taking and handling samples.

The situation is complicated further by evidence suggesting important interactions between risk factors. High levels of fruit and vegetable consumption appear to be able to reduce the risk of certain cancers associated with exogenous carcinogens, such as tobacco or Helicobacter Pylori, while they have little or no effect on cancers caused by endogenous factors, such as breast and prostate cancer.

Looking to the future, it is increasingly apparent that there are substantial differences in gene frequency between populations. Thus, some genes become common because they once conferred a selective advantage in the face of a past exposure but in current, changed circumstances, cause disease. The thrifty genotype theory, developed to experience the high rate of diabetes in Pacific Islanders, is a well-known example. However there is also intriguing evidence that of high frequencies of genotypes among the Russian population that enable alcohol to be broken down rapidly to acetate, making it possible to drink very large amounts and be relatively immune from the worst effects of an acetaldehyde related hangover. In contrast, the most common genotype among Japanese people leads to a rapid rise in acetaldehyde, acting as a strong disincentive to binge drinking.

Finally, most studies in the past have focused on a few countries only and on one or two risk factors at a time. The need for more comprehensive research based on several countries using a variety of measures of lifestyle and psycho-social determinants of health is manifest.

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3. SCIENTIFIC DESCRIPTION OF THE PROJECT RESULTS AND METHODOLOGY

3.1. Methodology

Data were collected by face-to-face interviews (N=10,406) in November, 2001. The survey was conducted by organizations known for their experience in survey research in Belarus (Center for Sociological and Political Research, Belarussian State University); Kazakhstan (Center for the Study of Public Opinion); Russia (Center for Sociological Studies, Moscow State University); and Ukraine (East Ukrainian Foundation for Social Research). The study was funded by the Copernicus Program of the European Union as part of the Living Conditions, Lifestyles and Health (LLH) Project. The survey consisted of a representative sample of the adult population age 18 years and over. Samples were selected using multi-stage random sampling with stratification by region (except Kazakhstan) and area (urban/rural) (see Pomerleau et al. 2002). There was no over- or under-sampling of subgroups, but certain categories of individuals were excluded such as prisoners, military personnel, institutionalized and hospitalized persons, and the homeless. Also excluded were geographically inaccessible regions with few people in the autonomous districts in the Russian Far North and locales subject to military action like the Chechen and Ingush Republics in the Russian Federation.

Primary sampling units were established for each country and, within each unit, households were selected using standardized route procedures. The adult with the nearest birthday was interviewed within the household. If, after three visits (different days, times), there was no one home, the next household on the route was selected. Since a sample size of 2,000 provides reliable estimates of proportions that represent three percent or more of the population at the national level with a precision level of 0.75 percent for most CIS countries, the number of respondents in Belarus and Kazakhstan is 2,000 each. Because of their significantly larger and more diverse populations, the number of respondents was 4,006 in Russia and 2,400 in Ukraine. The response rates were 82 percent in Kazakhstan, 76 percent in Ukraine, and 73 percent in Belarus and Russia. No contact with eligible respondents after three visits ranged from 11 percent in Russia to 9 percent in Ukraine; refusals after contact ranged from 17 percent in Belarus to 15 percent in Ukraine. Non-contacts and refusals were not reported for Kazakhstan.

In the autumn of 2001 quantitative cross-sectional surveys were conducted in eight countries (Armenia, Georgia, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine), by local organisations with expertise in survey research, and using standardised methods. In brief, each survey sought to include representative samples of the national adult population aged 18 years and over, although a few small regions had to be excluded because of geographic inaccessibility, socio-political situation or prevailing military actions: Abkhazhia and Osetia in Georgia, the Trans-Dniester region

and municipality of Bender in Moldova and the Chechen and Ingush Republics and the autonomous districts located in the far north of the Russian Federation.

Samples were selected using multi-stage random sampling with stratification by region and area. Within each primary sampling unit, households were selected using standardised random route procedures, except in Armenia where random sampling from household lists was used. Within each household the adult with the nearest birthday was selected for interview.

It was decided to include at least 2000 respondents in each country, but to boost this number to 4000 in the Russian Federation and to 2500 in Ukraine to reflect the larger and more regionally diverse populations in those countries. The combined dataset contained valid data on health-seeking behaviour for 18,428 individuals.

The first draft of the questionnaire was developed in consultation with country representatives from pre-existing surveys conducted in other transition countries and from the New Russia Barometer surveys adjusted to the national context. It was developed in English, translated into appropriate national languages, back translated to check consistency, and piloted in each country. The questionnaire covered a wide range of issues related to living conditions, lifestyle and health, supplemented by an extensive battery of questions on socio-demographic and economic characteristics, experience of and attitudes to political transition, psycho-social characteristics, and social networks and support. It utilises responses to questions on decisions to seek care, the circumstances of obtaining care, and coping strategies substituting for formal treatment in the health system.

The questionnaire was administered by trained interviewers using face-to-face interviews conducted in respondents' homes. Statistical analysis was undertaken using the Statistical Package for the Social Sciences (SPSS).

3.2. Health service utilisation in the Former Soviet Union

A decade after the transition from communism, health systems in the countries that emerged from the Soviet Union have moved, at different speeds, away from the Soviet model of health care. The Soviet system was characterised by universal, free access to basic health services, centrally planned according to strict norms with the goal of achieving services of uniform quality in all parts of the Soviet Union. The events that accompanied the break up of the Soviet Union made it inevitable that this system would change, for two reasons. First, in many countries there was a widespread rejection of the Soviet model, with its symbolic association with the communist system. Second, in many countries, the economic collapse caused by the disruption of production and trading relationships and, in some cases, civil disorder, exacerbated by a widespread break down in the power of the state, meant that government revenues were no longer able to sustain the inherited system.

The systems that have emerged vary considerably although all countries have formally retained the principle of universal access to care. Changes have been both planned and unplanned. Planned changes include a move to more pluralistic systems of both funding and delivery. New systems of funding have included shifts to health insurance and expansion of out-of-pocket payments. Planned reforms of health care delivery include decentralization of the organisation of the system.

However in many countries it is the unplanned changes that have been more important in shaping the new system. They include a substantial increase in informal payments in some countries and a breakdown of existing systems for health system governance.

While there is extensive anecdotal evidence that access to care has suffered in this region, some small scale studies indicating how particular groups, such as those with chronic diseases, have suffered considerably, and a multi-country study found that 0.6% of households in Kyrgyzstan and 3.9% in Ukraine faced catastrophic expenditure due to health costs in one year. However there is, to our knowledge, no systematic research comparing how changes in different ex-Soviet countries have

affected access to health care. This study begins to fill this gap by examining patterns of health system utilisation in eight former Soviet Union countries, exploring the socio-economic determinants of utilisation and the extent of payment for health care, looking in detail at those who, despite illness, do not access health care.

3.2.1 Objectives

In this part we examine the health seeking behaviour of two groups of people. The first are those who consult a health care provider (regardless of whether they have had experienced an illness), looking at the situations in which they consult, where, whether they pay for these services, and their views on when it is appropriate to seek care. The second group are those who, despite experiencing illness, did not consult, even though they felt they should have done so.

3.2.2 Utilisation rates

In the preceding 12 months, in the sample as a whole, 52% of respondents visited medical doctor, 5% visited a medical assistant (feldsher), and 44% did not visit any health professional. When weighted for the differing populations of the countries, the corresponding figures for them as a regional grouping are 61.1%, 4.3%, and 34.7% respectively. However the probability of attending a health professional in the previous year varied widely across countries, ranging from 65.7% in Belarus to 24.4% in Georgia.

3.2.3 Affordability and access to care

The first step in interpreting the results is to separate those who did or did not experience an episode of illness that they felt justified consulting a health professional. Overall, of those reporting an illness they felt justified seeking attention, 20.7% did not do so. The probability of not seeking attention when it seemed justified varied greatly among countries. Only 9.4% did not seek care in Belarus while the corresponding figures were 42.4% in Armenia and 49% in Georgia.

The reasons cited for not seeking care, including alternative strategies to cope with the illness, among those who reported being ill but not obtaining care (n=2478), were explored in more detail. 77.8% of respondents cited one reason, and 21.8% two or more reasons for not consulting. The most important reason for not seeking care was lack of money to pay for treatment, at 45.2%. 32.9% reported self-treating with home-produced remedies and about a fifth (21.8%) purchased medicine directly from a pharmacist, without obtaining a doctor's prescription. Reasons such as long waiting times to see a health professional (8.8%), or lack of trust in the health system in general or health professionals in particular (7.7%) were less common reasons for not consulting.

These aggregate results mask dramatic differences between countries. The countries appear to fall into three groups. The first consist of Armenia, Georgia and Moldova, where unaffordability was particularly common, with 33%, 23% and 13% respectively of those ill reporting being unable to afford to attend a skilled health worker. In Belarus, Russia and Kyrgyzstan, few of those reporting having been ill said that they had been unable to afford care. Kazakhstan and Ukraine occupied intermediate positions, with about one in ten people reporting illness unable to afford care. In most countries the combined percentage of those reporting not seeking care but instead either self-treating or buying something from a pharmacist was similar, with the precise division between the two options varying; the exceptions were Belarus and Kyrgyzstan, where these options were rarely used.

Another perspective on the relationship between health and expenditure can be obtained by asking whether the household had to do without necessary medical services or drugs in the previous year because of affordability. The exception is Kyrgyzstan, where not having money to pay seems a very rare reason for not obtaining treatment when ill yet a relatively high proportion of households report having to do without either medical care or drugs at least sometimes. The explanation for this discordance is not obvious, as respondents from Kyrgyzstan are not more likely to self-treat.

Another perspective can be gained by looking at respondents' experiences in their most recent consultations. Overall, 31.2% of those who had consulted paid out-of-pocket, whether in the form of money, gifts or both. In 3.6% of cases a fee was paid, but by the employer, and 65% made no

contribution. However, the vary widely among countries. As expected, the highest probability of making an out-of-pocket payment or a gift was in in Georgia and Armenia (65% and 56% respectively), with the lowest in Belarus and Russia, at 8% and 19% respectively . Among those who reported the value of the payment or gift, the median amount was US$6.3.

3.2.4 Determinants of utilisation

Those who report being ill but do not consult are of particular interest. To understand their characteristics better, the analysis examined how the probability of not consulting when ill varied with a range of covariates that might be expected to exert an influence on health-seeking behaviour. The probability of not consulting was highest among those over 65, those with lower educational attainment, or who were single, in all countries. There is also a clear relationship the material status, with the probability of consulting when ill increasing as the number of key household assets increased. The probability of consulting also increased with subjective measures of well-being, such as satisfaction with income and material living conditions. These subjective measures have, elsewhere, been found to correlate better with health-related behaviour than more 'objective' measures of income, a finding that is unsurprising given the widespread informal economy and non-monetary transactions in this region.

It is also plausible that health-seeking behaviour will be influenced by factors related to what has become termed broadly as social capital, including the extent of social support available to the individual. There is some evidence that utilisation is less among those with the least social support, for example those who do not participate in organisations. Perceptions of freedom of choice or control over one's life have less marked relationships with utilisation.

Clearly many of these variables are inter-related. Consequently their influence was explored further by means of logistic regression, using SPSS. The dependent variable was the probability of not consulting a health professional among those reporting having been ill. As no obvious differences among countries were seen in the univariate analyses, at least in terms of the nature of relationship between potential explanatory variables and health seeking behaviour, an aggregated dataset was used. Independent variables to be entered into the model were selected from among the variables listed in, in the light of the univariate relationships exhibited, and of evidence from literature on the determinants of health-seeking behaviour. They were then grouped logically into several broad categories: socio-demographic (sex, age, education, and marital status); financial status (financial resources, number of assets, self-assessed financial status); and social support systems (a composite index of freedom of choice and control over life, membership of organisations, and a composite index of social support). The composite indices were taken from an earlier study using this dataset, looking at responses to transition. Each block was then entered stepwise, with forward selection according to likelihood ratio. Three models were created entering one to three blocks of variables.

In the model containing socio-demographic variables, the probability of not seeking care increased with age, with those over 65 being more than three times more likely not to seek care compared to those under 35. Education was also important, with lower use among those with lower education. Gender and marital status were not independently important.

When financial factors were added to the model, the influence of age was reduced. Use of health care was markedly lower among those with fewer assets or shortage of money. The addition of variables related to social support increase explanatory power further, although also reducing the influence of age while maintaining the influence of financial status. Formal social support, defined as membership in organisations of any kind, is an important determinant of seeking care, as is the composite index of social support, while control over one's life was not important.

3.2.5 Care settings

In the Soviet system, primary care was provided in two types of facilities, district health post or policlinics (primarily for those not in employment, including children, pensioners and the unemployed, and occupational facilities, for those in employment. In six countries, more than 60% of those respondents who had received care in the previous year experienced their most recent contact

with a health professional one of these settings, with most contacts taking place in district facilities. The exceptions were Armenia (53%) and Georgia (41%). In both of these countries, the overall probability of consulting was lowest, the explanation seems to be a much lower use of district facilities.

In Georgia, the lower use of district primary care facilities is, to some extent, counterbalanced by a much higher use of private facilities, with 16% of last contacts in this sector, compared with a maximum of 6% (Kazakhstan) in the other countries.

3.2.6 Utilisation in different hypothetical scenarios

The analyses so far have looked at actual behaviour in relation to episodes of illness, with the nature of the illness undefined (of necessity, given the vast range of possible conditions and the difficulty of categorising them for analysis). Another way to assess experience of obtaining care (combining information that respondents will have obtained from their own experiences and those of friends and relations) is to ask what they would do when faced with a range of common health conditions. The situations in which formal medical advice is most likely to be sought include fever lasting over three days (38%), abdominal pain (24%), and for chest pain (18%). Self treatment, including use of home remedies and alcohol especially common in cases of cough, or diarrhoea, but is widely used for all complaints. Purchase of pharmaceuticals without prescription is also common, especially for headache, bad cough and diarrhoea.

Differences between countries were explored in more detail by focusing only on the three conditions perceived to be most likely to justify seeking care (chest pains, abdominal pains, fever lasting over three days). The probability of seeking care varies widely among countries. While in Belarus 56% would consult with a health professional where there was a prolonged fever, only 16% would do so in Armenia.

Health seeking behaviour was explored further by asking what someone should do if they were in need of urgent hospitalisation but they were told that there was a waiting list of several months. The most frequently mentioned course of action was to use of informal mechanisms, such as use of connections (36.7%) or offering health professionals money (28.5%). More transparent strategies such as seeking to persuade hospital staff or lodging a complaint scored much lower on the list. 7.8% would turn to alternative or traditional healers and 15.2% believed there was nothing they could do. The percentage of those saying they would pay or use connections varied but there was no clear pattern, so that the figures were similar in Belarus and Georgia, despite very different access to care in the two countries as shown by responses to earlier questions.

3.2.7 Discussion

The creation of the Soviet health care system was, by any standards, a remarkable achievement. Prior to the liberation of the serfs in 1861, health care in rural Russia was virtually non-existent. The situation began to change in 1864 when Tsar Alexander II initiated a system of local government, the Zemstvos, with responsibility for, among other things, health. Yet while these entities achieved much, by the end of the nineteenth century the situation in many remote areas remained dire, as described eloquently by commentators such as Anton Chekhov.

The Bolsheviks placed a high priority on health, initially emphasising prevention in the face of widespread epidemics of typhus following the civil war. Over time the Soviet government built up a widespread network of health facilities and while the quality of care was always better in the cities than in rural areas, it did manage to deliver universal access to basic care to an extremely dispersed population. Yet by the 1980s the weaknesses in the system were already apparent. The failing Soviet economy could not provide the increasingly technical model of health care emerging in the west. Yet it still managed to provide at least basic care to all, an achievement that, in many of the newly independent states, would not survive the break-up of the Soviet Union.

This paper provides the first detailed comparative assessment of access to health care in a majority of the former Soviet Union. Its strength is its use of standardised questionnaires administered simultaneously, with large samples in eight countries, several of which have been the subject of

virtually no such research until now. The samples appear largely representative of national populations in terms of common demographic variables although there does seem to be a slight under-representation of men in Armenia and Ukraine and of the urban population in Armenia and of the rural population in Kyrgyzstan, and the oldest age group are slightly over-represented in Armenia, Moldova and Ukraine. However comparisons with official data may be limited by the failure of some country data to fully capture post-transition migration and other factors and these deviations are minor and unlikely to affect the results significantly. However we cannot exclude the possibility that, as with all surveys in the former Soviet Union, it will have missed groups living on the margins of society who are especially difficult to reach. Consequently it is plausible that these findings underestimate the scale of problems that exist.

Its weaknesses are common to all population-based surveys of health care utilisation. To fully understand the process of seeking health care it is necessary to have detailed information on pre-treatment health status as well as utilisation. Furthermore, given the many factors other than simply health status that influence whether an individual will seek care for a particular condition, it is important to supplement quantitative data with qualitative research. Such research is being undertaken as part of the larger project within which these surveys were undertaken and will be reported subsequently. Another weakness is the use of 12 month recall periods, necessitated by the need to identify adequate numbers of people reporting illness in each country. Ideally, the samples would have been much larger and would have focussed on a period of only four weeks. Another limitation is that respondents defined whether an episode of illness justified seeking health care; although in a survey this is the only feasible approach, clearly the criteria used will be shaped by expectations and experiences. Unsurprisingly, the probability of having an episode of illness that met these self-defined criteria varied, and in the way that would be expected, with 48% of the Georgian sample so responding, compared with 73% of the Belarusian sample. It is, of course, impossible to say whether respondents from Belarus are therefore overusing services or Georgians under-using them; it is, however, clear that the threshold for considering seeking care varies, with the barrier highest in the countries where the system seems to be functioning least well. This also implies that, as with the challenge of including hard to reach populations, the findings underestimate the scale of the problem where the situation is worst. However, the inclusion of questions about the hypothetical circumstances in which it is appropriate to seek care to some extent overcomes this limitation. The surveys also are not sufficiently large to yield meaningful sub-national results. For example, the implementation of health insurance has varied among regions in Russia and it is highly likely that similar differences exist elsewhere.

The data confirm the impression that, while some countries have managed to maintain access to some form of care for most people, in others the situation is near collapse. In Belarus, a country that has undergone very little economic reform and has retained many features of the Soviet system, albeit in a situation of sustained economic decline and increasing isolation, health services remain affordable for virtually everyone. Two-thirds of households stated that they never had to do without health care because of cost, and this is in a country where the threshold for seeking care is much lower than the others. In contrast, in Georgia, a country that has suffered a civil war and where the government is not in control of some regions, only 14% of households report never having to do without care because of cost. Access to care also seems to have remained generally affordable in Russia, by far the largest and wealthiest of the countries included. However national income does not explain the differences in access to care; in 2001 the gross national product of Russia was US$1,750 while that of Kyrgyzstan was US$280, while the percentage of those reporting illnesses but unable to afford care was almost the same in the two countries, although as noted above, the responses to this question from Kyrgyzstan are inconsistent with the other findings. The pattern of affordability of drugs is similar to that of access to care. Problems are less frequent in Russia and Belarus but few households in Armenia, Georgia, Kyrgyzstan or Moldova are entirely free of problems.

When the aggregate figures are broken down according to the characteristics of respondents it is apparent that there are substantial inequalities in each country. Thus, in Georgia and Armenia, among those in the group with fewest household assets, about two-thirds of respondents had not sought care despite being ill because they could not afford it. While the multivariate analysis confirms how, taking

account of other variables, those with fewest resources are most disadvantaged, it also shows that financial resources are not the only factor and others, such as social support systems, play a role, an issue that will be returned to later.

In most countries the referral system appears to have remained intact, with most people receiving care in their local or workplace primary care facility. The exception is Georgia, where a relatively high proportion of the most recent visits have been in hospitals. This provides further evidence of the breakdown of the Georgian health system. This impression receives more support from the question on paying for care, with two-thirds of Georgian respondents paying or making a gift during their most recent consultation. Once again, the lowest figure is in Belarus, at fewer than 10%. Elsewhere we have shown that the phenomenon of informal payment is extremely complex, with its nature varying according to context. Consequently, it is not possible to understand fully what is happening from a survey such as this. Instead, there is a need for more detailed qualitative and quantitative work to assess the scale of transactions, to identify who pays and who receives, and to drill down by means of interviews with givers and receivers to understand the true motivations of both parties. For now, however, it is sufficient to note that, throughout this region, such payments are widespread, justifying further research. It is also of interest to note that, despite the considerable variation in the frequency of paying in different countries, when faced with a hypothetical situation of being unable to obtain necessary treatment, the proportion of respondents saying they would either pay or use connections is relatively similar. Earlier work in Russia has shown the importance of using connections to obtain health care, especially among the higher socio-economic groups, although the situation is not entirely clear-cut, as some less well-off families benefit by having a family member who is, for example, a driver for a senior doctor. This social stratification is also apparent in the present study. While 25% of those with insufficient resources for nutrition would use connections, 53% of those with sufficient resources for luxuries would do so. As might be expected, those who are members of organisations are more likely to say they would use connections than those who are not (44% versus 35%). Unsurprisingly, there is also a difference in the proportion of respondents who would pay, although the gap is narrower, at 24% and 40% respectively.

The former Soviet Union is, with sub-Saharan Africa, one of only two major regions where life expectancy is currently declining. The Soviet health system, despite its many weaknesses, did achieve basic universal coverage. While some of the Soviet Union's successor countries, such as the three Baltic republics (not included in this study) are now experiencing sustained economic growth and falling mortality, elsewhere the situation has deteriorated considerably and the prospects for the future are poor, with the situation especially adverse in the Caucasus republics (Armenia and Georgia). Yet even where the system still seems to be functioning, as in Belarus, there are no grounds for complacency. While recognising the need for caution in interpreting economic statistics in this region, Belarus' gross national product per capita has fallen by almost two-thirds in a decade; it seems unlikely that its social protection systems can be sustained in the medium term. In Russia, where there has been a relatively successful (at least compared with other post-Soviet republics) transition to health insurance, some vulnerable groups remain without coverage. So far there has been relatively little research on how different groups have fared in the face of the changes to health systems in this region, with the notable exception of Russia. Yet many of these countries face similar problems and there is scope for shared learning. This study seeks to facilitate this process.

3.3. Diet and Health

This study is focused on exploring the issues of lifestyle and living conditions as they relate to health. Such an exploration is ambitious given the multi-faceted nature of health from a biological, psychological, spiritual, social and environmental perspective. This part begins with a synopsis of recent research on the relationship between diet and major chronic diseases, and living conditions and diet. The analysis of the self-reporting data from the survey has been divided into three parts. Part 1 of this section explores the relationship between diet and chronic diseases through logistic regression

modelling. Part 2 explores the relationship between living conditions and diet through multiple linear regression modelling. Part 3 summarizes health assessment data collected from a sub-sample. Results will be followed by our discussion, including a summary, and recommendations for policy, practice, education and further research.

3.3.1 Objectives

The first of the analyses reviewed the impact of diet on disease in Post-Soviet societies, the second considered the impact of living conditions on diet, and the third reviewed health assessment data from a smaller sample drawn from three regions (good health, bad health, Chernobyl). The work conducted this year can be viewed as an extension of last year's contribution to the understanding of health and lifestyle within eight CIS-nations (Armenia, Byelorussia, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine).

3.3.2 Description Of The Work

- Drawing upon the survey data to undertake a comparative analysis of the effect of diet on disease
- Drawing upon the survey data to undertake a comparative analysis of the implications of living conditions for diet
- Drawing upon the health assessment data to describe the health status of a smaller sample from 3 regions (good health, bad health, and Chernobyl).

3.3.3 Diet and Health

The link between diet and health maintenance and health restoration has been well established by the scientific community (Booth et al., 2001; Noakes et al., 1999). Over 2,500 years ago, Hippocrates declared that food has a key medicinal role in health. Today the relationship between diet and health has been studied with increased vigor to improve understanding of food as both a preventative and curative element. Classical studies have conclusively demonstrated that food intake is associated with growth, maintenance of normal physiological and cognitive functions, and prevention of deficiency diseases such as anaemia, rickets and pellagra (Bingham, 1991). Early scientific discoveries of micro-nutrients and their impact on health were a significant milestone in understanding the relationship between diet and health.

Recently, attention has focused on diet and its direct relationship with major chronic diseases such as coronary heart disease (CHD), stroke, cancer, diabetes and degenerative diseases. The former two diseases have had a major impact on morbidity and early mortality in many populations, and diet is considered to be a major contributing factor. Other studies have highlighted the correlation between diet and fertility and conceptual ability (Pickard, 1986), while Stamler et al (1993) have found that diet is linked to arteriosclerosis and hypertension.

Whilst these studies do not specifically relate to the CIS, Parizkova (2000) has established that inadequate nutrition, malnutrition and poor nutrition are prevalent in the CIS populations, particularly among those with low socio-economic status. Furthermore, Parizkova has identified that through the period of transition during the last two decades, nutritional profiles and dietary practices in CIS have deteriorated. The mortality and morbidity statistics within the CIS indicate a high incidence and prevalence of CHD and stroke, mirroring the situation in other European and affluent societies (Basford et al., 2002).

3.3.4 Diet and disease prevention

Unquestionably, diet is central to the health and well-being of individuals. In the modern and post-modern eras attention has been given to the components of food that are classified as "good" and/or "bad" with specific relationship to major diseases. For example, in 1985, people in the United States were told that eating bacon and eggs would raise cholesterol levels and precipitate cardiovascular disease. The public was advised to eat oat bran muffins, as oat bran would significantly reduce

cholesterol levels and protect against heart disease. Such a perception became internalized by the public at large, but challenges to this notion began to emerge, backed up by scientific findings from the Lipid Research Clinic and the Framingham Trials (McBride, 1990). The results from these two significant pieceas of research suggested that dietary interventions did not result in survival advantage, and other factors such as genetics were significantly important.

In addition, McBride articulated that oat bran as a cholesterol reducing food was no better than any other form of carbohydrate fiber. Noakes et al (1994) supported this position, suggesting that a reduction in the intake of saturated fatty acids is just one part of the equation, and it is essential for health that the diet be composed of cereals, fruits, vegetables and marine sources. Other studies have recommended a diet of fish (Savige, 2001); nuts, seeds and soy (Lukito, 2001); fruits and vegetables (Berliner & Heinecke, 1996); and olive oil as cardio-protectors that enhance health, well-being and longevity.

3.3.5 Dietary fats and health

Over the last two decades, research has focused on dietary fats with particular emphasis on the notion that saturated (animal) fats have a direct relationship with increased cholesterol levels and associated heart disease (Department of Health, 1994). Based on this evidence, the Department of Health (UK) advocated for a reduction in saturated fat intake to 10% of total dietary energy in order to lower cholesterol concentration levels by 0.4 mmol/l to 5.4 mmol/l. According to the Department of Health (UK), the result would be a reduction in cardiovascular disease (CVD), particularly if there was an increased intake of dietary fibre.

However, while there are health benefits with reduced intake of saturated fats, it is suggested that the issue of diet and health is much more complex. Diets low in fat intake can be equally damaging to health in that they increase plasma triglyceride (TG) and reduce high density lipoprotein (HDL) cholesterol concentrations. Current evidence indicates that these are independent risk factors for future CHD (Roche, 2000). Thus, the scientific community continues to debate the benefits of a low fat, high carbohydrate diet on CHD risk, particularly since recent epidemiological evidence indicates that a total reduction in fat intake is not protective against CHD (Hokanson & Austin, 1996; Hu et al., 1997). Recent research has recognized the need for a more comprehensive explanation of the development of CVD, suggesting that consideration be given to genetics, habitat, lifestyle, and socio-economic factors (Daniels, 2002; Noakes et al., 1999). Thomas (2001b) suggests that any cardiovascular dietary advice should be contextualized to consider overall nutritional intake and should be modified to the following regime:

- Eat two or more portions of fish weekly
- Eat at least five portions of fruit and vegetables each day
- Replace saturated fat primarily with monounsaturated fats (rapeseed or olive oil)
- Replace some dietary fat energy by increasing complex carbohydrate intake.
- Divide fat intake between at least three regular daily meals.
- Avoid excessive alcohol intake
- Limit salt intake.

The balance of food intake described above is taken from the Mediterranean diet with a view that such a diet is a protector against CVD. The concept of the Mediterranean diet as a protector of heart health was instrumental in initiating the Seven Countries study (Noakes et al., 1999) which concluded that there was a strong independent positive correlation between saturated fatty acid consumption and CHD mortality rates. This study reported that eating N-3 fatty acids in the form of oily fish was a protector against CHD (Kromhout et al., 1995). Kroumhout et al suggested that 30g of fish per day should be eaten to ensure a more than 50% decreased risk of mortality from CHD. This position has been challenged, but there is significant scientific support for the finding that fish consumption is strongly associated with a significant reduced risk of total mortality (Albert et al., 1998).

3.3.6 Diet and cardiovascular disease

In the previous sections the relationship between eating fatty food and CVD has been highlighted. The increasing rates of CHD and stroke in affluent countries are of major concern for politicians, health professionals and scientists. For example, one in three people in the UK die from CVD. Roughly half of the deaths are from CHD and one quarter from stroke (British Heart Foundation, 2002a). It is commonly acknowledged that the cause is multi-factorial, however diet is considered to be a major contributing factor. The evidence points to the fact that being overweight and obese (body mass index of 25-30 Kg/m2 -World Health Organization, 1998) increases the risk of developing diabetes mellitus; hypertension; and hyper-lipidaemia which are all risk factors for developing CHD (Department of Health, 1994). Thus, it is commonly viewed that reducing the incidence of obesity should contribute to an overall reduction of CVD.

However, statistical evidence does not corroborate this; instead, the evidence indicates that reduction in food intake alone is insufficient to protect against CVD. For example, Berliner and Heinecke (1996) assert that other food nutrients gained from eating fruit, vegetables, pulses and nuts are significant protectors against CVD. The prime ingredient in these foods is the antioxidants which, according to Diplock et al (1998), are a CVD protector through the inhibition of low density lipoprotein oxidation. Other significant micro-nutrients contained in these foods are potassium, folic acid and soluble fiber (Renaud & Lanzmann-Petithory, 2001). Potassium, for example, is said to control blood pressure (Department of Health, 1994; Nakagawa et al, 1999), whilst low intake of folic acid increases the risk of CHD (Renaud & Lazmann-Petithory, 2001; Voutilsinen et al., 2001), and low density lipoproteins are affected positively through the intake of soluble fiber (Department of Health, 1994).

3.3.7 Diet and cancer

The development of cancer cannot be said to be caused by diet alone, however there are some types of cancer that are associated with dietary intake, such as stomach and colon cancer. An examination of the Japanese Okinawa diet by Yamori and colleagues (2001) concluded that the reason Okinawans have the lowest stomach cancer rate in Japan and have greater longevity is because the Okinawa diet is low in sodium. In addition, they have stated that there is a lower incidence of mortality from prostate, breast and other cancers in Okinawans (Yamori et al., 2000). One explanation for this phenomenon is that the Okinawa diet contains a high consumption of soy beans which are rich in isoflavines. Isoflavines are said to influence a "weak estrogenic activity, estrogen receptor blocking activity or the inhibition of angiogenesis" (p145). In conclusion, Yamori et al (2000) identified that

> "healthy aging in Okinawa can be attributed to low CHD and cancer mortalities, as a result of the Okinawan diet, characterized by low salt, soy beans, fish, seaweed and probably also green vegetable" (p.145).

Not only is such a diet deemed to decrease the risk of cancers, it is also significant in reducing the incidence of CVD and other debilitating diseases, thus enhancing life expectancy and life free from disability. Nonetheless, diet is not the only explanation for health and longevity, as living conditions also play a significant part.

3.3.8 Diet, lifestyle and health

In our post-modern world, individuals engage in lifestyle behaviours (e.g. smoking, diet, exercise) that are deemed as 'healthy' or 'unhealthy'. According to Cockerham (2000), these behaviours are based on "choices from options available to people according to their life chances" (p.2). The seminal work of Max Weber (1978) postulated that life choices and life chances are intrinsically linked to one another, with choices being limited or facilitated by chances. Thus, the notion that we have choice is somewhat overshadowed by the opportunities or options that are presented to us.

With respect to dietary intake, it is assumed that people will choose to engage in a healthy diet as an optimum choice, but sometimes chances are limited by availability. It is assumed that when there are healthy foods available, people will always choose them to promote optimal health and well-being and their ability to live a long and disability free life. However, people's choice of food intake is

determined by numerous factors, including: (i) complex and interwoven life choices; (ii) motivational factors; (iii) social mores; (iv) socio-economics; (v) living conditions and (vi) the political milieu within which people live. Within communist nations the relationship between individuals and the state is one of control, which negates the freedom of choice (Cockerham, 2000).

The power and influence societies and groups have over individual choice should not be taken lightly and has been termed in sociological language as "structure" and "agency" (Weber, 1978; Dahrendorf, 1979). Structure is referred to as the "collective patterns of living associated with societies, institutions, social classes, communities, groups, and roles that constrain or enable individuals to act" (Cockerham, 2000). Structure is therefore viewed as a set of rules or frameworks, and resources that either promote and support social action or limit or restrain it (Sewell, 1992). On the other hand "agency" is a lifestyle process that allows individuals to be cognizant of their past but engage in activities that support the present and their future direction. This is due to an individual's capacity to critically examine and reflect upon their previous habits and the influence these habits may have on their future situations (Emirbayer & Mische, 1998).

Evidently, the concepts of both 'structure' and 'agency' are important in the notion of life choice. Notwithstanding this premise, investigations into the health lifestyles of Russian people under the socialist regime have recognized that structure was a prominent factor in choice, given that the responsibility for health was firmly in the hands of the State. Under this regime, people were passive recipients of health care and were not encouraged to take responsibility for their own health and well-being. There were few options available for healthy foods such as fresh fruit, vegetables and lean meat, especially in the winter periods (Keep, 1995).

Lifestyle choices can be influenced at the individual or collective level and can be instrumental in either promoting or negating health. For example, dietary intake can be determined by individual choice that is free from influence of others, or as Simmel (1950) asserts, lifestyle can be dictated through a collective and cultural perspective related to the development of society and the growth of modernity. Simmel further postulates that the advent of modernity somehow negates personal freedom of choice with respect to social influence and control within the frameworks of mass societies. On the other hand, he argues that a developing and vibrant society can provide opportunity for uniqueness.

This is clearly a paradox that requires explanation. With modernity and economic abundance there are increased opportunities for life choice through engaging in a plethora of life's opportunities. Thus, individuals have options with regards to different paths of opportunities that are presented. This process of choice imbues a sense of individualism and uniqueness within the mass society. Such a concept can be seen in the dietary choice of some individuals who do not succumb to societal or sub-cultural influences or peer pressures, such as vegans. Nonetheless, individuals who exert their independence in dietary choices are often in the minority. For the most part, people conform to societal and cultural norms, and their dietary intake usually reflects this position.

Weber (1978) comprehensively explains the issue of lifestyle within the context of individuals and groups, postulating that individuals are influenced by groups and the class system to which they belong. The power and persuasion of groups influences production and acquisition of goods, and the consumption of goods is dictated by the lifestyles they collectively prescribe to. Drawing on these concepts to explain diet, it is evident that people do have individual choice in modern and affluent societies, but there is a strong persuasion for individuals to conform to a diet that is accepted by particular groups.

Notwithstanding this position, life choices for people living in the CIS are overshadowed by life chances. Bourdieu (1990) supports this sentiment, stating that the health lifestyles of Russians are predominantly affected by chance and structure rather than choice and agency. He continues to explain that the unhealthy lifestyle practices of Russian men in particular are based on their reflective experiences: their socialization in a communist state, and the class or grouping to which they belong. Thus, their unhealthy lifestyles continue as part of everyday routine and become imprinted behaviours within their psyche, even though they now live in a different political system and structure. Breaking the mould of entrenched habits is difficult to do (Cormier & Cormier, 1998).

3.3.9 Diet, living conditions and health

Over the last four decades health research has focused on the relationship between diet and disease entities, particularly dietary modification as a preventative and treatment intervention. However, enquiries into the relationship between the availability of healthy foods and people's dietary intake are limited (Morland et al., 2002). In addition, the effect of the quality of the environment on the production and distribution of "healthy" foods and on dietary intake has not been adequately studied. It is clear that the people of CIS, due to state control and the influence of the communist regime, had little life choice, but were subjected to life chances. For example, the harsh winter environments that some of the CIS people are subjected to, and the lack of adequate food transportation systems, means that certain foods (fruit and vegetables) are in short supply or are unavailable in the winter period. In such circumstances, life choice relating to a healthy diet is limited. Whilst the availability of nutritious foods is one part of the equation, the food available in the CIS is not scrutinized for contamination before consumption. Contaminated food does have serious effects on the health of both the current populations and unborn children (Ministry of Agriculture, Fisheries and Food, 1998a).

3.3.10 Food contamination and health

It is widely known that metals found in food are damaging to health. For example, organic mercury compounds and lead in food substances can affect neuropsychological development, whilst other metal substances such as arsenic (carcinogenic) and cadmium (renal failure) have serious effects on human health. More benign health effects such as gastric upsets can be caused by tin. While the human body requires small amounts of substances such as copper, zinc, selenium and chromium, large doses can have a negative effect on health (Ministry of Agriculture, Fisheries and Food, 1998a,b). More recently attention has focused on food contamination through radiation and agricultural waste. This situation is exemplified in the CIS by the Chernobyl disaster (radiation) and the death of the Aral sea due partly to agricultural waste.

Due to the Chernobyl disaster, people in the CIS have been subjected to large doses of radiation that have seriously affected their health. One of the paths of contamination is through the ingestion of contaminated food. Nonetheless, recent studies have indicated that the damage to health caused by ingesting contaminated foods can be overturned through the eating of fresh fruit and vegetables (Kordish et al., 2001). Kordish and colleagues examined the Clastogenic Factors (CFs) (i.e. chromosome damaging substances) in children who immigrated to Israel between 1989 and 1993 from the regions contaminated by the Chernobyl disaster. Their study concluded that eating fresh fruit and vegetables decreases the level of CFs, a finding supported by other scientific studies that found fruits and vegetables to act as antioxidants (Halliwell et al., 1995; Jenkins, 1995). Antioxidants have the ability to reduce the effect of pollutants once inside the body. However, if people in the CIS do not have access to fresh fruit and vegetables (even if only for the winter periods), their health status will be compromised over time.

Morland et al (2002) assert that the intricate relationship between the environment and healthy foods has received limited attention. They contend that health professionals need to have a clearer understanding of the environment and the type of food available prior to embarking on health promotion activities and developing public health policies. For example, the difficulty in changing dietary behaviour may not be due to ignorance relating to a healthy diet, but to food quality and food availability. Clearly, dietary intake is not always about choice, but is influenced by the environment within which people live.

3.3.11 Diet, economy, and health

The impact of socio-economic status on the ability to buy foods that are nutritious is well established. Indeed it has been identified that there is a direct relationship between low socio-economic status (SES) and poor health (Townsend et al., 1982; Marmot, 1986). Health outcomes vary according to SES (Marmot, 1986), with earlier mortality for those people living on, or below, the poverty line (Townsend et al., 1982). The chief cause of death is often associated with cardiovascular disease, respiratory disease and cancer (Smith, et al., 1994). Several investigations have found similar occurrences in most countries with a slightly higher tendency in the western world (Holme et al.,

1980; Feldman et al., 1989), and to a lesser degree in Eastern Europe (Dennis et al., 1993). In Eastern Europe, educational attainment is significantly related to the ability to increase one's socio-economic status (Dennis et al., 1993).

Whilst it is acknowledged that there are significant differences in health according to socio-economic status within countries, there is an additional concern regarding the striking and growing health divide between the more affluent (Western) countries and the less affluent (Eastern European) countries. Marmot (1994) contends like cannot always be measured as like, given the differences in social determinants between the east and the west, and in part, the health divide may "reflect a social gradient" (p. 141). Kristenson and her colleagues (2001) compared Lithuanian and Swedish middle aged men, and found those in low social classes had growth retardation, were more prone to psychological stress, experienced attenuated cortisol response in the laboratory setting, and had antioxidant status that was not conducive to maintaining health. Whilst social stress is significant here, diet plays an intrinsic part in explaining socio-economic differences in health, such as dyslipidaemia and lack of vitamins (Smith et al., 1994).

Clearly, the quality and type of food eaten is directly linked to the socio-economic status of individuals and over time impacts the health and well-being of individuals.

3.3.12 Methods

This section of the final report was separated into three parts:

- Part 1 consisted of the description and analyses of diet and chronic disease;
- Part 2 consisted of the description and analyses of living conditions and diet and;
- Part 3 consisted of the description of the health assessment of the smaller sample drawn from the regions considered to be of good health, bad health, and from Chernobyl.

Study Variables: Part 1 & 2

The variables of interest were those indicative of diet, disease, living conditions, and overall health, which are all defined below:

Diet

The diet variables included amount of meat, fish, fresh vegetables (excluding potatoes), fruit, animal fat, butter, cheese, milk, and cream/sour cream consumed, and were self-reported as follows: daily, 2 or 3 times per week, one time per week, or extremely seldom.

Disease

The disease variables included heart attack, stroke, high blood pressure, diabetes, stomach or digestive disorders, and cancer (other than of the lung), and were self-reported as follows: no, or yes.

Living conditions

The living conditions variables included surfacing of the road, material living conditions, ownership of a plot of land, hot water available, bathroom available in home, type of heating, number of rooms in the home, estimated water quality, current level of education, number of household technologies, and satisfaction with air purity and were defined as follows:

a) surfacing of the road was defined as: asphalt or not asphalt
b) material living conditions were self-reported as: the money is not enough even for our nutrition; the money is just enough for food and clothes; it is enough to buy TV, fridge, but not enough for car/flat; or we can purchase expensive goods (car, flat)
c) ownership of a plot of land was defined as: yes or no
d) hot water available was defined as: yes or no
e) bathroom available in home was defined as: yes or no

f) type of heating was defined as: 'other' or central heating

g) number of rooms in home was coded as a continuous variable

h) estimated water quality was defined as bad or good

i) current level of education was defined as: primary school and without education, non-finished secondary education, secondary education, secondary vocational education, non-finished higher education, or higher education.

j) number of household technologies was coded as a continuous variable including the number of the following: television, phone, video recorder, washing machine, dishwasher, video camera, and personal computer.

k) Satisfaction with air purity was self-reported as: dissatisfied or satisfied.

Study Variables: Part 3

In this phase of the project, a series of intensive regional studies were carried out with 290 people. Medical history and health checks were provided for respondents in Ukraine (n=100), Russia (n=100), Byelorussia near Chernobyl (n=30), Ukraine near Chernobyl (n=30), and Russia near Chernobyl (n=30). The variables of interest were blood pressure, treatment for blood pressure, and body mass index (BMI) categorization. According to the National Heart, Lung, and Blood Institute <NHLBI> (2003), normal blood pressure was defined as less than 140/90 and greater than 90/60. Treatment for blood pressure was defined as yes or no. BMI was categorized as follows: underweight <18.50, normal 18.50-24.99, overweight 25-29.99, and obese > 30 (NHLBI, 2003).

3.3.13 Results

Description of the Samples

Parts 1 and 2

The total sample size was 18428. The sample consisted of 2000 participants from Armenia, 2000 from Byelorussia, 2000 from Kazakhstan, 2000 from Kyrgyzstan, 2022 from Georgia, 2400 from Ukraine, and 4006 from Russia.

Demographics

The ages ranged from 18 to 99, with a mean age of 45.5 years. Of the total sample, 56.7% (n=10454) were female. In summary of marital status, 64.3% of the sample were married (57.2%) or remarried (7.1%), while 13.7% were single, 7.5% were divorced and not remarried, 12.9% were widowed and not remarried, and 1.6% were living together. With regard to level of education, 16.7% had not completed high school, 62.5% had finished high school (including vocational and non-completed post-secondary), and 20.8% had completed university.

Diet

The study participants were asked how often they had consumed various foods during the previous weeks. Most commonly the sample consumed meat, fish, cheese, and cream/sour cream 'extremely seldom' (30.7%, 51.4%, 41.6%, and 35.5% respectively). However, the sample most commonly consumed fresh vegetables, animal fat, butter, and milk daily (39.4%, 32.2%, 31.8%, and 38.6%, respectively).

The results indicated wide variations in eating habits (or availability of foods) among countries. For example, while about 27% of the respondents from Kazakhstan and Russia said they had meat daily during the previous week, this was the case in less than 3% of respondents in Georgia, Moldova, and Armenia. Fish was in general not consumed very frequently, however it was more frequently consumed in Byelorussia and Russia, where more than one in four respondents said they had consumed fish at least twice during the previous week.

Daily intake of fresh vegetables and fruit was relatively low. Daily intake of fresh vegetables was observed in less than half the respondents. The highest daily intakes of fresh vegetables were in

Kyrgyzstan (45.1%), Russia (44.6%), and Ukraine (42.1%). Of concern is the 10.3% of the sample from Armenia that indicated an extremely seldom intake of fresh vegetables. Daily and 2 to 3 times a week consumption of fruit was observed in less than 50% of the sample. Only between 15% (Russia) and 39% (Kyrgyzstan) of the respondents had consumed fruits every day during the previous week. The highest daily intakes of fruit were in Kyrgyzstan (38.6%) whereas the lowest daily consumption was in the Russian sample (14.9%). Also of concern is that over one quarter of the sample from Kazakhstan reportedly consumed fruit extremely seldom (28.4%).

The consumption of animal fat, for cooking or eating, presents a worrying profile. The proportion of participants using animal fat at least two to three times a week was lowest in Moldova and Georgia (35% and 37% respectively) and highest in Armenia (70%). Butter was most frequently consumed in Byelorussia and Russia, with almost half the respondents consuming butter daily. The highest percentage of extremely seldom consumption was from the Moldovan sample (41.5%).

The frequency of cheese and milk consumption differed among countries. Cheese was most frequently consumed in Armenia and Georgia, with over 60% of respondents consuming cheese at least twice a week. However, milk was most frequently consumed in Byelorussia and Kazakhstan, with over 80% of respondents consuming milk at least twice a week. Cream/sour cream consumption was highest in Byelorussia, with two out of five respondents consuming it daily.

When asked about the importance of eating a lot of meat, the vast majority (66.6%) stated that it was not important (36.3% 'rather unimportant', 30.3% 'unimportant'). When asked about the importance of having a healthy diet, an overwhelming majority (95.4%) believed that it was important (73.5% 'important', 21.9% 'quite important').

Disease incidence

There was a low incidence of chronic diseases: 2.4% of the sample reported having had a heart attack and 1.4% had had a stroke, 13.9% reported persisting high blood pressure, 2.2% reported having diabetes, 21.1% reported stomach or digestive disorders, and only 0.5% reported having a cancer other than of the lung. Overall, the countries with the lowest percentage of sample with chronic diseases were Georgia, Kazakhstan, and especially Kyrgyzstan. The countries with the highest percentage of sample with chronic diseases were Byelorussia, Russia, and especially Ukraine.

Living conditions

The vast majority of the sample (90.4%) indicated that their home town was accessible via a paved road. In addition, 65.3% reported that they had a plot of land which could be used for growing agricultural products. The majority of the sample were satisfied with their air purity (64.8%), estimated that the water quality was good (66.7%), and had a bathroom in the home (60.5%). Over half the sample (51.7%) had 2 or 3 household technologies, and 61.8% had 2 or 3 rooms in their home. However, the majority did not have hot water on tap, geyser, or hydrant (59.6%) or central heating (67.8%). The majority of the sample reported that their money was just enough for food and clothes (59.6%), while a further 22.7% reported that the money was not enough even for nutrition.

Part 3

The total sample consisted of 290 people, with 100 from Russia, another 100 from Ukraine, and 90 from three Chernobyl areas (30 from each of Byelorussia, Ukraine and Russia). Of the total sample, 149 (51.4%) were male and 141 (48.6%) were female. The average age was 43.2 (SD=8.0) with a range of 30 years to 57 years.

The average weight was 75.2 kilograms (SD=13.5) with a range of 45 to 117 kilograms. The average height was 168.8 centimetres (SD=8.8) with a range of 142 to 190 centimetres. Based on the BMI categorization (underweight <18.50, normal 18.50-24.99, overweight 25-29.99, obese >30.00), the majority were normal weight (n=130, 44.8%) with an average BMI of 26.4. In addition, only 2 people (0.7%) were underweight, while 99 (34.1%) were overweight, and 59 (20.3%) were obese.

3.3.14 Logistic Regression:

Prediction of disease from diet (Part 1)
Heart attack

A test of the full model with all nine predictor variables against a constant-only model was statistically reliable, (9, N = 18 428) = 108.6, p<0.001. The variance accounted for was small, however, with Nagelkerke R squared = .030. Overall prediction success was 97.6%. However, this was due to perfect prediction of the non-heart attack sufferers and zero prediction of the heart attack sufferers, stemming from the extremely small percentage of the sample that suffered a heart attack (2.4%). To eliminate the extreme difference between the two groups, an equal number of non-heart attack sufferers was randomly selected. This new model resulted in an overall prediction success of 76.7%, with 76.1% of non-heart attack sufferers being correctly predicted, and 77.3% of heart attack sufferers being correctly predicted. In addition, the Nagelkerke R squared increased to 0.452.

We calculated the regression coefficients, Wald statistics, and odds ratios for each of the nine predictors from the original model. According to the Wald criterion, the amount of meat, fish, fresh vegetables, and fruit consumed reliably predicted suffering from a heart attack (z= 45.80, p<0.001; z= 5.19, p<0.05; z=8.29, p<0.01; z=19.83, p<0.001, respectively). The odds ratios of 1.5 for meat consumption and 1.3 for fruit consumption indicate that the likelihood of having a heart attack increases with decreasing meat and fruit consumption. However, the odds ratios of 0.9 for fish consumption and 0.8 for vegetable consumption indicate that the likelihood of having a heart attack decreases with decreasing fish and vegetable consumption.

Stroke

A test of the full model with all nine predictor variables against a constant-only model was statistically reliable, (9, N = 18 428) = 69.5, p<0.001. The variance accounted for was small, however, with Nagelkerke R squared = .027. Overall prediction success was 98.6%. However, this was due to perfect prediction of the non-stroke sufferers and zero prediction of the stroke sufferers, stemming from the extremely small percentage of the sample that suffered a stroke (1.4%). To eliminate the extreme difference between the two groups, an equal number of non-stroke sufferers was randomly selected. This new model resulted in an overall prediction success of 80.3%, with 78.2% of non-stroke sufferers being correctly predicted, and 82.4% of stroke sufferers being correctly predicted. In addition, the Nagelkerke R squared increased to 0.546.

According to the Wald criterion, the amount of meat, fish, fruit, and cheese consumed reliably predicted suffering from a stoke (z= 20.85, p<0.001; z= 4.60, p<0.05; z=3.83, p=0.05; z=10.46, p=0.001, respectively). The odds ratios of 1.4 for meat consumption, 1.1 for fruit consumption, and 1.3 for cheese consumption indicate that the likelihood of having a stroke increases with decreasing meat, fruit and cheese consumption. However, the odds ratio of 0.8 for fish consumption indicates that the likelihood of having a stroke decreases with decreasing fish consumption.

Persisting high blood pressure

A test of the full model with all nine predictor variables against a constant-only model was statistically reliable, (9, N = 18 428) = 310.7 p<0.001. The variance accounted for was small, however, with Nagelkerke R squared = .031. Overall prediction success was 86.1%. However, this was due to perfect prediction of the non-persisting high blood pressure sufferers and zero prediction of the persisting high blood pressure sufferers, stemming from the extremely small percentage of the sample that suffered persisting high blood pressure (13.9%). To eliminate the extreme difference between the two groups, an equal number of non-persisting high blood pressure sufferers was randomly selected. This new model resulted in an overall prediction success of 69.9%, with 69.31% of non-persisting high blood pressure sufferers being correctly predicted, and 70.6% of persisting high blood pressure sufferers being correctly predicted. In addition, the Nagelkerke R squared increased to 0.269.

According to the Wald criterion, amount of meat, fresh vegetables, fruit, butter, and cheese consumed reliably predicted suffering from high blood pressure (z= 75.58, p<0.001; z= 36.93, p<0.001; z=57.49, p<0.001; z=6.03, p<0.05; z= 29.33, p<.001, respectively). The odds ratios of 1.3 for meat

consumption, 1.2 for fruit consumption, and 1.1 for both butter and cheese consumption indicates that the likelihood of having high blood pressure increases with decreasing meat, fruit, butter and cheese consumption. However, the odds ratio of 0.8 for vegetable consumption indicates that the likelihood of having high blood pressure decreases with decreased vegetable consumption.

Cancer other than of the lung

A test of the full model with all nine predictor variables against a constant-only model was statistically reliable, (9, N = 18 428) = 25.54, $p<0.01$. The variance accounted for was small, however, with Nagelkerke R squared = .021. Overall prediction success was 99.4%. However, this was due to perfect prediction of the non-cancer sufferers and zero prediction of the cancer sufferers, stemming from the extremely small percentage of the sample that suffered from cancer (0.5%). To eliminate the extreme difference between the two groups, an equal number of non-cancer sufferers was randomly selected. This new model resulted in an overall prediction success of 85.5%, with 87.0% of non-cancer sufferers being correctly predicted, and 84.0% of cancer sufferers being correctly predicted. In addition, the Nagelkerke R squared increased to 0.685.

According to the Wald criterion, the amount of fresh vegetables and animal fat consumed reliably predicted suffering from cancer other than lung ($z= 4.18$, $p<0.05$; $z= 6.3$, $p<0.05$, respectively). The odds ratio of 1.2 for animal fat consumption indicates that the likelihood of having a cancer other than lung increases with decreasing animal fat consumption, whereas the odds ratio of 0.8 for vegetable consumption specifies a decreased risk of cancer with decreased vegetable consumption.

Diabetes

A test of the full model with all nine predictor variables against a constant-only model was statistically reliable, (9, N = 18 428) = 42.17, $p<0.001$. The variance accounted for was small, however, with Nagelkerke R squared = .012. Overall prediction success was 97.8%. However, this was due to perfect prediction of the non-diabetes sufferers and zero prediction of the diabetes sufferers, stemming from the extremely small percentage of the sample that suffered from diabetes (2.2 %). To eliminate the extreme difference between the two groups, an equal number of non-diabetes sufferers was randomly selected. This new model resulted in an overall prediction success of 79.1%, with 78.3% of non-diabetes sufferers being correctly predicted, and 80.0% of diabetes sufferers being correctly predicted. In addition, the Nagelkerke R squared increased to 0.488.

According to the Wald criterion, the amount of meat and animal fat consumed reliably predicted suffering from diabetes ($z= 5.94$, $p<0.05$; $z= 4.97$, $p<0.05$, respectively). The odds ratios of 1.2 for meat consumption and 1.1 for animal fat consumption indicate that the likelihood of having diabetes increases with decreased meat and animal fat consumption.

Stomach or digestive problems

A test of the full model with all nine predictor variables against a constant-only model was statistically reliable, (9, N = 18 428) = 193.37, $p<0.001$. The variance accounted for was small, however, with Nagelkerke R squared = .016. Overall prediction success was 78.9%. However, this was due to perfect prediction of the non-heart attack sufferers and zero prediction of the heart attack sufferers, stemming from the extremely small percentage of the sample that suffered a heart attack (21.2%). To eliminate the extreme difference between the two groups, an equal number of people who did not suffer from stomach or digestive disorders was randomly selected. This new model resulted in an overall prediction success of 65.9%, with 64.0% of non-stomach/digestive disorder sufferers being correctly predicted, and 67.7% of stomach/digestive disorder sufferers being correctly predicted. In addition, the Nagelkerke R squared increased to 0.189.

According to the Wald criterion, the amount of fresh vegetables, fruit, animal fat, butter, and cheese consumed reliably predicted suffering from stomach or other digestive problems ($z= 11.76$, $p=0.001$; $z= 47.31$, $p<0.001$; $z=41.56$, $p<0.001$; $z=4.68$, $p<0.05$, $z=45.25$, $p<.001$, respectively). The odds ratios of 1.2 for fruit consumption and 1.1 for both animal fat and cheese consumption indicate that the likelihood of having stomach problems increases with decreasing fruit, animal fat and cheese consumption.

3.3.15 Multiple Linear Regression:

Prediction of diet from living conditions (Part 2),
Data screening and analysis of multivariate assumptions

Prior to analysis, all variables were reviewed for accuracy of data entry, identification of missing values and outliers, and the fit between their distributions and the assumptions of multivariate analysis, including normality, linearity, homoscedasticity, and non-multicollinearity.

All missing data was determined to be random and less than 2%. These missing values were imputed using SPSS Linear Trend at Point.

Univariate and multivariate outliers were determined through examination of each variable's distribution and the Mahalanobis distances for each case with $p<0.001$, respectively. No outliers were identified.

The individual variables were screened for normality through histograms and values of skewness and kurtosis. Number of rooms was severely skewed and was logarithmically transformed to normalize it. The moderate skewness of material living conditions was corrected with a square root transformation. The other variables demonstrated histograms and values of skewness and kurtosis that approximated the normal distribution.

The assumptions of linearity and homoscedasticity were revealed by bivariate scatterplots of each pair of variables. Screening for multicollinearity and singularity was accomplished using SPSS collinearity diagnostics in which conditioning indexes and variance proportions are produced for each variable. No variables had an index greater than 30 or a variance proportion greater than 0.5, which Tabachnik and Fidell (1996) define as criteria of multicollinearity.

Multiple Linear Regression

Multivariate modeling using linear regression in SPSS was used to produce estimates of the independent effect of surfacing of the road, ownership of a plot of land, availability of hot water, bathroom in home, type of heating, number of rooms, material living conditions, satisfaction with air purity, estimated water quality, number of household technologies, and education level in a predictor model for each of the diet variables. The predictor variables were entered simultaneously.

R for each regression was significantly different from zero (meat: $F=774.012$, $p<0.001$; fish: $F=309.671$, $p<0.001$; fresh vegetables: $F=95.749$, $p<0.001$; fruit: $F=174.216$, $p<0.001$; animal fat: $F=71.491$, $p<0.001$; butter: $F=429.944$, $p<0.001$; cheese: $F=228.692$, $p<0.001$; milk: $F=252.447$, $p<0.001$; cream/sour cream: $F=258.289$, $p<0.001$).

At least eight of 11 variables indicative of living conditions contributed significantly to the prediction of the amount of meat, fish, fresh vegetables, fruit, animal fat, butter, cheese, milk, and cream/sour cream consumed.

Examination of the standardized regression coefficients indicated that transformed material living conditions and number of household technologies were consistently strong predictors of the amount of each diet variable consumed.

Altogether, 31.6%, 15.6%, 5.4%, 9.4%, 4.1%, 20.4%, 12%, 13.1%, and 13.4% of the variability in amount of meat, fish, fresh vegetables, fruit, animal fat, butter, cheese, milk, and cream/sour cream consumed, respectively, was predicted by knowing the scores on all 11 predictor variables.

3.3.16 Summary

Part 1: Diet and disease

The majority of the sample consumed meat (30.7%), fish (51.4%), cheese (41.6%), and cream/sour cream (35.5%) extremely seldom. In contrast, the majority of the sample consumed fresh vegetables (39.4%), milk (38.6%), butter (31.8%), and animal fat (32.2%) daily. It is important to note, however, that a significant proportion of the sample reportedly consumed fresh vegetables and fruit 3 times per week or less (60.0% and 73.4% respectively).

There was a low incidence of chronic diseases: 2.4% of the sample reported having had a heart attack and 1.4% had had a stroke, 13.9% reported persisting high blood pressure, 2.2% reported having diabetes, 21.1% reported stomach or digestive disorders, and only 0.5% reported having a cancer other than of the lung. Our study indicates that there are consistently lower incidences of these chronic diseases in Georgia, Kazakhstan, and especially Kyrgyzstan. On the other hand, Byelorussia, Russia, and Ukraine demonstrated consistently higher incidences of the chronic diseases.

The six logistic regressions performed all resulted in highly significant models for predicting chronic disease from diet ($p<0.01$). However, the Nagelkerke R^2 in each model indicated that the amount of variation accounted for was small, with the largest being 3.1%. No consistent patterns of association between each disease and the diet variables were identified. Decreased meat consumption increased the chance of having a heart attack, stroke, high blood pressure, and diabetes, while increased vegetable consumption increased the likelihood of having a heart attack, high blood pressure, and cancer. Similar to meat consumption, decreased fruit consumption increased the chance of having a heart attack, stroke, high blood pressure, and stomach or digestive disorders.

Part 2: Diet and living conditions

With regard to the living conditions of the sample, the majority had a paved road (90.4%), a plot of land (65.3%), a bathroom in the home (60.5%), 2 or 3 household technologies (51.7%), and 2 or 3 rooms in their home (61.8%). Although the majority had a bathroom in the home, a significant percentage (39.5%) did not. Furthermore, 67.8% did not have central heating, and 59.6% did not have hot water available in the home. The reported material living conditions were very low, given that 59.6% indicated that the money they had was just enough to meet basic needs, while 22.7% said that the money was not sufficient to meet basic needs. Finally, although the majority of the sample was satisfied with air purity (64.8%) and water quality (66.7%), a significant proportion was not (33.9% and 31.8%, respectively).

The eight multiple linear regressions all resulted in highly significant power for predicting diet from living conditions ($p<0.001$). The model predicting amount of meat consumed demonstrated the largest percent of variability accounted for (31.6%), followed by amount of butter consumed (20.4%). For the remaining models, less than 15.6% of the variability in amount consumed was predicted by knowing the scores on all 11 predictor variables. Transformed material living conditions and number of household technologies were consistently strong predictors of the amount of each diet variable consumed. Specifically, decreased material living conditions and decreased number of household technologies were associated with decreased consumption of each of the eight diet variables.

Part 3: Health assessment

Of the 290 people sampled, 54.4% were overweight or obese, and only 0.7% were underweight, based on BMI categorization. Although Russia had the highest percentage of obesity, univariate analysis indicated that the relationship between country and obesity was not significant. Almost 36% of the sample had high diastolic blood pressure, and 34% had high systolic blood pressure. However, only 20.3% reported being treated for high blood pressure.

3.3.17 Discussion

It would appear that a significant proportion of the population is malnourished. Common sources of protein, including meat, fish, and cheese, were most commonly consumed extremely seldom (30.7%, 51.4%, and 41.6%, respectively). Furthermore, despite universal recommendations for a reduction in saturated fat intake to reduce the risk of CVD, animal fat and butter were consumed daily by the majority of the sample (32.2% and 31.8%, respectively). Finally, fresh vegetables and fruit, which are sources of important micro-nutrients, were reportedly consumed 3 times per week or less by 60% and 73.4% of the sample, respectively. Furthermore, the condition and freshness of the fruit and vegetables is unknown, and may not have proper nutrients to benefit those who do consume them daily. These findings are consistent with research conducted by Parizkova (2000), which established that inadequate nutrition, malnutrition and poor nutrition are prevalent in the CIS populations. Furthermore, Parizkova has identified that through the period of transition during the last two decades, nutritional profiles and dietary practices in CIS have deteriorated.

In addition to poor nutrition, a large proportion of the sample reported poor living conditions. The survey did not provide a direct measure of living conditions. Rather, living conditions was inferred based on self-reported variables indicative of living conditions and, in a broader sense, socio-economic status. A significant percentage of the sample did not have a bathroom in their home (39.5%), did not have central heating (67.8%), and did not have hot water available in the home (59.6%). The reported material living conditions were very low, in that 59.6% indicated that the money they had was just enough to meet basic needs, while 22.7% said that the money was insufficient to meet basic needs. The majority of the sample had only 2 or 3 household technologies.

The high prevalence of poor nutrition and poor living conditions is explained by the relationships identified in the eight multiple linear regressions. Each model indicated that low material living conditions and few household technologies were consistently related to lower amounts of each diet variable consumed. This means that because a large proportion of people have poor living conditions, they are likely to also have poor nutrition. For example, the correlation coefficient for amount of meat consumed and material living conditions was -0.496 ($p<0.001$). Interestingly, this relationship is the smallest for the amount of animal fat consumed ($r= -0.135$, $p<0.001$). Thus, the consumption of animal fat is the diet variable least affected by the lower level of living conditions.

Considering the poor nutrition of the majority of the sample, one would expect a significant proportion of underweight individuals. However, in part 3, the health assessment data indicated that only 0.7% of the sample were underweight, while 54.4% were overweight or obese. This finding could be accounted for by the previous finding that animal fat is least affected by a lower level of living condition, and that the majority of the larger sample reportedly consumed animal fat daily (32.2%).

The health assessment data also illustrated that almost 36% of the sample had high diastolic blood pressure, and 34% had high systolic blood pressure. However, only 20.3% reported being treated for high blood pressure, suggesting that a significant proportion of high blood pressure goes untreated, perhaps due to a lack of health promotion or primary health care services. The finding of untreated high blood pressure is of concern, given that high blood pressure is a major risk factor for mortality from CVD.

The low chronic disease percentages may seem surprising at first glance, but it can be surmised that these low percentages may be the result of under-reporting, as well as high mortality rates from these chronic diseases (Basford et al., 2002). In other words, people may not be surviving these diseases, perhaps because of inadequate prevention and intervention. In addition, the lower life expectancies reported in CIS- nations (Basford et al., 2002) may mean that people are not living long enough to develop these chronic diseases, as they would in more affluent countries. This leads to important implications for future research and health policy, which will be discussed in the following section.

Although the variation in disease accounted for by each diet variable was small (<3.1%), highly significant logistic regression models that predicted disease from diet were developed. This could be explained by the enormous power to detect a statistically significant difference due to the large sample size and the difficulty capturing the large variability inherent in a large sample. Of further concern was that 0% of chronic disease sufferers was correctly predicted by each model, due to the extremely small incidence of disease. To account for this statistical bias, an equal number of people who did not suffer from each of the chronic diseases were randomly selected. These new models resulted in overall prediction success rates ranging from 65.9% to 85.5%, and substantial increases in percentage of variability accounted for in each disease. This significant finding indicates that if there is a high base rate of a chronic disease in the population, diet is an important predictor of disease status, and should not be minimized by the low prediction success and variability accounted for in the original models.

Few consistent relationships between diet and disease state were identified. Decreased meat consumption was found to be related to an increased chance of having a heart attack, stroke, high blood pressure, and diabetes. Given that meat is often high in saturated fat, and that saturated fat is recognized as a risk factor for CVD (Department of Health, 1994), this relationship appears counterintuitive. However, recent research has recognized the need to consider habitat and socio-

economic factors in the development of CVD (Daniels, 2002; Noakes et al., 1999). The multiple linear regression model presented in Part 2 supports the idea that confounding variables are implicated in CVD. Specifically, self-reported material living conditions decreased with decreased meat consumption. Thus, it is reasonable to extrapolate that low socio-economic status results in a higher incidence of CVD.

Similar to the meat and disease relationship, decreased fruit consumption increased the chance of having a heart attack, stroke, high blood pressure, and stomach or digestive disorders. These findings support the general recommendation established by Thomas (2001b) that individuals should eat fruit daily to improve overall health and reduce the likelihood of chronic disease. However, a significant proportion (60%) of the sample from the CIS reportedly consumed fruit 3 times per week or less, with 18.1% consuming fruit extremely seldom. It is important to increase the availability of fresh fruit and ensure equal access to this important source of nutrition to reduce morbidity and mortality from chronic disease.

Decreased consumption of fish was found to decrease the chances of having a heart attack or stroke. This contradicts evidence that the oils in fish protect people from CVD and the recommendation that 30g of fish be consumed to reduce the risk of mortality from CVD by 50% (Kroumhout et al., 1995). It is plausible that a third confounding variable accounts for this counterintuitive relationship. More than 80% of the sample reportedly consumed fish one time per week or less and decreased fish consumption has already been noted to be associated with poor living conditions. Given this, one would expect that decreased fish consumption would increase the chances of heart attack and stroke. Further research investigating possible reasons for this relationship is needed.

Inexplicably, decreased vegetable consumption decreased the likelihood of having a heart attack, high blood pressure, and cancer. These findings also contradict evidence that a balanced diet, including micronutrients from fresh vegetables, contributes to overall health and reduces mortality rates from chronic diseases (Noakes et al., 1999). It is difficult to postulate why a reduction in vegetable consumption would improve health. One possibility is that vegetables are being contaminated by the environment in which they are grown, cultivated, handled, transported, and stored. However, further research detailing the exact types of vegetables, specific levels of known protective micronutrients, with consideration to other sources of bias could help reduce the bias of self-report data in the current study and provide further insight into this perplexing relationship.

Further support for the idea that it is not solely diet that affords protection from chronic disease, but rather socio-economic status is provided by the variations in incidence of chronic disease in the countries. Consistently, Georgia, Kazakhstan, and Kyrgyzstan demonstrated lower rates of chronic disease, while Byelorussia, Russia, and Ukraine had higher rates than the total sample. However, no consistent diet patterns were able to explain the discrepancies based on the observed relationships between diet components and disease state. For example, if diet accounted for the difference in heart attack rates between the two sets of countries, one would expect those with low heart attack rates to consume more meat, but this is not identified in the cross-tabulation analysis. Therefore, other factors, like poverty rates should be examined to establish why some countries appear healthier than others.

3.4. Prevalence of smoking in eight countries of the Former Soviet Union

3.4.1 Objectives

To provide accurate and timely data on the determinants of smoking in countries of the former Soviet Union in order to facilitate the development of effective tobacco control policies in the region. Such data are urgently needed given the absence of accurate, comparative data, the changes experienced with transition and the substantial transformation of the region's tobacco industry.

3.4.2 Background

In 1990, based on lung cancer mortality, it was estimated that a 35 year old man in the former Soviet Union (FSU), would have twice the risk (20%) of dying from tobacco-related causes before the age of 70 as a man in the European Union (EU; 10%). In women the risks are much lower at 2% versus 1%. Moreover tobacco related mortality continues to increase in the FSU while stabilising or declining in the EU as a whole.

Despite these deplorably high levels of tobacco-related mortality, relatively little is known about smoking prevalence in the region. Virtually no recent or reliable data exist for the countries of central Asia. Recent surveys have been conducted in Georgia but are limited to the capital Tbilisi. Data from elsewhere in the Caucasus are scarce, leading authors to rely on anecdotal reports of smoking rates.

Historical and more recent data, which come largely from Russia, Ukraine, Belarus and the Baltic States show that smoking rates in men are high at between 45% and 60% while rates are far lower in women, varying from 1% to 20%. Unfortunately however, other than the Baltic states, few countries collect data using similar data collection tools thereby precluding accurate comparisons.

These issues underlie the need in the FSU for comparable and accurate data on smoking prevalence, which have been widely recognised as pre-requisites for the development of effective public health policies. The need for such data is made more urgent in the FSU by the profound changes experienced in the region's recent economic transition and more specifically by the changes to its tobacco industry. The latter were first felt as soon as these formerly closed markets opened, with the rapid influx of cigarette imports and advertising, which was previously unknown in the region. Later, as part of the large scale privatisation of state assets, most of the newly independent states privatised their tobacco industries and the transnational tobacco companies (TTCs) established a local manufacturing presence investing over US$2.7 billion in 10 countries of the FSU between 1991 and the end of 2000, and tripling cigarette production capacity in their newly acquired factories.

Some suggest that privatisation may have positive impacts, arguing that governments will be more willing to impose tobacco control measures when they are no longer involved in selling tobacco. However, economic theory suggests that privatisation, like trade liberalisation, will increase competition, driving down prices, increasing advertising and in turn stimulating consumption. Empirical studies confirm that increased trade liberalisation leads to increased consumption. And although there have been no rigorous empirical evaluations of the impact of privatisation, there is increasing evidence that privatisation of state owned tobacco industries and their acquisition by powerful tobacco transnational companies (TTCs) will harm public health. The alleged benefits of privatisation (at least in a competitive market) - increased efficiency and output and reduced unit costs - can be seen as harms when the product in question is damaging to health. By contrast, the inefficiencies of state owned monopolies can be seen as beneficial to public health. TTCs allegedly behave differently from state-owned monopolies – they market their products heavily, introduce new, more attractive products sold through a larger number of outlets and are more likely to challenge attempts to control tobacco use.

Here we present the data on smoking prevalence and determinants. We aim to assess age and gender specific prevalence rates for each of the eight countries surveyed and to examine the demographic and socio-economic determinants of smoking. Given the negative health impact of starting early we examine the age of first smoking. The number of cigarettes smoked per day and time to first cigarette are measured as indicators of dependence and used to assess the proportion of smokers with moderate to severe nicotine dependency, an indication of their ability to quit.

3.4.3 Methods

Surveys were coded into SPSS (SPSS Inc.). Data were merged and converted into STATA version 6 (Stata Corporation) for statistical analysis. The continuous variables age of first smoking and smoking duration were transformed before analyses using log normal transformations to reduce the level of skewness of their distribution.

Current smokers were defined as respondents reporting currently smoking at least one cigarette per day. We calculated age and sex-specific smoking prevalence for each country. Among current smokers, we examined the age of first smoking and number of cigarettes smoked. We assessed levels of nicotine dependence by identifying the proportion of current smokers who consume more than 20 cigarettes per day and smoke within an hour of waking. This is equivalent to a score of 3 or more on the abbreviated Fagerstrom dependency scale and indicates moderate (score 3-4) to severe dependency (score $\geq$5) (due to the way in which data were collected we were unable to break the score down further than this). Within each country, gender differences in smoking habits were assessed using chi-squared tests and two-sample t-tests; variations by age group were estimated using logistic regression analyses taking 18-29 year olds as the reference category. Between country comparisons in the likelihood of smoking were made using logistic regression taking Russia as the baseline, while comparisons in the geometric mean age of first smoking were made using ANOVA combined with Bonferroni multiple comparison tests.

To assess the determinants of smoking we used logistic regression analyses, stratifying by gender. In a first step, age-adjusted odds ratios were calculated and then, multiple logistic regression analyses were used, with simultaneous adjustment for all the factors in the regression model. The variable social support was derived from five yes/no questions asking whether the respondents had anyone: 1) you can really count on to listen to you when you need to talk; 2) you can really count on to help you out in a crisis; 3) you can totally be yourself with; 4) you feel appreciates you as a person; and 5) you can really count on to comfort you when you are very upset. Respondents could get a maximum score of 5 that was categorised as follows: 1) score of 5 = no lack of social support (69% of respondents); 2) score of 4 or 3 = some lack (12% and 7% of respondents respectively); and 3) 2 or 1 or 0 = severe lack (4%, 2%, 6% of respondents respectively).

. To allow for the large number of comparisons made we used 99% confidence intervals and took significance as <0.01.

3.4.4 Results

Male smoking rates vary among countries from 43.3-65.3%. Female smoking remains uncommon in Armenia, Georgia, Kyrgyzstan and Moldova (2.4-6.3%) but in Belarus, Ukraine, Kazakhstan and Russia rates are higher (9.3-15.5%). Men start smoking significantly younger than women, smoke more per day and are more likely to be nicotine dependent.

Age was a strong determinant of smoking throughout the region and in both genders, with elderly individuals being less likely to smoke. Men who were more socially disadvantaged (less educated, poorer economic situation, and/or less social support) were more likely to smoke. In women, living in larger urban areas was the strongest predictor of smoking. Divorced, separated or widowed women were also more likely to smoke than married women. In Kazakhstan and Kyrgyzstan, Muslim males and females smoked less frequently compared with other respondents.

Response Rates

In total, 18,428 individuals were surveyed. Response rates varied between 71% and 88% among countries (calculated on the basis of the total number of households for which an eligible person could be identified). Item non-response rates were generally very low, for example 0.03% for current smoking, 0.05% for frequency of alcohol consumption, 0.5% for education level.

Sample characteristics and representativeness

The samples clearly reflect the diversity of the region and are broadly representative of the populations they denote. Comparisons with official data may be limited by the failure of some country data to fully capture post-transition migration and other factors but suggest a slight under-representation of men in Armenia and Ukraine, of the urban population in Armenia and of the rural population in Kyrgyzstan. Age group comparisons for those in the sample aged 20 plus suggest there is a tendency for the oldest age group to be over-represented at the expense of the youngest age group particularly in Armenia, Moldova and Ukraine.

Smoking prevalence

Rates of male smoking are high. In many of the countries surveyed almost 80% of men have ever smoked. The prevalence of current smoking is lowest in Moldova (43.3%) and Kyrgyzstan (51.0%) and highest in Kazakhstan (65.3%), Armenia (61.8%) and Russia (60.4%).

Rates in women are far lower (p-value for gender comparisons <0.001 in all countries) and somewhat more variable, ranging from 2.4% to 15.5% with the lowest rates seen in Armenia, Moldova and Kyrgyzstan and the highest in Russia, Belarus and Ukraine.

The relationship between smoking and age varies by gender. In men, with the exception of Moldova, current smoking prevalence varies little between the ages of 18 and 59 but then declines more markedly in the over 60s. The decline with age is accounted for by an increase in the proportion of ex- and never-smokers. In women, the overall trend is for both current and ex-smoking to decrease with increasing age with very low smoking rates observed in the oldest age group (ever smoking rates vary from 0.8-3.9%). However, closer inspection suggests that the countries can be divided into two groups. In the first (Russia, Belarus, Ukraine, Kazakhstan), rates of current and ever smoking imply that initiation of smoking has increased rapidly between generations and especially in the youngest age group. In the second group (Armenia, Georgia, Kyrgyzstan and Moldova) the trends with age are less obvious and do not reach significance (except when comparing the oldest and youngest age groups in Moldova).

Age of uptake

The majority of male smokers start under the age of 20 and, on average, a quarter start in childhood. Far fewer women start in childhood and a sizeable portion start over the age of 20. These gender differences are significant in all countries.

Differences are also observed between countries - in Belarus, Kazakhstan, Russia and Ukraine the geometric mean age of first smoking in men is under 18 and in women under 20, compared with older ages elsewhere. Overall between country differences are significant in both genders ($p<0.001$) yet Bonferroni multiple comparisons show that significant differences in women exist only when comparing Armenia with countries other than Georgia and Moldova ($p<0.01$, data not shown). In men, a significantly younger age of starting is seen in Russia and Ukraine compared with Armenia, Georgia, Kyrgyzstan and Moldova, in Belarus compared with Armenia and Kyrgyzstan, and in Kazakhstan compared with Kyrgyzstan (all $p<0.01$, data not shown).

Amount smoked and nicotine dependence

Men tend to smoke more cigarettes than women, with the majority smoking 10 or more cigarettes per day while most women smoke under 10. Between-gender differences in the proportion of respondents smoking more than 20 cigarettes per day reached significance only in Belarus, Kazakhstan, Russia and Ukraine ($p<0.001$).

The majority of smokers smoke their first cigarette within an hour of waking although in all countries bar Georgia a far higher proportion of men than women do so ($p<0.01$). Men are therefore more likely to be moderately to severely nicotine dependent although gender differences only reach significance in Belarus, Kazakhstan, Russia and Ukraine.

Impact of age of first smoking

Using multiple logistic regression analyses adjusted for current age, we observe that respondents who started smoking at a younger age are more likely to smoke more cigarettes per day and to have higher levels of addiction. The age-adjusted odds ratios for the likelihood of moderate to severe dependency and for the likelihood of smoking more than 20 cigarettes per day is 6% lower for an increase of one year in the age of uptake.

Determinants of smoking

For the sake of brevity, only the multivariable analyses will be presented in full here. Age was a significant predictor of smoking in males in all countries and in females from all countries except

Armenia. Kazakh and Kyrgyz Muslim respondents had a much lower risk of smoking compared with other respondents.

In men, educational achievement was significantly inversely related to smoking in six countries, i.e., Belarus, Georgia, Kazakhstan, Moldova, Russia and Ukraine (p-value for trend <0.01). Men with poorer economic status were less likely to smoke in Russia although in the age adjusted analysis this association had also been seen in Kyrgyzstan and Ukraine. A lack of social support was significantly associated with smoking in Kyrgyzstan and Russia, but the association seen in the age adjusted analysis became only borderline significant in Kazakhstan. Single men from the Ukraine and Kazakhstan, were less likely to smoke than married men.

Other than age and religion, the variables associated with smoking in women were quite different. No significant association was seen with education, economic position or social support. Although in the age adjusted analysis women in Kazakstan, Kyrgyzstan and Ukraine who were separated, divorced or widowed were more likely to smoke than those who were single, this association reduced in the multivariable analysis. The most notable association was the higher risk of smoking in women living in urban areas (p-value for trend <0.005 in seven countries), although unlike the age-adjusted analysis, the association was only borderline significant (p=0.015) in Kyrgyzstan.

Finally, we can also see that once differences in demographic and socio-economic variables were taken into account, between-country differences in smoking prevalence remained albeit with some minor adjustments from the unadjusted prevalence data presented above. Men from Moldova, Ukraine, Belarus and Georgia were less likely to smoke than Russian men while those from Kazakhstan were 32% more likely to smoke. In females, compared with respondents from Russia, those from Armenia, Moldova, Georgia and Kyrgyzstan were far less likely to smoke, while those from Kazakhstan and Belarus had a somewhat lower risk of smoking. In addition, women in Armenia, Moldova and Georgia were also less likely to smoke than those in Ukraine and Belarus.

3.4.5 Conclusions

Male smoking rates in the selected countries are amongst the highest in the world and show no evidence of decline. Female smoking rates have increased from previous years and appear to reflect transnational tobacco company activity. Smoking is a major public health issue in the FSU particularly affecting socially vulnerable men and young women living in urbanised areas. Effective tobacco control strategies are urgently needed and could target these high risk groups.

3.4.6 Discussion

These surveys of over 18,000 individuals provide important new data on the prevalence of smoking in eight countries that represent more than four-fifths of the population of the former Soviet Union. For some countries they provide the first accurate, country-wide data on smoking prevalence. Importantly they provide some of the first truly comparative data for countries of the FSU other than the Baltic states. Response rates were relatively high and the samples broadly representative of their study populations, indicating the generalisability of the findings. However, the surveys were based on self-reported smoking status with no independent biochemical validation and may thus have been affected by reporting bias. Although there is some concern that self reported smoking status may under-estimate smoking and the amount smoked, studies in the west suggest it is a sensitive and specific measure and that interviewer-administered questionnaires provide more accurate responses than self-completed questionnaires. The only study in the FSU that addresses this issue found that among those claiming to be non-smokers, 13% (48/368) of women and 17% (12/375) of men in rural north west Russia were, according to blood cotinine levels, likely to be smokers compared with only 2% of each gender in Finland. Given the far lower prevalence of smoking among women this had a disproportionately large impact on the reported female smoking prevalence. Although this suggests that prevalence may be underestimated in women in areas where smoking is still culturally unacceptable, our questionnaires were administered by interviewers in the respondents' homes rather than self-completed as in this survey, thus making it harder for respondents to deny smoking.

Finally our surveys did not measure use of tobacco other than cigarettes. Although the use of smokeless tobacco is fairly common in some parts of Azerbaijan, Tajikistan and Turkmenistan, and chewing tobacco is used in some southern parts of Kyrgyzstan, cigarettes are the main form of tobacco used here and in all other countries surveyed.

The study confirms that male smoking rates in this region are among the highest in the world with rates over 50% seen in all countries surveyed except Moldova and reaching 60% or more in Armenia, Kazakhstan and Russia. Elsewhere in Europe rates over 50% are only seen in Turkey (51%) and Slovakia (56%) and worldwide less than 20 countries are reported as having rates over 60%. In men the lower prevalence of current smokers and higher prevalence of never and ex-smokers in those over 60 is likely to reflect the disproportionate number of premature deaths among current smokers compared with never and ex-smokers, although there is also known to be a cohort effect in the FSU with those who were teenagers between 1945 and 1953 carrying forward a lower rate of smoking as cigarettes, like other consumer goods, were in short supply in the period of post-war austerity under Stalin.

Compared with male smoking patterns, smoking in women is far less common, varies more between countries and has a different age-specific pattern. Although ever smoking rates are under 4% in the over 60s in all eight countries, in the four countries with the highest female smoking rates (Belarus, Kazakhstan, Russia and Ukraine), smoking is now significantly more common in the younger generations with risk ratios between the youngest and oldest age-groups of 12.2 to 37.3 compared with 1 to 5.5 in the other four countries.

Findings from this survey are comparable with those from previous surveys for all countries except Kyrgyzstan where the only recent source quotes a 60% male and 12% female smoking prevalence in adults aged 15-64 in 1997 but this was a casual sample of clinic attendees in the capital Bishkek (personal correspondence Chinara Bekbasarova) and is therefore likely to overestimate prevalence particularly in women. In Georgia, previous reports come from small surveys in Tbilisi which cannot be directly compared with our results. The limited comparative data for Armenia and Moldova are dated between 1998 and 2001 and suggest there have been little if any changes in smoking prevalence. Previous data for Kazakhstan are also limited but suggest a small increase from the 60% and 7% prevalence rates recorded in men and women respectively in 1996. More data are available for the remaining three countries. In Belarus rates in men have been hovering around 52% to 55% for some time, while rates in women have climbed steadily from under 5% in the mid 1990s to a maximum of 12% in this survey. Data for Russia as whole suggest that prevalence in men has risen from approximately 40-50% in the 1970s and 1980s to around 60% in the 1990s with little change since, whilst in women rates have risen from around 10% in the early 1990s to 15% now. Pre-transition data on women are confined to Moscow or other areas and whilst not directly comparable suggest that rates have been rising since the 1970s but most notably through the 1990s. Similarly in Ukraine historical data for Kiev show a steady rise in smoking among women from the mid 1970s to 1990s while male smoking rates barely changed, hovering around 50%. More recent national data suggest male smoking then rose slightly to reach approximately 57% by the turn of the century, suggesting that our rate of 52.5% could represent a downturn although further data will be needed to confirm this. In women, the only nationally comparative data is our previous survey which found a rate of 10% in 2000. Although other surveys found rates of 14% in 2000 and 2001, the difference is likely to be accounted for by their slightly younger age sample.

Between gender and inter-country differences in smoking prevalence are reflected in other smoking habits. Men are more likely than women to start smoking when young, smoke more heavily and be nicotine dependent. Two groupings of countries appear to emerge from the between country comparisons - Belarus, Kazakhstan, Russia and Ukraine on one hand and Armenia, Georgia, Kyrgyzstan and Moldova on the other. In addition to having higher female smoking rates and more pronounced age specific trends, the former group tend to have lower ages of smoking uptake (particularly when compared with Armenia, Georgia and Moldova) and more marked gender differences in the number of cigarettes smoked per day and levels of nicotine dependency.

The between country differences observed in this study suggest that smoking patterns in Armenia, Georgia, Moldova and Kyrgyzstan are more traditional than those in Belarus, Kazakhstan, Russia and Ukraine. This could be explained by the differing degree of TTC penetration in these countries. The Moldovan industry remains a state owned monopoly and although the Georgian and Armenian industries were privatised, this occurred late (post 1997) and none of the major TTCs invested directly. Kazakhstan, Russia and Ukraine by contrast saw major investments from most of the major tobacco companies in the early 1990s onwards. Belarus which retains a state owned monopoly and Kyrgyzstan, where the German manufacturer Reemtsma invested would therefore appear to be exceptions. In Belarus however, the state manufacturer has only a 40% market share, with an additional 40% made up of smuggled and counterfeit brands. The importance the TTCs attach to this illegal market is illustrated in the fact that, despite having little official market share, British American Tobacco (BAT) and Philip Morris have the highest outdoor advertising expenditure and the ninth and tenth highest television advertising expenditures of all companies in Belarus. As in Ukraine and Russia, tobacco is the product most heavily advertised outdoors and in Belarus the fourth most advertised product on television (there are now restrictions on television advertising in Ukraine and Russia). It is clear therefore that with continuing (if so far fruitless) discussion of a possible reunification with Russia, the TTCs treat Belarus as an important extension of the Russian market. Compared with the other countries in which the TTCs invested, investments in Kyrgyzstan came later (1998) and gave Reemtsma a manufacturing monopoly. However, Kyrgyzstan also differs from Belarus, Kazakhstan, Ukraine and Russia through its lower level of development and industrialisation and its larger rural and Muslim populations. The multivariable analysis shows that when urbanicity, socio-economic factors and religion are accounted for, as one might expect, the differences in female smoking rates between Kyrgyzstan and Kazakhstan, Belarus and Ukraine disappear although those with Russia remain.

The survey findings, combined with data on disease burden, confirm that the long-standing high smoking rates in men continue unabated. Amongst women, smoking in Armenia, Georgia, Kyrgyzstan and Moldova remains relatively uncommon and does not appear to have increased significantly as judged by rates in younger compared with older generations or by comparisons with previous data. By contrast female smoking in Belarus, Ukraine, Kazakhstan and Russia are higher, have increased from previous surveys and the age specific rates suggest an ongoing rise in younger generations. It is unlikely to be a coincidence that the higher rates are observed in countries with the most active TTC presence. Although between-country differences exist in the relative importance of each demographic and socio-economic determinant of smoking, common trends were observed with greater smoking rates among men who were more socially vulnerable and women living in more urbanised areas and thus being exposed to greater western influence.

Concerted and urgent efforts to improve tobacco control must be made throughout the FSU to curtail current smoking patterns and prevent any further rise in female smoking. Our results suggest that public health interventions targeted at the high-risk population subgroups could have the largest effect in preventing morbidity and premature mortality due to smoking. Detailed qualitative information on how smoking is perceived, why high-risk population sub-groups take up smoking and how they could be persuaded to stop would further enable policy makers to develop the most effective smoking prevention and cessation strategies for the region.

3.5. Patterns of alcohol consumption in the former Soviet Union

Types of alcoholic drinks consumed and beliefs related to alcohol intake in eight countries of the former Soviet Union. Alcohol intake in the former Soviet Union

Although reports of the use of alcoholic beverages reach back to the dawn of recorded history, the drinks consumed and the circumstances in which they are consumed has continuously evolved as societies changed. The European Region, as defined by the World Health Organization, has the highest alcohol consumption in the world, but with major regional variations in drinking habits,

beliefs and attitudes. Wine drinking, for example, is predominant in southern European countries while beer is more common in northern and western Europe. It is sometimes assumed that alcohol is consumed solely as spirits in countries of the former Soviet Union (FSU) but this hides the rich diversity of regional traditions, as well as the growing choices available as countries open to global markets.

Recent studies of the amounts and types of alcohol drinks consumed in the FSU have highlighted the dramatic decrease in alcohol intakes that followed Gorbachev's 1985 anti-alcohol campaign and which accelerated in market reforms of the early 1990s. However, these studies have generally been limited by the inherent short-comings of aggregate statistics on per capita alcohol intake, in particular the difficulty of estimating quantities of alcoholic drinks produced illegally (e.g., samogon, homemade wine and beer) or smuggled. They have also focussed mainly on Russia and the Baltic Republics, and on total alcohol consumption, rarely describing trends in the consumption of different types of alcoholic drinks. Compared with trade statistics, survey data have the advantage of providing more detailed information on actual levels and patterns of intakes. However what data exist have, again, been mainly from Russia and the Baltic Republics.

The Living Conditions, Lifestyles and Health (LLH) Project began in 2000 and investigated social conditions, health and lifestyle in the adult populations of eight countries of the former Soviet Union, that is, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia and Ukraine. The major strength of the study is that it used standardised methods of data collection that allow for the comparison of results among countries. This paper reports variations in the consumption frequency and mean intakes of beer, wine and spirits using data from eight representative cross-sectional surveys (total of 18,428 respondents) conducted within the framework of the LLH Project. Beliefs related to alcohol consumption were also examined.

Questions related to alcohol intake first inquired about the overall frequency of alcohol consumption. Respondents were categorised as never drinkers, rare drinkers (drinking once every two to three months or less frequently), occasional drinkers (drinking between once a month to once every two to three weeks), weekly drinkers (drinking between one to three times a week), or frequent drinkers (drinking at least four times a week). The questionnaire also asked about the frequency of beer, wine and spirits consumption in all respondents who reported consuming alcohol, as well as the amounts usually drunk at one time in those drinking these types of drinks at least once every two to three weeks. Categories of intake were as follows: a) beer: "Less than 0.5 litre", "About 0.5 litre", "About 1 litre", "About 1.5 litre", "About 2.0 litres", and "More than 2.0 litres"; b) wine: "Less than a glass, less than 200 grams", "A glass or about 200 grams", "Half a bottle, about 350 grams", "Half a litre", "A bottle (750 grams)", and "A litre or more"; c) spirits: "Less than 100 grams", "About 100 grams", "About 200 grams", "About 300 grams", "Half a litre (1 bottle)", and "More than half a litre". Based on this information, usual weekly intake of alcohol was estimated; respondents who reported consuming beer, wine or spirits less frequently than once every two to three weeks were assumed to have a mean weekly intake of zero grams of alcohol for these types of drinks respectively. The reported usual amounts of alcohol consumed were converted from millilitres/litres into grams of pure alcohol per week assuming 40 grams of alcohol in one litre of beer, 80 grams of alcohol in a 750 grams bottle of wine, and 160 grams of alcohol in a bottle of 500 ml of vodka or spirits. Those saying they drink more than two litres of beer, a litre of wine or more, and more than half a litre of vodka or spirits were assumed to drink respectively 2.5 litres of beer, one litre of wine, and 600 grams of spirits. Mean intakes of beer, wine and spirits were estimated and the proportion of total intake represented by these types of drinks was calculated. Questions on the reasons why some respondents do not drink alcohol and on general beliefs related to alcohol intake were also included in the questionnaire.

3.5.1 Background

With the exception of Russia and the Baltic States, little information is available on current patterns of drinking in the former Soviet Union (FSU). This paper describes patterns of beer, wine and spirits consumption in Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Republic of Moldova, Russian Federation, and Ukraine.

Between-country variations in consumption frequency and intakes of beer, wine and spirits and beliefs were examined.

3.5.2 Methods

Data from each country were merged and analysed using STATA version 6 (Stata Corporation). Variations in the frequency of alcohol consumption by country, gender, age, and type of alcoholic drink were examined. The association between intake frequency and age was estimated using chi-squared tests and tests of linear trend for the log odds. Mean weekly intakes of alcohol and beliefs were examined stratifying by country and gender.

3.5.3 Results

Between 11-34% of males and 26-71% of females reported never drinking alcohol. Wine was most commonly drunk in Moldova (particularly in older respondents) and to a lesser degree in Georgia. In Russia, Ukraine and Belarus spirits were most frequently consumed but beer intake was relatively high. In Kazakhstan, Kyrgyzstan and in Armenian males, spirits was the preferred alcoholic beverage. Beer was more frequently drunk by younger compared with older respondents. More frequent drinkers were more likely to believe that alcohol is a good way to mark special occasions, relax, and forget problems, and that it is advantageous for health.

The study provides information on between-country variations in the frequency of alcohol consumption and in the estimated weekly alcohol intake by gender and type of alcoholic drinks. Our analysis shows that the proportion of abstainers varied between 11% (Russia) and 34% (Kyrgyzstan) in males and between 26% (Russia) and 71% (Georgia) in females. Women were about two to four times as likely as males to never drink alcohol. Conversely, males were 2.4 and 6.9 times as likely as females to consume alcohol at least once a week. The proportion of frequent drinkers (four to seven times a week) was lowest in Kyrgyzstan (2.6% in males and 0.5% in females) and highest in Moldova (23.7% in males and 5.3% in females).

Large between-country variations existed in the types of alcoholic drinks most frequently drunk. In Moldova and Georgia, wine was preferred by both males and females. Males from Armenia, Kazakhstan and Kyrgyzstan tended to choose spirits more frequently, while beer and spirits were both commonly consumed in men from Belarus, Russia and Ukraine. Among women, beer was preferred in Belarus, Russia and Ukraine, while spirits were consumed slightly more frequently than beer in Kazakhstan and Kyrgyzstan. Armenian women chose wine and spirits more frequently than beer. These between-country preferences in the types of drinks most commonly drunk in each country are also seen when looking at the proportions of total alcohol intake coming from beer, wine and spirits.

When consumption frequencies were compared among countries, we could see that beer was most frequently consumed in Belarus and Russia, with about 40% of males and 11% of females reporting drinking beer at least once a week. About one in 14 (7%) Belarusian and Russian males were drinking beer at least four times a week. In contrast, beer consumption was relatively low in Kyrgyzstan and Armenia. Wine consumption was particularly frequent in Moldova: 48.8% of males and 21.2% of females reported consuming wine at least once a week, and 20.3% of males and 5.0% of females were frequent wine drinkers. Drinking wine was also relatively frequent in Georgian males and Belarusian females (26.5% and 7.5% respectively consuming wine at least weekly). Among males, the consumption of vodka and other spirits tended to be most frequent in Ukraine, Belarus and Russia, where more than 3 out of 10 respondents were drinking spirits at least once a week. A point to note is the relatively high proportion of Armenian males (8.7%) drinking spirits at least four times a week, compared with 5.7% in Ukraine, 3.3% in Belarus and 3.8% in Russia. Among females, there was less inter-country variation in the frequency of strong spirit consumption, and the proportion of women drinking spirits frequently was low in all countries (0.2-0.6%). However, drinking spirits at least once a week was slightly more common among women in Kazakhstan (4.8%), Belarus (4.7%), Russia (4.4%), and Ukraine (4.1%) than in the other countries. Mean weekly alcohol intakes from beer, wine and spirits are very similar to those described above. Indeed, beer is consumed in larger quantities, on average, in Belarusian and Russian males and females, but also in Ukrainian women. Moldovan respondents had the highest mean intake of wine. The consumption of spirits by males was highest in

Ukraine, Belarus, Russia and Armenia. Among women, mean intakes of spirits were particularly high in Russia, but they were also relatively high in Kazakhstan, Belarus, and Ukraine. Overall mean alcohol intakes ranged from 31 to 105 grams per person per week in men and from 4 to 18 grams per person per week in women; the highest intakes were observed in Belarus, Moldova and Russia in both males and females, and the lowest intakes were found in Kyrgyz men and Armenian women.

In each country, beer tended to be much more frequently consumed by younger male and female respondents than by their older counterparts, although large between-country variations existed in the proportion of respondents (in the different age groups) who reported never drinking beer. The proportion of males and females drinking beer at least weekly was particularly high in Russia and Belarus and to a lesser degree Ukraine, with an inverse relationship being observed between frequency and age (p-value for trend <0.0001). Approximately 11 to 13% of young males (18-29 years) and 2 to 4% of young females from these countries reported drinking beer at least four times a week. In Moldova, where wine is clearly the preferred type of drink, there was also a relatively high proportion of young males (9%) drinking beer at least four times a week, as well as an inverse relationship between age and the likelihood of drinking beer frequently (p-value for trend <0.0001). In males, beer was particularly infrequently drunk by Kyrgyz respondents and this in all age groups. In females, beer intake was relatively much lower in respondents from Armenia and Kyrgyzstan, and this particularly in women aged 30 years and over.

Age variations in the frequency of wine and spirits drinking were less clear and less consistent among countries compared with beer drinking. However, for wine intake, one main finding emerged: the frequency of wine consumption was clearly highest in Moldova (in both males and females) and the likelihood of frequent consumption tended to increase with age in this country (p-value for trend <0.005 in males and <0.0005 in females).

With spirits there is a strong direct relationship between age and the likelihood of being a frequent spirits drinker among Armenian males (p-value for trend =0.0001); respondents aged 60 years and over were 9.6 times as likely as those aged 18-29 years to consume spirits at least four times a week. A similar relationship was observed, but to a lesser degree, among Georgian males (p-value for trend <0.05). In the other countries, spirits tended to be most frequently consumed by middle-aged men. In women, the proportion of respondents who reported never drinking spirits increased with age in Belarus, Georgia, and Ukraine (p-value for trend <0.001). This association assumed a J-shape in Kazakhstan, Kyrgyzstan, Moldova and Russia, and a U-shape in Armenia. Frequent drinking of spirits was low in women from all age groups and was generally lower than 1% (except among women aged 40-49 years in Armenia and Russia where it reached 1.4% and 1.1% respectively) The highest proportions of women drinking spirits once to three times a week were observed in women aged 30-39 years living in Belarus and Kazakhstan (8.2%).

Our study shows the proportion of respondents agreeing with various statements related to alcohol intake, stratified by the reported frequency of alcohol consumption. Large between-country differences existed in the level of agreement with each statement. However, in each country, males were more likely to agree to some extent with each statement. Overall, respondents were particularly likely to believe that alcohol is a good way to mark special occasions (81% of males, 69% of females) and that it helps to relax (64% of males, 43% of females) or to communicate (62% of males, 40% of females). The likelihood of agreeing with these statements tended to increase directly with the frequency of alcohol consumption. More frequent drinkers were also more likely to agree that alcohol helps them forget problems, that it stimulates their creativity, that they like the taste of alcohol, or that alcohol is advantageous for health. Approximately one in five males and one in eight women believed that alcohol is advantageous for health; the highest proportion was observed in Armenia (30% of males, 18% of females) and Russia (28% of males, 16% of females); the lowest was in Georgia (12% of males, 5% of females).

Reasons for not drinking alcohol among respondents who never consume alcohol are the following: the main reason for respondents not to drink was its bad effects on personal health (46% of males, 47% of females), with the highest proportions observed in Moldova and Kyrgyzstan. A high proportion of female abstainers also reported that they did not like the taste of alcohol (42%). The

proportion of respondents saying that they did not want to become an alcoholic was particularly high in Kyrgyzstan compared with other countries.

3.5.4 Conclusions

The results of this study confirmed important regional variations in the types of alcoholic beverages consumed in eight countries of the FSU. It provides an important baseline for future comparisons as markets open to new products, as has been the case elsewhere in Europe.

3.5.5 Discussion

During the past decades, there has been a convergence in alcohol consumption patterns in western European countries both in terms of the quantities consumed and types of drink chosen. Per capita alcohol consumption has generally decreased in the previously high consuming countries of southern Europe and increased in some northern countries thus leading to a change in the south/north ratio from 3.6 in 1950 to an estimated ratio of 1.4 in 2000. There is also a trend towards greater homogeneity in beer and wine drinking patterns in the European Union (EU) moving in the direction of a general beverage mix of around 50% beer, 35% wine and 15% spirits. Wine is being slowly replaced by beer in southern EU countries while it is increasing in popularity in northern European countries where it was not traditionally been consumed. Spirits consumption has also changed with a general reduction in intake in both the north and south of the EU and with changes in the types of spirits consumed. These new trends in drinking habits have been influenced by several factors including increased internationalisation and cultural cross-fertilisation, growth of multinational and transnational corporate enterprises, general economic conditions, aging of the population, increased public concern over problems related to alcohol misuse and health and lifestyle more generally, and changing government regulations and fiscal policies. It is likely that some of these factors, in addition to Gorbachev's anti-alcohol campaign and its legacy, as well as recent social and economic changes, also influenced drinking patterns in the FSU but the lack of earlier country-specific information on the amounts and types of alcoholic drinks consumed (except for Russia) and the acknowledged limitations of aggregate statistics on alcohol intake in the region preclude time trend analyses.

The FSU is a very diverse region in terms of ethnicity, culture and traditions and it cannot be assumed that vodka is the favourite alcoholic beverage in all countries. This is highlighted by the differences observed in the choice of preferred alcoholic drinks consumed by the respondents in this study. In Moldova, as in its neighbour Romania, wine is clearly the most commonly consumed type of alcoholic drinks both in terms of frequency and average amounts drunk. To a lesser degree, wine is also a beverage of choice in the Transcaucasian republic of Georgia but not in Armenia where spirits are consumed frequently and in large quantities in males. In the Slavic republics of Russia, Ukraine and Belarus, which represent about 71% of the population of the FSU, alcohol is taken primarily as spirits, although the frequency of beer consumption is also relatively high. Finally, in the Central Asian republics of Kazakhstan and Kyrgyzstan (both with large Muslim communities, particularly in Kyrgyzstan), spirits also remain the most commonly used alcoholic beverage.

Although the LLH surveys do not allow for the assessment of time trends in the consumption of different alcoholic beverages in the FSU, a few differences in the frequency of beer, wine and spirits intakes among age groups support evidence from other sources suggesting that traditional habits might be changing in this region in parallel to changes seen in other parts of Europe. For example, beer appears to be more popular in younger respondents than in their older counterparts. This agrees with the evidence that beer sales are thriving in Russia mainly because younger consumers appreciate its lower alcohol content and find that drinking vodka is passé The beer industry is indeed blooming in Russia as well as in other new independent states (NIS). During the late 1990s, beer production increased by 213% in Russia (1996-2001), 240% in Kazakhstan (1996-1998), 148% in Georgia (1996-1999), 138% in Ukraine (1996-2001), and 69% in Belarus (1996-2000). In Armenia, it increased by 1250% (from 37,000 hl in 1996 to 500,000 hl in 2001), a change that agrees with our observation that younger Armenian males choose beer more frequently than their older counterparts who are themselves more frequent drinkers of spirits than young Armenian males. These recent

changes in the beer market in the region could have profound effects on the future drinking habits of the FSU.

Other generational differences are apparent in our data, particularly among young women. In the "spirit-consuming" countries Russia, Belarus and Ukraine, young women not only differ from their older counterpart in terms of beer consumption, but also with wine intake which they are more likely to consume at least weekly. On the contrary, young female, as well as male, respondents from the "wine-consuming" country Moldova appear to be abandoning the traditional wine and replacing it by beer.

Mean weekly alcohol intakes are an important source of information when comparing drinking habits among countries although they should not be over-interpreted as they are prone to reporting bias and need to be complemented by the proportion of abstainers in the population and by information on drinking pattern as the same mean consumption can have more detrimental effects in countries where heavy drinking in concentrated among fewer people. Estimating alcohol intake is well known to be problematic and survey respondents often tend to underestimate or distort their consumption. In countries where substantial drinking is common, we can assume that there may be less social stigma associated with reporting alcohol intake, at least in men. However, underreporting of intake could be higher in women.

In this study, the highest consumption of alcohol was observed in Belarus, Moldova and Russia; it was also in these countries that the proportion of abstainers was lowest, i.e., about 11-13% of males and 27-30% of females. The lowest intakes of alcohol were observed in Kyrgyzstan for males (31 grams/person.week) and in Armenia for females (8 grams/person.week), countries that also had a high proportion of males and females abstainers. In Russia, the proportion of male and female respondents who said they never drink alcohol was 11% and 27% respectively; however no distinction was made in the questionnaire between lifelong abstainers and ex-drinkers. The proportions observed tend to differ from results from previous surveys conducted in the mid-1990s which reported that approximately eight to nine percent of Russian men and between 35 and 51% of Russian women do not drink alcohol. These could represent real changes between 1994 and 2001, but the trend in males would contradict the observed reduction in the proportion of male abstainers observed between 1985 and 1995 in adults aged 25-64 years in Novosibirsk, a large industrial centre of western Siberia. Conversely, the Russia Longitudinal Monitoring Study (RLMS) suggested a very high proportion of male abstainers (29%) in 2001, the same year as the LLH surveys; however, underreporting of alcohol consumption in the RLMS has been suggested. In women, the reduction in the proportion of abstainers during the last 1990s would be consistent with the current pattern seen for smoking which is characterised by a rapid increase in the traditionally low prevalence of smoking, particularly in young women. Once more, however, the RLMS suggested a much higher rate of 54% of abstention in women in 2001 which seems too conservative. Other surveys conducted in western Europe generally showed a lower prevalence of abstention in women compared with our findings. In the UK for example, only 11% of women aged 16 years and over in 1996 reported never drinking alcohol. In Finland, Germany, Ireland and Iceland, the proportion of female abstainers ranges from approximately 14% to 16%. In Sweden, there is a somewhat higher proportion of women who abstain from drinking alcohol (25%) compared with women from other Nordic countries, possibly due in part to the history of a strong temperance movement in that country. However, recent trends suggest that this is changing and that young women are developing more hazardous drinking patterns. Higher proportions of abstainers are observed in southern European wine drinking countries such as Spain (51%) and Portugal (49%), where wine is an integral part of the diet and drinking alcohol to intoxication is regarded as socially unacceptable. In parallel, we also observed the highest rates of abstention in women in countries where wine was most frequently consumed, i.e., Moldova (61%) and Georgia (71%). In men, the proportion of abstainers observed in Armenia, Georgia, Kazakhstan, Kyrgyzstan and Ukraine tended to be higher than what is seen in Western Europe (range from 7% in the UK to 13% in Sweden). It is possible that this result was in part due to selection bias in this project since individuals who drink most heavily are less likely to participate in surveys (but this should also have influenced other surveys of alcohol consumption) and since individuals unable to participate because of heavy alcoholic intoxication were excluded from the LLH surveys. However, otherwise the

respondents were generally representative of the survey population as the surveys' response rates were generally high and the distribution of the samples by sex, age, area of residence and nationality compared favourably with the distributions found in the general population. In addition, response rates for questions related to alcohol consumption were high (e.g., 99.95% for overall frequency of consumption; >99.8% for the frequency of beer, wine and spirits consumption).

The main motives cited by individuals for drinking alcohol are generally to cope with stress, be sociable, increase social confidence, and enjoy oneself. In this study respondents commonly stated that alcohol helps to relax and to forget problems, particularly among men and those who drink more frequently. The beliefs that alcohol can enhance confidence (help to communicate) and that it is important for enjoyment (good way to mark social occasions) was also widespread among drinkers. One important finding is the fact that about one in four respondents who drink alcohol at least occasionally (one in five in Belarus, Russia and Ukraine) believe that alcohol is advantageous for health. This suggests that public awareness of the possible risk of alcohol to one's health is not widespread in the region, or that people are in a state of denial. Indeed, few alcohol prevention programmes are yet in place and there is little evidence that alcohol, as a threat to health, is a serious policy concern in the region. This weakness, along with the acknowledged health and economic burden due to alcohol in this region, the continuing access to cheap legal and illegal home-made alcoholic beverages, and evidence suggesting an increasing trend in the proportion of young Russians drinking frequently and being drunk strongly suggest that alcohol consumption should be a priority on the public health agenda in the region. Policies aiming at preventing and reducing alcohol-related harm must take account of the context of increasing globalisation in alcohol drinking patterns, beliefs and attitudes in Europe.

3.6. The relationship between stress, health lifestyles, and gender in Belarus, Kazakhstan, Russia, and Ukraine

This part examines the relationship between stress, health lifestyles, and gender in Belarus, Kazakhstan, Russia, and Ukraine. Whereas there have been several studies of gender and lifestyle differences in the mortality crisis in the nations of the former Soviet Union, the precise role of stress has been unknown because of a paucity of data. Our data allows us to assess the contribution of stress to the adverse life expectancy patterns in the four countries in our analysis. We find that adult females show significantly higher levels of stress than males do on virtually every measure, although it is males who are the principal victims of the premature mortality. We suggest that negative health lifestyles among males are the primary social determinant of the mortality crisis.

There have been several studies of the mortality crisis that began nearly 40 years ago in the former Soviet Union and continues today in certain regions of its successor—the loosely configured Commonwealth of Independent States (CIS). This unprecedented change in life expectancy remains an important topic of investigation because its origins have not been fully determined. Some sources suggest stress is a major cause of the rise in death rates, but the precise role of stress in this crisis is unknown (Leon and Shkolnikov 1998; Shkolnokov, Cornia, Leon, and Meslé 1998a; Siegrist 1996, 2000). Obviously the people in the CIS countries have been subjected to considerable macro-level stress, both in the final decades of the former Soviet Union and especially during the collapse of the Soviet bloc and the difficult post-communist transition. Given the fact that the leading causes of death are increased heart disease, alcohol poisonings, and alcohol-related accidents and violence—that have a well-established association with stress—the stress explanation for high mortality has a logical appeal. Yet this explanation is based primarily on speculation, since there is a paucity of empirical evidence. Stress was not a favored area of study in the former socialist states and research on this topic has been slow to develop.

The purpose of this paper is to utilize data from four CIS countries—Belarus, Kazakhstan, Russia, and Ukraine—to assess the role of stress in the downturn in life expectancy. These countries were selected

for analysis because the mortality crisis is uneven in the CIS and these four countries exhibit the most severely curtailed longevity for both males and females. If stress is promoting lessened life expectancy, these countries should provide the strongest evidence.

There are, however, three different positions in the literature regarding the stress-mortality link in the former socialist countries. One view directly implicates stress as a major cause of increased deaths (Cornia 2000; Leon and Shkolnikov 1998; Shkolnikov et al. 1998a), another proposes that the effects of stress are largely indirect and operate primarily through influencing negative health lifestyles (Cockerham 1999, 2000a, 2002), and a third rejects the stress hypothesis altogether (Carlson and Rychtařiková 1996). In the absence of sufficient data, the debate could not be seriously examined until now. Before presenting our findings, we will review the mortality pattern in the former Soviet bloc and the stress-health lifestyle explanations in order to provide the background for interpreting our results.

3.6.1 The mortality pattern

Ironically, the downturn in life expectancy began in the mid-1960s when the Soviet Union reached its highest level of development. It launched the first space satellite in 1957, the first man in orbit in 1961, and the first crew-manned spacecraft in 1964. The Soviet economy between 1950 and 1960 grew at a rate faster than any other European country and double that of the United States (Skidelsky 1995). Levels of life expectancy in communist Europe in the mid-1960s equaled or exceeded those in the West. Moreover, the division of Germany into separate capitalist and socialist states offered a natural social laboratory for evaluating the health benefits of the two opposing political and economic systems. From the 1950s until the early 1970s, life expectancy was higher in communist East Germany (Nolte, Shkolnikov, and McKee 2000). It could be claimed that communism was good for health (Wilkinson 1996).

Yet the mid-1960s was the precise point at which male life expectancy began to decline in Russia. And, as it turned out, the mortality crisis was to be greater in Russia than in the other Soviet republics or the East European satellite states. Meslé et al. (2003) point out that the reversal in mortality trends in Russia at this time was almost a textbook example of Omran's (1971) theory of epidemiologic transition: infectious diseases had declined to an extent where any further decreases could not offset the consistent increases from deaths from cardiovascular diseases. Whereas mortality from cancer decreased, as did deaths from infectious, respiratory, digestive, and other diseases, mortality from cardiovascular diseases increased dramatically for males (Meslé et al. 2003). Deaths from alcohol-related causes also increased. By 1970, Russian males lived a full year (63.0 years) less on average than they did five years earlier in 1965 (64.0 years). Thirty-seven years later in 2002 they lived 5.5 years less (58.3 years).

The mortality crisis under communism was not restricted to Russia. Elsewhere in the Soviet Union, male longevity fell in Belarus, the Ukraine, and the Baltic States (Estonia, Latvia, and Lithuania). The only former Soviet republics to escape the downward trend prior to 1991 were in the Caucasus (an exception was Armenia) and Central Asia. In Eastern Europe, also beginning in the mid-1960s, male life expectancy entered a period of decline in Bulgaria, Hungary, Poland, and Romania. Exceptions were the former Czechoslovakia and East Germany. Czechoslovakia experienced a decrease in male longevity that started in the mid-1960s, but was the only country to begin a recovery in the mid-1980s under communism. East Germany avoided the decline until just before its absorption by West Germany in 1990. Life expectancy for women in the former socialist states either stagnated or improved slightly from 1965 until the collapse of the communist regimes in 1989-91.

The population group most responsible for the decline in longevity is middle-age males (Cockerham 1997, 1999, 2000a; Meslé et al. 2003; Tulchinsky and Varavikova 1996). Mortality rates have been dramatically higher for several years among 40-59 year-old males than any other group in each of the CIS countries in this study (Abbott 2003). And this is especially the case for middle-age men with working-class backgrounds characterized by manual occupations and lower levels of education (Carlson and Vågerö 1998; Cockerham 1999, 2000a; Cockerham et al. 2004; Shkolnikov, Field, and Andreev 2001; Shkolnikov, Meslé, and Leon 2002; Shkolnikov et al. 1998b; Siegrist 2000). Something was causing premature male mortality and it was not clear what it was.

Several possible causes were investigated. Infectious diseases, environmental pollution, impoverishment, and malnutrition were not major sources of the increased mortality (Bobak and Feachem 1995; Cockerham 1999; Hertzman 1995; Meslé et al. 2003; Shkolnikov et al. 1998a; Zohoori et al. 1999). Medically avoidable deaths (deaths amenable to effective health care) have been traditionally higher than in the West and rose when health care delivery systems deteriorated in countries like Russia after the fall of the Soviet Union (Andreev et al. 2003). However, these deaths had little impact on the overall pattern of mortality (Bojan, Hajdu, and Belicza 1993; Forster and Józan 1990; Shkolnikov et al. 1998a). A policy failure to address the epidemiological transition from acute to chronic diseases was a major shortcoming. Socialist health care delivery lacked the flexibility administratively and structurally to adjust to health problems that could not be handled by the mass measures successful in controlling infectious ailments (Field 2000). But policy did not cause increased cardiovascular disease; rather, it failed to contain it (Cockerham 1999). Thus it falls to stress, negative health lifestyles, or some combination thereof to bear the major responsibility for the rise of cardiovascular and alcohol-induced mortality in the CIS and other former socialist states.

3.6.2 The stress explanation

Stress is a heightened mind-body reaction to stimuli inducing fear or anxiety and typically begins with a situation that a person finds troublesome or burdensome. The fears and anxieties associated with this predicament, if prolonged, may produce serious psychological distress and physiological reactions that impair health and a sense of well-being. While much of the research literature on stress focuses on small group interaction or other micro-level stressors that affect individuals in their everyday life, macro-level stressors originating in the wider society also promote stressful feelings. The rise and fall of communism is an example. Regardless of whether or not the changes associated with this outcome were seen as positive or negative by the people directly experiencing them, lives changed dramatically as state socialism was implemented at a great human cost through revolution, war, internal migration, labor camps, and purges only to eventually break down when it failed economically.

Limitations on personal freedom and a repressive psychosocial environment constraining innovation, creativity, and life satisfaction under state socialism is believed by some scholars to have promoted widespread feelings of apathy, alienation, and low sense of personal control (Bobak et al. 1998a, 1998b, 2000; Cornia 2000; Palosuo 2000, 2003). These stresses were compounded by the rise in unemployment, collapse of price controls for food and rent, reduced purchasing power, and novel conditions of uncertainty and perplexity in the immediate post-communist period. Women, in particular, were losers in this situation in that they additionally faced disproportionately higher unemployment, loss of child care and maternity benefits, and higher costs for basic goods (Ferree 1994). Overall, as Leon and Shkolnikov (1998) point out, the collapse of state socialism and the process of social, political, and economic transformation that followed created enormous stress for the population.

Shkolnikov et al. (1998a) cite high levels of alcohol consumption as largely responsible for the initial increase in premature male mortality in Russia between 1965-84 that reduced male life expectancy from 64.0 years to 61.7 years. They note the temporary reversal of these trends during 1985-87 as male life expectancy recovered to a modern high of 64.9 years in 1987. There is well-documented evidence that this improvement was largely due to Gorbachev's anti-alcohol campaign reducing the availability of alcoholic beverages through higher prices and lower production (Nemtsov 2002; Shkolnikov and Nemtsov 1997). This positive development ended with the curtailment of the anti-alcohol measures in 1987 due to widespread unpopularity and the loss of significant tax revenues. Russian longevity then entered a period of accelerated decline—centered around the post-communist transition—in which male life expectancy fell to a modern low of 57.6 years in 1994. Finally, in 1995, there was some improvement in life expectancy and the possibility that the mortality crisis had eased.

While heavy alcohol consumption continued, Shkolnikov et al. (1998a) claim that "mass psychological stress" induced the accelerated rise in mortality for both men and women that occurred during 1992-94 (p. 2008). They believed the stress was a consequence of the rapid dismantling of state paternalism and a sudden inability to adapt that left many people in a state of confusion, uncertainty, and calamity. Shkolnikov et al. (1998a) state:

> According to the logic of the stress hypothesis, the mortality increase in 1992-94 was connected with the implementation of the Russian economic reforms. At the same time, the mortality decrease in 1995-96 is associated not with improvement of socioeconomic standards (which simply never occurred), but with a gradual adaptation of the population to the new realties of life (p. 2009).

Consequently, Cornia (2000) argues that the gradual rise in mortality in Russia between 1965-85 can be best explained by chronic stress related to frustration, limited opportunities, lack of decision-making and reward at work, and social exclusion, while the steeper mortality increase in 1989-94 can be attributed to a failure to adapt to the acute stress associated with the post-communist transition.

However, while the life expectancy of Russian males improved from 57.6 years in 1994 to 61.3 years in 1998, it turned downward again in 1999 to 59.9 years and continued to decline to 58.5 years in 2002 (the most recent year data are available). Moreover, after escaping the mortality crisis for twenty-five years, longevity for Russian females fell from a high of 74.5 years in 1989 to 71.2 years in 1994. Between 1995-97, female life expectancy rose from 71.7 years to 72.9 years, but declined to 71.8 years by 2002 in a pattern similar to that of males. Russian women were now caught in the downturn.

If the 1995-97 recovery period signified that Russians had adapted to the stressful conditions generated by the post-communist transition, that adaptation clearly failed after 1997 even though more time had elapsed for it to continue. Moreover, after years of decline, the Russian economy has shown some improvement. The GDP rose 10.0 percent in 2000, 5.0 percent in 2001, and 4.3 percent in 2002, while the percentage of the population living below a subsistence level decreased from 30.2 percent in 2000 to 25.0 percent in 2002 (World Bank 2003). As the economic crisis lessens, the mortality crisis continues.

Among the few existing studies measuring the direct effects of stress on people in the former socialist countries, control over work was found to be related to non-fatal myocardial infarction in the Czech Republic (Bobak et al. 1998a) and to self-rated health in Russia (Bobak et al. 1998b) and seven former communist countries (Bobak et al. 2000). The less control respondents had over their work, the higher the rate of heart attacks and the lower the self-assessment of their health. A similar pattern was found in Ukraine with respect to perceived control over life and self-rated health (Gilmore, McKee, and Rose 2002). In Hungary, Kopp, Skrabski, and Szedmák (2000) found that men with the most severe depressive symptoms and socioeconomic deprivation had the highest self-rated morbidity. These symptoms were connected to feelings of hostility, low control at work, low perceived social support, and emotional ways of coping. Palosuo (2000, 2003) and her colleagues (Palosuo et al. 1998) found somewhat greater alienation among residents of Moscow than Helsinki and alienation, in turn, was related to poor perceived health and a higher number of self-reported physical symptoms. Palosuo (2000, 2003) also observed a more negative health lifestyle among Muscovites and noted the possibility that stress affected health indirectly through such lifestyles.

Siegrist (2000) advocated a stress explanation of mortality in the former socialist societies because of chronic strain associated with the loss of core social roles and effort-reward imbalances in the workplace. However, he observed that the health lifestyles and stress explanations had developed independently of each other and suggested it is necessary to bridge the gap between these two research traditions by focusing on the psychosocial dynamics of agency and role acquisition. It is his position that poor health in specific adult populations stems from exclusion or inadequate participation in society's opportunity structure. Watson (1995), however, rejected the health lifestyle explanation of premature mortality in favour of a psychosocial stress argument. Her focus was on the incongruity between personal aspirations and the means of achieving them under communism, along with family-coping strategies. She believed that health lifestyle choices were too constricted. Watson primarily looked to lessened social support and higher mortality rates among unmarried than married men to advance her claim about the dominant role of stress in the mortality crisis.

Another indicator of stress during turbulent social conditions is an increase in homicide and suicide rates. Homicide rates increased in Russia during the stressful 1992-94 period, only to fall in 1995 and rise again in 1998-99. However, there is a direct relationship between alcohol consumption and

homicide rates in Russia (Pridemore 2002), which suggests that the effects of stress on murder are mediated by alcohol abuse. Some 70-80 percent of people convicted of homicide are intoxicated at the time of the offence (Chervyakov et al. 2002). Stress also appears to have little direct effect on suicide. Mäkinen (2000) studied suicide mortality in all of the former socialist countries and found that suicides contributed little to overall death rates. In fact, he noted the absence of any general trends in suicide in Eastern Europe and the CIS, although all of the countries studied experienced similar post-communist transformations. "From our results," states Mäkinen (2000), "it is obvious that rapid transformations of society do not per se necessarily produce more suicide, something that conflicts with the classical Durkheimian theory" (p. 1416). This finding is consistent with that of Bobak et al. (1999) who observed that alcohol consumption was spread relatively uniformly among males in Russia and was unrelated to individual perceptions of the recent societal changes.

Additional evidence negating a stress explanation of mortality comes from the Czech Republic. Although the economic conditions in the Czech Republic and Russia are not equivalent, the Czechs, like people in the other former socialist countries, experienced an increase in male mortality from heart disease beginning in the mid-1960s. But unlike the others, this trend was reversed in the mid-1980s—prior to the end of Soviet domination and the difficulties associated with the transition out of communism—and continues today after a one-year interruption in 1990. It can be argued that the Czech Republic experienced many of the same stressful events as its socialist neighbours, but has seen male life expectancy consistently increase since 1984. Declines in deaths from cardiovascular and cerebrovascular diseases are principally responsible for the changes in mortality. Rychtaříková (2002) credits social/behavioral (lifestyle) factors and especially medical improvements in treating cardiovascular diseases for this development. Škodová et al. (1997) provide evidence of positive health lifestyle adjustments in dietary changes (more fruits and vegetables, less meat and diary products) and reduced smoking. Carlson and Rychtaříková (1996) reject a stress hypothesis for the Czech Republic by pointing out that "rapid declines in nearly all causes of death for all age groups after 1990 has coincided with rapid social transformation, economic insecurity, stress, unemployment, new freedom in the marketplace to buy and sell an unprecedented variety of foodstuffs, and, in general, an acceleration of the sort of 'westernisation' that was supposed to be producing rising death rates" (p. 9).

In sum, the evidence supporting a stress explanation for the mortality crisis is mixed at best and a strong case in favor of the argument has yet to be made. There is general agreement that the initial period of the post-communist transition (1992-94) was exceptionally stressful, and it seems likely that stress was a major factor in the downturn in life expectancy for both males and females at this time throughout the former Soviet bloc. But evidence has not been presented showing this is the case, or that stress is a direct cause of the long-term pattern of premature male deaths. Consequently, some researchers favour the health lifestyle explanation.

3.6.3 The Health Lifestyle Explanation

Health lifestyles are collective patterns of health-related behaviour based on choices from options available to people according to their life chances (Cockerham 2000b). This definition reflects Weber's (1978) seminal conceptualisation of lifestyles that suggests life choices and life chances interact with one another in a dialectical relationship, with choices constrained or empowered by life chances and likely to be consistent with the capability to realize them. The four most common health lifestyle practices involve positive or negative choices concerning alcohol use, smoking, diet, and exercise, but may include other activities like rest and relaxation, drug use, seat-belt use, preventive checkups by physicians, and similar health-related behaviours.

Life chances is a term introduced by Weber to signify the chances or probabilities a person has in life to obtain satisfaction for his or her needs and desires, and is especially indicative of class position. The higher the social class, the greater the range of lifestyle choices and the probability of realizing them; conversely, the lower the class, the more limited the choices and lessened the probabilities of realization. Other social structural variables denoting life chances, like age, gender, race/ethnicity, and living conditions, also influence lifestyle choices.

According to Bourdieu (1984), lifestyles are generated by a habitus, which is a repertoire of dispositions that people use to guide and evaluate their behavioral choices and options. These dispositions to act in a particular way as opposed to other behavioral options are relatively enduring and habitual. The habitus is formed through socialization and experience, and shaped by the reality of the individual's class circumstances. Bourdieu emphasizes the collective basis of the habitus by pointing out that people who internalize similar life chances share the same habitus. He maintains that the habitus adjusts an individual's desires and expectations according to the probabilities of success or failure common to members of his or her class for a particular behavior. Therefore, lifestyle practices are not the uncoordinated behaviors of unconnected individuals, but are personal routines that merge into an aggregate form characteristic of specific groups and classes.

Under state socialism, life choices and chances were aligned with a dominant political ideology negating individuality and initiative (Medvedev 2000). The central government assumed overall responsibility for health care and the belief was prevalent that health depended on the health care system, not the individual (Dmitrieva 2001; Shkolnikov and Meslé 1996). There is evidence this situation promoted a passive orientation toward positive health lifestyles that was reinforced by a lack of public health campaigns advocating healthy practices for individuals (Cockerham, Snead, and DeWaal 2002). Furthermore, a sense of personal responsibility on the part of the individual for his or her health was not likely to appear in the immediate aftermath of communism's collapse, as alternative sources of support and established norms for health promotion were lacking.

Rather, a habitus producing an enduring disposition toward a negative health lifestyle appears to have become normative for many people—especially adult males—in the former socialist countries and reproduced over time when regularly acted out in unhealthy routine drinking, smoking, eating, and other practices. While it can argued that such a habitus is ultimately harmful, the dispositions it produces may nevertheless be the normative lifestyle for a person's group or class and be reproduced by being consistently acted out, as individuals adapt to limited opportunities to do otherwise.

Shkolnikov and Nemtsov (1997), for example, describe the mode of drinking common to middle-age Slavic males as part of a northern European lifestyle involving rapid group consumption of large doses of vodka. Participants are expected to continue to drink with their fellows as long as they are able to hoist the beverage to their mouths or until the supply of alcohol is consumed. Little or no social stigma is attached to drunkenness. Earlier in the 20th century, Russian workers typically drank large amounts of alcohol only on their days off (Sunday and Russian Orthodox Church holidays). However, during the Soviet period, heavy alcohol consumption became common throughout the year, which likely fostered a lifestyle characterized by regular heavy episodic or binge drinking. This situation suggests that it is the normative demands of a particular lifestyle, rather than stress per se, that is largely responsible for the pattern of male drinking in Russia.

Several studies identify the negative health lifestyles of middle-age, working-class men—consisting of an entrenched pattern of excessive alcohol consumption and binge drinking, heavy smoking, high fat diet, and absence of health-promoting leisure-time exercise—as the primary determinant of the rise in male mortality throughout most of the former Soviet bloc (Adevi et al. 1997; Carlson and Vägerö 1998; Cockerham 1997, 1999, 2000a; Cockerham et al. 2002; Ginter 1997; Janeĉková 2001; Janeĉková and Hnilicová 1992; Kulin and Skakkeback 1995; Ostrowska 2001; Palosuo 2000, 2003; Palosuo et al. 1998; Steptoe and Wardle 2001). Other research shows that smoking is higher in Russia than in the West (Hurt 1995; Lopez 1998; McKee et al. 1998; Prokhorov 1997), while the diet has changed considerably since the 1960s and become one of the fattiest in the world (Popkin et al. 1997). Moreover, the heavy use of alcohol continues (Nemtsov 2002) and data on leisure-time exercise show it to be minimal (Palosuo 2000, 2003). These unhealthy lifestyle practices remain far more characteristic of men than women.

Clinical findings concerning coronary heart disease support the importance of health lifestyles, even though there is a notable difference in overall cholesterol levels between people in the former socialist countries and the West. Recent analyses of over 500,000 heart patients in the United States and elsewhere by Greenland et al. (2003) and Khot et al. (2003) show the vast majority of patients (80-90 percent at some sites) exhibited at least one or more of four conventional risk factors all associated

with lifestyles: smoking, diabetes, high blood pressure (hypertension), and elevated levels of cholesterol (hyperlipidemia). Both studies noted the central role of health lifestyles—especially smoking and dietary practices—in causing or preventing these risk factors. Research in northern Russia (the Arkhangelsk region), however, shows that despite high cardiovascular mortality, Russian men and women have lower levels of cholesterol than their counterparts in northern Norway in Tromsø and Finnmark (Averina et al. 2003). This result is consistent with findings from an earlier MONICA project showing populations in 15 European communist countries having a lower prevalence of hyperlipidemia than people in 25 democratic nations (Ginter 1995).

Nevertheless, in the MONICA study, there was significantly higher mortality from heart disease and stroke for both men and women in the communist countries despite lower overall cholesterol. Among women, there was a strong relationship between heart disease mortality and overweight and hypertension. Men were particularly at risk from smoking and hypertension, and exhibited high alcohol consumption. “In communist countries,” states Ginter (1995), “there was at least two-times higher consumption of [alcoholic] spirits” (p. 203). A 12-year study of middle-age men in Moscow and St. Petersburg by Shestov et al. (1993) likewise found low cholesterol levels in a large subset of males with increased risk of cardiac death. The mortality risk was primarily associated with lifestyle characteristics, principally high alcohol consumption. These studies suggest the effects of sustained heavy drinking are more important for premature cardiovascular mortality for men than cholesterol levels. It is therefore not surprising that alcohol use has been identified as perhaps the single most important lifestyle variable in the mortality crisis (Balkau 1999; Leon et al. 1997; McKee, Shkolnikov, and Leon 2001; Shkolnikov, McKee, and Leon 2001; Nemtsov 2002; Shkolnikov and Nemtsov 1997; Walberg et al. 1998). It also appears that the cardio-protective features of alcohol do not operate the same way in Russian society as in the West, most likely because of the high volume of consumption, the drinking style (heavy frequent drinking), and strong preference for vodka with its high alcoholic content (Britton and McKee 2000; Deev et al. 1998).

There are few detailed critiques of the health lifestyle explanation in the literature on the former Soviet bloc. An exception is Watson (1995) who agreed with Giddens (1991) that fewer lifestyle choices exist in tradition-oriented societies and that such choices expand the more tradition loses its hold on social life. She argues that under state socialism, tradition was not losing its grip; to the contrary, it was becoming more entrenched. Coping strategies were fixed and lifestyle choices intended to create new ways of living were unavailable. The limitations on such choices precluded them from being significant factors in the mortality crisis. However, as Giddens (1991) also points out, everybody has lifestyle choices, even the poor, which are conditioned by their life chances (p. 85). The constraints of life chances on lifestyle choices do not render them unimportant, but instead illustrate the powerful influence of structural conditions on those choices (Cockerham 1999; Cockerham et al. 2002). These conditions channel lifestyle choices down particular pathways, as opposed to alternative options, and allow us to understand the persistence of choices that are harmful to a person’s health and longevity. Thus the pervasive influence of social structural conditions on health lifestyles in the former socialist countries and, to quote Watson (1995, p. 933), “the perceptual framework to which such arrangements gave rise,” helps us to comprehend the unchanging nature of those choices which have ultimately had disastrous consequences for the life expectancy of those making them.

3.6.4 The gender gap

Given the improvement in longevity in many Eastern European and CIS countries, we have focused on those CIS nations where the mortality crisis continues to be severe. These countries are Belarus, Kazakhstan, Russia, and Ukraine. Belarus, Russia, and Ukraine have large Slavic populations and a long history of adverse male mortality, while Kazakhstan in Central Asia has a large ethnic Russian minority of five million people (a third of the population) out of a total of 14.8 million people in 2001. Unlike the other countries in this study, life expectancy for males in Kazakhstan actually increased 2.2 years between 1979-80 and 1991-93. Female longevity increased 1.2 years during this period. But Kazakhstan has had the same pattern of life expectancy as the other three nations for both males and females through the 1990s and early 2000s.

Although both male and female longevity declined overall, with an intermittent rise, in each country during 1991-2002, the longevity gap between men and women has continued to be wide. In fact, Russia has the world's biggest gender gap in life expectancy (Shkolnikov et al. 2002). The gap is approximately double that of other industrialized countries and four times greater than it was in the 1960s (Shkolnikov, Field, and Andreev 2001). Russian females outlived their male counterparts an average of 13.4 years in 2002. The gender gap in life expectancy in the United States, in contrast, was 5.2 years in 2003. This gap is not as extreme in Belarus, Kazakhstan, and Ukraine, but is among the highest in the world nonetheless. Although females have joined males in the mortality crisis, gender remains significant because the difference in years lived between adult men and women has continued to widen.

In the former Soviet Union, men maintained the dominant role in gender relations despite the official policy of gender equality (Grey 1990). Communist propaganda from the very beginning idealized the image of the heroic and combative male as the basis for building and defending the socialist order, while women filled supportive roles on the job and in the home (Weitz 1996). The structure of employment outside the home also favoured men, as "the higher the social status of the job, the lower the proportion of women employed in it" (Baskakova 1997, pp. 64-65). Therefore, the post-communist transition may have been more psychologically distressing for men than women if they were unable to provide for their families or fill their traditional patriarchal role.

However, because of the convergence of men and women in the labour force under socialism, both sexes would have been exposed to the same macro-level stress from the transition, including job insecurity, layoffs, and loss of income. Research from the Czech Republic suggests that the stress of men and women workers was about the same during the economic reforms in that country (Hraba et al. 1996). Whether or not the same situation existed in the CIS is not known. But one possibility, based on the findings of Aneshensel et al. (1991) in the U. S., is claimed by Andreev, McKee, and Shkolnikov (2003). Andreev et al. suggest that stress affects men and women differently and it is the differential effects of stress that are causing mortality differences. They agree with Aneshensel et al. that men react to stress with hostility and anger, which is often accompanied by substance abuse, and women are more likely to respond with anxiety and mood disorders. "This certainly seems true in the Russian Federation," state Andreev et al. (2003), "where hostility and anger are especially likely to lead to premature death" (p. 784). Therefore, stress would seem to impair the health of women, but lead men to their graves. If stress is the major culprit causing the gender gap, then males should experience more of it or be less able to cope with it.

Ten exogenous variables were employed in the analysis. Polytomous dummy variable coding was used to compare the other three countries to Russia. This comparison was undertaken because Russia is the epicenter of the mortality crisis and its population has experienced the most severe downturn in life expectancy in the CIS. We wanted to determine if there were differences between Russia and the other CIS countries in this study with respect to health lifestyles and stress. The coding was as follows: (1) Belarus, coded as resident of Russia = 0, resident of Belarus = 1. (2) Kazakhstan, coded as resident of Russia = 0, resident of Kazakhstan = 1. (3) Ukraine, coded as resident of Russia = 0, resident of Ukraine = 1. Other variables are (4) male, coded as female = 0, male = 1; (5) age, coded in years; (6) married, coded as single, divorced, widowed = 0, married = 1; (7) education, coded as primary or without education = 1, non-finished secondary education = 2, secondary education = 3, secondary vocational education (i.e., medical, technical, pedagogical college) = 4; non-finished higher education= 5, and higher education = 6; (8) disposable income, coded as not enough for nutrition = 1, just enough for food/clothes = 2, enough to buy TV/fridge, but not car/apartment = 3, can purchase expensive goods (car/apartment) = 4; (9) occupation, coded as agricultural/unskilled worker = 1, skilled worker = 2, office clerk without higher education = 3, manager/professional = 4, top manager = 5; and (10) employed, coded as unemployed = 0, employed = 1.

Twelve stress variables were arranged into a dichotomous format for this analysis. Each stress variable indicates the presence or absence of its respective stress symptom, and each is coded as no symptom present = 0, symptom present = 1. These variables include: (1) inability to concentrate; (2) insomnia; (3) feeling constantly under strain; (4) feeling you couldn't overcome your difficulties; (5) losing confidence in yourself; (6) often shaking or trembling; (7) frightening thoughts coming into

your mind; (8) getting spells of exhaustion or fatigue; (9) feelings of stress; (10) feeling lonely; (11) feeling an impossibility to influence things; and (12) feeling that life is too complicated.

Seven health lifestyle dependent variables were employed in this analysis. Each variable is in a dichotomous format. (1) Frequent drinker, measures frequency of alcohol consumption among drinkers only and is coded as drink one or less times a week = 0, 2-6 times a week or daily = 1. The importance of this variable is seen in the finding by Malyutina et al. (2003) that frequent heavy drinking in Russia increases the risk of cardiovascular disease more than episodic binge drinking. Although other studies (Bobak and Marmot 1999; Chenet et al. 1997) cite the relevance of binge drinking for male mortality, frequent drinking remains a significant negative health lifestyle practice (Balkau 1999; McKee et al. 2001). (2) Heavy vodka drinker, measures how much vodka a drinker consumes and is coded as less than 100 grams at one sitting = 0, over 100 grams (between 100-300 grams, half a liter, and more than half a liter) at one sitting = 1. There is no clear consensus as to the best measure of heavy drinking in Russia. Malyutina et al. (2002), for example, used 80-120 grams of alcohol consumed at one sitting to measure heavy drinking and 160 grams for binge drinking. Our review of past studies in Russia and vodka's high alcoholic content (80 or higher proof), suggests a cutoff point of more than 100 grams (approximately 3.5 ounces) of vodka consumed per sitting as constituting a reasonable standard for heavy drinking and beyond. Vodka was selected because our data show that it is favored over wine and beer as the most popular alcoholic drink in these countries and over-consumption is an especially lethal health lifestyle practice (Leon et al. 1997; McKee et al. 2001; Nemstov 2002; Shkolnikov, McKee, and Leon 2001).

(3) Smoking measures the use of cigarettes and is coded nonsmoker = 0, smoker = 1. Smoking is considered a highly negative health lifestyle practice, not only because of its strong relationship with lung cancer but also heart disease (Greenland et al. 2003; Khot et al. 2003). (4) Physical activity at work is a measure of how much physical activity is required by a respondent's job and is coded none, minimal, or some = 0, significant or extreme = 1. Physical activity at work is not necessarily a positive health lifestyle because of the stress associated with work demands and time schedules. The greatest health benefits are linked to relatively rigorous leisure-time exercise (Dunn et al. 1999). Unfortunately, a measure of leisure-time exercise was not included in these data, but physical activity at work is reported here as a less healthy form of exercise. Daily consumption of (5) meat, (6) vegetables, and (7) fruit—major components of a well-balanced diet—are coded separately for each food item as seldom, occasionally (once per week), and 2-3 times a week = 0, daily = 1.

Two additional measures of health—overweight and self-rated health status—are included in the analysis. Overweight is based on Body Mass Index (BMI) scores and is coded 24 and under = 0, 25 and over = 1. The BMI measures the ratio of weight (in kilograms) to height (in meters) and is typically used to determine healthy weight ranges. Positive scores for adult men and women are in the 19-22 range, while 25 and over signify being noticeably overweight. The mean score for males in this sample is 25.4 and the median is 24.5; for females, the mean is 26.2 and the median 24.5. Health status is a subjective self-ranking of one's own health and is coded bad and rather bad = 0, quite good and good = 1.

Multivariate analysis, adjusting for demographic co-variates, was performed using logistic regression. The advantage of logistic regression is that it calculates the probability of a discrete outcome (yes or no) for each dependent variable, rather than predicting the effects of several continuous independent variables on a single dependent variable. The statistics presented are the odds ratios, which express the direction and magnitude of the relationship between an independent and dependent variable. The 95 percent confidence intervals associated with the odds ratios are also reported.

3.6.5 Results

This analysis consists of a series of three statistical tests. The first examines the impact of the ten exogenous variables on health lifestyles in the four CIS states. The second investigates the effects of the same independent variables on symptoms of stress, and the third examines the relationship between the stress symptoms and health lifestyles. Residents of Belarus are significantly less likely

than Russian residents to smoke, eat meat and vegetables daily, and rank their health status as good or quite good. Belarussians are more likely to eat fruit daily, however. Residents of Kazakhstan are significantly less likely than residents of Russia to be frequent drinkers, but they are more likely to be heavy vodka drinkers. However, heavy vodka drinking among Kazakh males is not uncommon (Cockerham et al. 2004). Additionally, Kazakhs are less likely to smoke and eat vegetables daily and more likely to rate their health as good or quite good. Ukrainian residents, in turn, are significantly less likely than people in Russia to be heavy vodka drinkers, smoke, eat meat and vegetables daily, and rank their health as good or quite good. Ukrainian residents are more likely to eat fruit daily. Overall, these results show that respondents in Russia have a better diet with respect to daily meat and vegetable consumption than people in the other three countries, but they have a worse diet in regard to eating fruit daily. The Kazakhs are less frequent drinkers, but the Kazakhs consume vodka more heavily and the Ukrainians less heavily than Russian residents. The negative health lifestyle practice than most distinguishes Russian residents from people in Belarus, Kazakhstan, and Ukraine is significantly greater smoking.

The variable of principal interest is gender and the results are striking. Males are nearly ten times (OR=9.882) more likely than females to consume alcohol frequently and, among drinkers, they are more than four times (OR=4.375) more likely to be heavy vodka drinkers. Males are also thirteen times (OR=13.216) more likely to smoke cigarettes and twice as likely (OR=2.163) to engage in heavy physical activity at work. Additionally, males are more likely (OR=1.371) to consume meat daily, but are 13 and 11 percent less likely than females to eat vegetables and fruit on a daily basis. With the exception of daily vegetable ($p<.01$) and fruit ($p<.05$) consumption, which favour females, gender differences are significant at the .001 level. Males are 28 percent less likely than females to be overweight and they are twice as likely (OR=2.083) to rate their health as good or quite good. Overall, females exhibit much healthier lifestyle practices than males.

The results for age suggest that younger respondents are more likely to drink frequently, be heavy vodka drinkers, and smoke. They are also significantly more likely to consume meat and fruit daily, but not vegetables whose consumption via age does not produce significant differences. Older respondents are more likely to be overweight, but younger people are more likely to rate their own health as good or quite good. With respect to marital status, unmarried respondents are significantly (about 32 percent) more likely to drink alcohol frequently. However, married persons have a much healthier diet and are 1.5 times more likely to be overweight. Yet they are 1.1 times more likely to rate their own health as better than the unmarried.

The socio-economic status variables of education, disposable income, and occupational status were not powerful predictors overall of health lifestyle practices. Education was not significant on any measure except for self-rated health. Higher educated persons ranked their health better than less educated individuals. Disposable income had no significant effects on any of the dependent variables. Occupational status performed better, in that persons in lower status occupations had more physical activity and those in higher status jobs had better daily diets and ranked their health significantly better. The employed are more likely to eat meat daily, be overweight, and rank their health better. The unemployed are more likely to eat fruit daily.

Five of the twelve stress symptoms showed significant differences between residents of Belarus and Russia. Belarussians were less likely than Russians to feel constantly under strain, stressed, that it is impossible to change things, and that life is too complicated; they were more likely, however, to be exhausted/fatigued. Eight of twelve stress symptoms were significant in comparing Kazakh and Russian residents. Kazakhs were significantly less likely to be unable to concentrate, have insomnia, feel constantly under strain, and have shaking/trembling and frightening thoughts, feel stressed, and find life too complicated. Six stress symptoms were significant with respect to Ukraine and Russia. Ukrainians were less likely than Russian residents to suffer from insomnia, but were significantly more likely to feel constantly under strain, that they cannot overcome their difficulties, have shaking/trembling and exhaustion/fatigue, feel stressed, and that it is impossible to influence things and life is too complicated. Whereas people in Belarus and Kazakhstan appear to have fewer symptoms of stress than Russian residents, people in the Ukraine are more stressed overall than those in Russia. This finding weakens the stress explanation somewhat because the mortality crisis is

greatest in Russia, but Ukrainians express considerably more overall stress than Russians do. However, it is the results for gender that dramatically turn the stress hypothesis upside down.

For virtually every stress symptom, females are significantly more likely than males to have experienced the symptom. That is, women are more likely than men to be unable to concentrate, experience insomnia, feel they are constantly under strain, feel they cannot overcome their difficulties, and are losing confidence. They have more spells of shaking or trembling, frightening thoughts, exhaustion/fatigue, generally high levels of stress, feelings of loneliness, feel it is impossible to influence things in their lives, and that life is too complicated. The differences are all significant at the .001 level. With respect to the odds ratios, men are between 30 to 50 percent less likely than women to have not been symptomatic on every indicator. Overall, these data show that women in the four CIS countries are overwhelmingly more stressed than the men.

Similarly, the findings for age undermine the stress explanation. Except for being unable to concentrate (which is not statistically significant), older respondents are significantly more likely on all other stress measures to have experienced the symptoms than younger respondents. The results for age are all significant at the .001 level. However, the mean age for a male in this study is 44.7 years and the median 43.0 years; the mean age for females is 46.9 years and the median 45.0 years. Therefore, younger respondents are not very young; they are predominantly middle-aged. And it is the middle-aged who are suffering from the highest premature mortality. Yet these data show older people to have exceedingly more symptoms of stress and they are not the ones dying early.

Unmarried (single/divorced/widowed) individuals have nine out of twelve stress symptoms. The unmarried are significantly more likely to express problems concentrating, insomnia, feeling they are constantly under strain, that they cannot overcome difficulties, are losing confidence, it is impossible to influence things, and being lonely. The odds ratio shows unmarried respondents are almost 80 percent more likely to feel lonely. Each result is significant at the .001 level. In addition, unmarried persons have more shaking/trembling ($p<.05$) and feeling that life is too complicated ($p<.05$). There were no significant differences for frightening thoughts, exhaustion/fatigue, and feeling stress. Marriage may therefore serve as a protective factor against stress—particularly for males. Some 68.9 percent of the males in this sample are married compared to 54.6 percent of the females.

Among the socio-economic status variables, education was significant only in relation to less educated persons feeling more exhaustion/fatigue. Having more disposable income was significant in relation to five of twelve items (constantly under strain, more shaking/trembling, greater exhaustion/fatigue, more feelings of stress, and life being too complicated). Those respondents with more income were more stressed than those with less spending money. Occupational status was a considerably more robust variable, being significant for nine out of twelve items. On each measure showing statistical significance, persons in lower status occupations expressed the most stress. Similar to individuals working in lower-status jobs, the unemployed have more stress symptoms than the employed. Employment was significant for nine of twelve stress symptoms, with the unemployed showing the greatest stress on eight of those symptoms. The employed, however, were 1.2 times (OR= 1.201) more likely to be exhausted/fatigued.

In order to determine whether stress operates indirectly through health lifestyles, we treated the stress symptoms as independent variables to measure their effects on lifestyle practices. However, given the previous results showing that men have the most negative health lifestyles and women the most stress, it is not likely that a strong association will be found. People with the symptoms of losing their confidence and feeling that it is impossible to influence things are 1.3 times more likely to be frequent drinkers, but others with insomnia and finding life too complicated are less likely to drink frequently. The only stress variable significant for heavy vodka drinking is insomnia in that persons who have trouble sleeping are 30 percent less likely to be heavy vodka drinkers. Overall, the association of stress with alcohol is not strong in these data.

People losing confidence are about 1.5 (OR=1.456) times more likely to smoke, but respondents who cannot overcome difficulties, have frightening thoughts, are feeling lonely, or find life too complicated are significantly less likely to smoke. The results for strenuous physical activity at work show that respondents who are constantly under strain are 1.2 (OR=1.225) times more likely to have

this type of work situation and those with exhaustion/fatigue are 1.5 times more likely (OR=1.555). Persons with insomnia, unable to overcome difficulties, and feeling lonely are less likely to have physically demanding work. The daily consumption of meat, vegetables, and fruits is significantly less likely for respondents feeling lonely and finding life too complicated. Not eating meat daily is significant for those with insomnia, feeling they cannot overcome difficulties, and feeling it is impossible to influence things. Persons with shaking/trembling are 1.3 times more likely to consume vegetables daily, but being unable to concentrate and having frightening thoughts reverse this practice. People constantly under strain are 1.6 times more likely to eat fruit daily and those with exhaustion/fatigue are over 11 percent likely to not do so.

Respondents with insomnia are 1.5 times more likely to be overweight and those constantly under strain are 1.2 times more likely. Conversely, people unable to concentrate are about 22 percent less likely to be overweight. Every stress symptom, with the exception of being unable to concentrate and feeling stressed, is significant in relation to self-rated health status. In each outcome, lessened symptoms of stress translate into higher health status. It is striking that the solitary symptom of feeling stressed was not significant in relation to any of the health lifestyle practices, being overweight, or self-rated health status. Overall, these results suggest that stress symptoms are not powerful predictors of negative health lifestyles.

3.6.6 Conclusions

These data are limited in that they reflect one point in time (late 2001)—some ten years after the collapse of the former Soviet Union. The effects of stress on mortality and health lifestyles would have been greatest during the turbulent 1992-94 transition period. The respondents in this sample have had a decade to adjust to the changes and, as noted, there have been some recent signs of economic improvement. Yet this is a period when life expectancy for both adult males and females is still declining in Belarus, Kazakhstan, Russia, and Ukraine. For the three predominately Slavic nations, the decrease in longevity for males is part of a long-term trend stretching back nearly four decades. So, if stress is operative, it would be chronic rather than acute and these data do not provide evidence of strong effects on men. There is also the possibility of response bias in that both men and women may feel stressed, but only women report it. However, there is no evidence to suggest that this is the case. There were 4,444 randomly selected males spread across four CIS countries in this study and the results were consistent by gender and region. No subset of this population appeared to over-report or under-report stress symptoms. We believe the findings are accurate and that women are especially disadvantaged in these four countries, with stress serving as a major indicator of their predicament.

We know that the principal causes of the increased mortality are deaths from cardiovascular diseases and alcohol-related situations. The current challenge is to uncover the factors ultimately responsible for these causes. As noted, infectious diseases, environmental pollution, impoverishment, malnutrition, and medically avoidable deaths have been eliminated as major causal factors, leaving the respective contributions of stress and health lifestyles to be determined. These data clearly show that stress is not the principal cause of the premature mortality. Women are found to be exceedingly more stressed than men and, while stress undoubtedly makes their lives less pleasant and healthy, it is obviously not killing enough of them prematurely to overtake male mortality. These data also suggest that marriage may be an important barrier to stress for males.

As bad as the situation may be for females, the key to explaining the mortality crisis ultimately lies in male behaviour. These data and several previously cited studies show that males drink and smoke far more than females and have less healthy diets. These lifestyle practices and their relationship to cardiovascular and alcohol-related mortality appear to be the most pervasive cause of premature male mortality. We suggest that the disposition of males to routinely engage in harmful health habits is primarily grounded in the normative behaviour of males, rather than the stress they experience. These data show, for example, that heavy vodka drinkers do not suffer from insomnia, nor do they experience the other stress symptoms.

It may be that stress is not as strong a factor as expected in Russian male drinking because drinking eliminates its presence. This is not to say that stress does not underlie drinking, but that once drinking practices are established for an individual, drinking suppresses stress. As Boris Yeltsin (2002)

explains in his memoirs, he learned "fairly early on …that alcohol was the only means to quickly get rid of stress" (p. 318). Therefore, it may be that heavy drinkers are not stressed because they drink heavily. Drinking may, in fact, promote feelings of well-being. This outcome is seen in a study in Moscow where some 40 percent of male respondents reported that alcohol makes them feel more optimistic about life (Mustonen 1997). This may be one reason that research by Bobak et al. (1999) found alcohol consumption in Russia to be spread rather uniformly among males and not related to material deprivation, economic or political change, or ratings of the economic situation.

When men in the former socialist countries drank and smoked too much, these behaviors reflected a normative structure for male socializing. As Yeltsin points out: "The traditional Russian lifestyle dictates that it's impossible not to drink at a birthday; it's impossible not to drink at a friend's wedding; it's impossible not to drink with your coworkers" (p. 318). As previously noted, this situation suggests that it is the normative demands of a particular lifestyle that is largely responsible for the pattern of male drinking. As these normative drinking dispositions become routine and internalized by the habitus, they may be reproduced over generations by being constantly acted out. Bourdieu (1984) explains that the dispositions produced by the habitus are not eternal, but they are durable. These dispositions originated in a traditional drinking style of overindulgence in Imperial Russia that later flourished under state socialism (Shkolnikov and Nemstov 1997). The removal of religious constraints and the ready availability of cheap vodka as a major source of government tax revenue were important contributing factors.

While it might be argued there is always a choice to do otherwise, that is, to not drink or smoke, eat fatty foods, and not exercise, group norms can take precedence even though the choices they influence are ultimately punishing. As Bourdieu (1984) explains, people may have control over their lifestyle choices, but not necessarily over the social and psychological conditions channeling those choices in a certain direction as opposed to others they might take. Bourdieu (1977), for example, describes how the dispositions of French working-class youth toward low educational attainment were transmitted intergenerationally through socialization and continued to produce self-defeating behavior. We would argue that a similar process promotes negative health lifestyles among males in the four CIS countries in this study and that such lifestyles are primarily responsible for the abbreviated life spans.

3.7. Health, living conditions and wellbeing

3.7.1 Subjective Responses to Post-Soviet Transformation

> Wellbeing: The state of being happy, healthy or prosperous.
>
> Welfare: The state of doing well, especially in respect to good fortune, happiness, wellbeing or prosperity.
>
> Webster's New Collegiate Dictionary (1963: 1012)

The subjective approach to the study of wellbeing can be justified both theoretically and empirically. The English 'wellbeing' is derived from Old English and Old High German words for will, which can be defined as 'desire or wish' (Webster's, 1963: 1021). The example offered--'call it what you will'--is particularly apt here, since both ordinary people and social scientists may define subjective circumstances in a variety of ways.

In theory, welfare economics can avoid the problem of defining what constitutes welfare to individuals, or define the term so broadly as to include anything that satisfies human wants. But a definition so broad that it fails to distinguish between a desire to hit the jackpot in a Las Vegas casino and a non-monetized benefit such as backpacking in the Rocky Mountains risks being, as Ian Little noted (1963: 81f), 'an uninterrupted stream of logical deductions which are not about anything at all'.

Methodologically, at least five different types of indicators of wellbeing and the influences on wellbeing can be available for empirical analysis. There are the "hard" indicators, impersonal

attributes of individuals capable of reliable verification, such as income and health. But the validity of many so-called objective measures can be contested, especially outside mature market economies. Hence, there is a case for turning to subjective measures, assessments that individuals make of their own circumstances, such as happiness or life satisfaction. A third type of indicator is relational, as in social capital studies of networks involving the position of one individual vis a vis others. Fourthly, individual-level statistics can be aggregated to the national level to produce such measures as life expectancy. Finally, context variables characterize structural conditions that may affect individual wellbeing, for example, the extent to which a political regime is repressive or the environment is high or low in pollution.

In every society the distribution of health, money and happiness is a variable. A multiplicity of social science theories offer testable hypotheses about influences on wellbeing. If wellbeing is defined as happiness, then health can influence happiness, but if wellbeing is defined as health then the reverse may be true. In any event, other influences can also be involved making causal arrows more complex for each indicator. For example, good health can be hypothesized to cause happiness or happiness can be hypothesized to make people healthier and material living standards may cause both good health and happiness. The complexity of these relationships raises the prospect that these hypotheses are tautological, because health, happiness and prosperity are simply different labels of the same underlying intellectual concept.

The first object of this paper is to review what happens when measures of wellbeing are applied in societies in transformation; empirical data comes from representative surveys in eight successor countries of the Soviet Union. The second object is to set out five empirically testable hypotheses, namely: material conditions, health, human capital, social capital and context influence wellbeing. The third object is to test hypotheses with self-reported happiness as the dependent variable. Given the inter-relationship between health and happiness at both the conceptual and empirical level, the fourth section uses two-stage OLS regression analysis to assess empirically the extent to which health and happiness are independent or simply alternative indicators of the same underlying concept of wellbeing. The concluding discussion of policy implications uses empirical findings to distinguish between significant influences that are and are not readily amenable to direct influence by government actions.

3.7.2 Measures of well-being

The post-Soviet context. The greater the difference in context, the better the challenge to the robustness and universality of research assumptions based on research within established market economies and stable democracies. Since 1991 the context of the peoples of the Soviet Union has undergone a treble transformation: the boundaries of the state and nature of the regime have collapsed and new boundaries and institutions have been introduced; the non-market command economy has collapsed and been replaced with elements of a market economy such as market prices and employment insecurity; and a social structure based on prestige defined by the nomenklatura system and Communist doctrines has also collapsed.

The treble transformation of the institutions of the Soviet Union has been an extraordinary textbook example of something far worse than individual unhappiness, which can be temporary and is not collective. It fits Emile Durkheim's concept of anomie, (1952: 252), a social condition in which the shock of rapid change in the social order deprives individuals of the norms that guide how they are expected to act. Durkheim concluded that the strains of having to 'learn greater self-control' because of the breakdown in established social norms creates 'intolerable suffering' (1952 translation: 252) up to and including suicide. Consistent with Durkheim's hypothesis, aggregate mortality statistics for the Russian Federation have shown an unusual fall in life expectancy and a rise in deaths in age-specific groups due to avoidable causes, such as drunkenness and industrial accidents and murder (cf. Meslé et al., 1992; Cockerham, 1999). Often, such data is interpreted as evidence of pervasive unhappiness, or worse, in CIS societies. Yet collective theories based on aggregate evidence cannot explain the simple fact that half the post-Soviet population lives longer than the median while half does not. It thus encourages inferences based on the ecological fallacy and, equally important, fails to consider under

what circumstances and to what extent people who have been the objects of the shocks of treble transformation have been able to maintain social health and happiness (see Rose, 2003).

As the project's title makes clear, the survey questionnaire focused explicitly on individual-level conditions , both those conventionally described as subjective and those impersonal attributes of individuals such as education, conventionally described as objective. Moreover, for each conceptual topic multiple indicators were normally collected. The indicators discussed below have been selected on grounds of theoretical relevance and appropriate statistical grounds.

Although individuals were interviewed in what are today eight independent states, nearly every respondent has lived most of his or her life in the Soviet Union. Biomedical studies of health, the neo-classical economic paradigm and happiness studies all offer hypotheses regarding the consequences for happiness of differences between individuals according to age, income, education and so forth, all of which are independent of context and the boundaries of states. Ironically, Marxist doctrine and the structure of institutions of the Soviet Union also assume homogeneous influences on individuals from the Barents Sea to the Black Sea, the Caspian and the deserts of Central Asia. Moreover, surveys have documented that differences of state boundaries or ethnic differences within states are largely offset by positive attitudes toward inter-group and inter-state relations and considerable similarities in responses of different groups (see e.g. VCIOM, 1997; Rose, 2001). Thus, rather than treating the 18,387 survey respondents as if they had led their lives independent of each other in separate universes, we follow the assumption of generic theories and pool data for all respondents into a single file. In order to include a meaningful analysis of contextual differences, each national survey is weighted equally.

The LLH measure of happiness asks individuals to make an overall evaluation of how they see their situation today. The replies show that, notwithstanding the collective shocks of transformation, more than two-thirds feel happy. The median respondent describes their condition as fairly happy, and the proportion who say they are very happy outnumbers those who describe themselves as very unhappy by a margin of well over two to one. Moreover, in all eight successor states a majority of people say they are happy.

An alternative set of indicators of subjective wellbeing comes from a battery of questions about life satisfaction. In addition to a generalized question about life satisfaction overall, the LLH survey asked about satisfaction in domains as different as air pollution and income. When making assessments of different domains of life, people discriminate greatly: the highest degree of satisfaction, 82 percent, refers to satisfaction with climate, and other environmental measures also show high levels of satisfaction. The lowest level of satisfaction, 20 percent, is with personal income and next lowest is household finance. The median domain--public transport--satisfies 60 percent of respondents.

When asked to say whether or not they are satisfied with their life overall, CIS citizens divide into two almost equal groups: 45 percent show a degree of satisfaction and 52 percent express a degree of dissatisfaction, with more people being very dissatisfied than very satisfied. This places overall life satisfaction ninth in a list of domains rather than at or near the median (public transport, 60 percent). In other words, it is inappropriate, at least in the eight countries examined here, to generalize specific satisfactions from general life satisfaction, or vice versa. Factor analysis confirms the existence of three separate dimensions of life satisfaction. The first, and most important (eigen value 3.92; variance explained, 28.0%) loads highly on household finance (0.86); personal income (.84) and life overall (.76). The second (variance explained 15.4%; eigen value 2.16) loads high on three environmental measures: air purity, water quality and climate. The third factor (variance explained, 8.6%; eigen value 1.20) concerns conditions at work and education. The structure of satisfactions is consistent with Marxist ideas of subjective wellbeing as the "superstructure", and material circumstances as the determinants. The point is re-enforced by two of the three indicators in the third factor--satisfaction with work and with conditions of employment--cross-loading heavily with the first factor.

As would be expected, there is a substantial and statistically significant tau-beta correlation between the happiness indicator and overall life satisfaction (0.32). However, the relationship is far from complete. Together, four in seven fit the ideal-type extremes of being happy and satisfied (37 percent)

or unhappy and dissatisfied (19 percent). Contrariwise, three in ten are found in the completely "off diagonal" boxes, being happy yet dissatisfied with life overall (25 percent) and or unhappy yet satisfied with life (5 percent). In other words, for every two persons who may see happiness and life satisfaction as two aspects of the same thing, one does not.

An additional caution about treating happiness and life satisfaction as interchangeable, at least in the context of post-Soviet societies, is that when happiness is added to a factor analysis of the 13 different domains of life satisfaction, it is not strongly associated with any dimension of life satisfaction. Whereas overall life satisfaction is strongly linked with financial and income satisfaction, loading at 0.76, the loading for happiness is only 0.47. Moreover, the inclusion of happiness does not alter the overall three-dimensional structure of areas of life satisfaction.

Conceptual distinctions between happiness and life satisfaction are readily available. For example, satisfaction can be regarded as the result of goal attainment, whereas happiness can be found in striving toward a goal. For example, a medical student can be happy studying whilst far from the goal of being a practising and prosperous doctor or a married couple can be happy whilst remaining dissatisfied as long as their children have not yet settled down. A partial correlation between happiness and life satisfaction would therefore only be found among those who had achieved their goal as well as being happy whilst seeking to attain it. For the statistical analysis in this paper, the controlling consideration is the fact that the object is to test a multiplicity of influences on subjective wellbeing, including measures of economic conditions. In order to avoid biasing the results ab initio in favour of a materialist outcome, happiness is employed as the dependent variable.

3.7.3 Alternative hypothesis about subjective wellbeing

Just as there are multiple measures of wellbeing, so too there are multiple theories seeking to explain wellbeing. Comparative analyses using aggregate indicators may explain cross-national variations in wellbeing with contextual variables; employment studies may use income, employment status or related variables to explain happiness; and health studies may explain happiness in terms of health or vice versa.

Given the pervasiveness with which societies have been transformed by the collapse of the Soviet Union, the study of mass response to transformation requires special care in collecting appropriate indicators from multiple domains of life, since it cannot be assumed that findings about people in a stable Western society necessarily fit radically different circumstances. The approach to innovative measures pioneered in the New Russia Barometer since 1992 (see www.cspp.strath.ac.uk) has been followed in the Living Conditions, Lifestyles and Health survey of eight CIS countries. Thus, it is possible to use one data set to test a variety of competing hypotheses about determinants of wellbeing.

H 1. If individuals are materially better off, they are likely to be happier.

Economic transformation was a systemic shock that affected all members of a CIS society through hyper-inflation and replacing non-market with market allocation of goods. However, the impact of the shock was not felt equally within CIS societies. Statistics showing about a third or so of the population living in poverty imply that two-thirds were not. Since many economic variables are highly intercorrelated, to avoid multicollinearity four were selected for inclusion in regression analyses in this paper. When people are asked to evaluate their current economic situation, 51 percent said it was average or 'in between'; 40 percent said it was bad or very bad; and 9 percent described it as good or very good. An indicator of the impact on the household's economic conditions in the past decade found that 59 percent felt worse off; 23 percent reported no change and 18 percent reported improvement. An alternative measure of income is the possession of durable consumer goods; then three-quarters report the ownership of a television set; 24 percent report owning a car; and 25 percent owning a videocassette recorder. The figure for VCR ownership is particularly revealing, for unlike a car or television set or many other durables, VCRs only came on sale in CIS countries after economic transformation, and the cost of this consumer durable can represent several months income (Rose and Krassilnikova, 1996).

H 2. If individuals are healthier in mind and body (mens sana in corpore sano), they are likely to be happier.

Two questions asking an individual to make an overall evaluation of their health were asked in different parts of the questionnaire. The question used in this analysis asked about 'your health these days' on a four-point scale, with responses ranging from good to bad. After taking respondents through a series of questions about their medical history, people were also asked about satisfaction with their health on a four-point scale. The two measures have a Kendall's tau-beta correlation of 0.72, and 89% percent were consistently positive or negative in response to both questions. Particularly relevant in countries in transformation was a second question asking people whether or not they felt they could control what happened to them in life, a measure found significant in research in the United States and in other post-Soviet studies (Syme, 1989; Rose, 2003). Another question addressed self esteem by asking people whether or not they felt confidence in their ability to cope with life.

H 3. If individuals have more human capital, they are likely to be happier.

Education is a familiar human capital indicator. Age is also relevant, insofar as younger people should be better able to adapt to transformation than older people, and have a longer time horizon in which to await future benefits in return for immediate costs. Gender may be conceived as a form of human capital too, albeit its significance is problematic in the post-Soviet context (cf. Watson, 1995).

H 4. If individuals have more social capital, they are likely to be happier.

There is no standard definition of social capital: Robert Putnam (1993) has himself mixed attitudes and behaviour and James Coleman (1990) challenges this view by emphasizing that social capital is an instrumental asset for getting things done. In the Soviet and post-Soviet context (Rose, 2000), social capital can be used to subvert official rules and regulations as well as to make government work. A varied range of eight indicators are therefore employed as tests of the potential influence of social capital.

H 5. If the perceived and actual context of individuals is more positive, they are likely to be happier.

Cultural theories of happiness lump a host of potential influences under a single label. With survey data a dummy variable can be created for each country, but this has the disadvantage of being mute about the reasons why such a variable should be significant. The strategy employed here is to disaggregate the notion of culture or context into multiple measures of context, in order to identify which particular contextual attribute does or does not influence individual attitudes, net of differences in social conditions. The five indicators cover inflation, freedom, town size, and perceived changes in the national economy compared to the past, and evaluation of the environment.

3.7.4 Influences on happiness

A series of OLS regression analyses were undertaken to test influences on happiness. To ascertain the extent to which each hypothesis was sufficient to explain variance in individual happiness, separate regressions were initially run with a bloc of indicators appropriate for each hypothesis. Each bloc regression identified some indicators as significant and some as insignificant or, given the massive size of the sample, as trivial in terms of Beta values, even though statistically significant. Trivial influences were dropped from the second stage that combined all influences in a single multiple regression analysis.

Multiple influences on happiness. The bloc regressions show that more than one hypothesis can explain a noteworthy proportion of variance in happiness--but not equally so. Happiness is most influenced by health (19.8 percent of the variance explained). It makes sense to speak of a sound mind in a sound body, for not only is an individual's general state of physical health important for happiness but also a person's sense of control over what happens in their lives and self confidence. Material conditions also register a substantial influence, explaining 14.1 percent of the variance in a bloc regression. The most important material influences are subjective satisfaction with the current household economic situation and objective material living standards, as indicated by a household's number of consumer goods. While the bloc regression for social capital registers a slightly better fit for happiness than does human capital, both are of

secondary importance, explaining about half the variance that health can explain, and also less than material conditions.

The need for a multi-variate explanation of happiness is confirmed by combining the independent variables from the five bloc regressions into a single analysis. When this is done, the total variance explained rises to 28.8 percent. Net of the impact of material conditions, all three health indicators remain substantially important, and three of the four indicators of material conditions do so too. The relative importance of social capital is shown by five social capital influences remaining significant as against only one human capital influence. Taking individual-level variables into account further reduces the influence of context. It is particularly striking here that inflation, which is a pervasive influence affecting everyone in a money economy, fails to register any statistical significance as an influence on happiness in post-Soviet societies. In other words, how an individual responds to transformation is far more important for happiness (and much else) than the objective nature of a contextual stimulus.

Impact on happiness. The impact on happiness of each hypothesized bloc is reflected in the b values for the combined regression. It simulates the effect of a change in each statistically significant independent variable from its lowest to its highest value. Thus, if a person moved three steps upwards from the worst to the best self-assessed health, then the impact on their happiness, net of all other influences, would be an increase of 0.72 on the four-point happiness scale, bringing the average person towards the prospect of being very happy rather than fairly happy.

Altogether, the impact of both health and material conditions is large--and independent of each other. Being at the highest rather than the lowest level on all three health indicators boosts happiness by almost one full point, and the same is true for the four indicators of material circumstances. Although none of the social capital indicators shows as strong an influence on happiness as the most important material and health measures, net of all other influences, they collectively are capable of raising a person by almost seven-tenths of a point on the happiness scale. By contrast, age, education and gender have little impact and the same is true of context.

3.7.5 Influences on wellbeing

Since self-assessed health has the biggest statistical influence and impact on happiness, this re-opens the question: What is the relationship between the multiplicity of indicators that may be used to assess wellbeing? Since wellbeing is not a tightly defined word or concept, it can be argued that health, happiness and overall life satisfaction are simply three facets of the same construct. If this is the case, we would expect that adding health to the factor analysis of satisfaction indicators and happiness would produce a single factor in which all three indicators loaded together. Such a result would suggest that the influence of health on happiness is largely spurious.

Health and happiness do load strongly together on the same factor (0.79 and 0.75), but these two components of wellbeing are independent of overall life satisfaction. Life satisfaction continues to load strongly with indicators of material conditions. In other words, health and happiness are not just an alternative form of material satisfaction. Since the happiness/health factor has only a minimally acceptable eigen value (1.1), the factor analysis leaves open the possibility that the relationship between happiness and health could be that of cause and effect rather than being two parts of the same underlying construct.

There is also the possibility that health is caused by material conditions. This assumption can be tested by running a regression, in which health is the dependent variable. The evidence rejects this assumption. Age is by far the strongest influence on health. As people grow older their health deteriorates. Education and gender are also important influences. The poor health of women in the sample is due to the fact that women are grossly over-represented among the older population, because of high rates of early mortality among men. The bloc R2 for the three health indicators is 21.6 percent. Although material conditions are influential too, the bloc R2 is barely half that of health. The influence of social capital and of context is minor.

When all influences on health are combined in a multiple regression, the total amount of variance explained rises to 28.7 percent, but this increase is only seven percentage points more than the variance explained by the bloc regression for human capital. The collective impact of human capital cannot be assessed, since education improves health substantially, while age reduces healthiness. Material conditions, particularly a person's current household economic situation, also has a substantial positive impact on health. Social capital is much less important for health (collective impact, 0.34) than for happiness (impact, 0.69).

To determine the extent to which happiness and health influence each other a two-stage Least Squares Regression was run. It confirms that there is an exchange of influence. Health has a Beta of .17, the largest of any significant influence on happiness. Likewise, happiness has the most influence on health (Beta: .21). The variance explained in each two-stage regression shows that there is a good fit, 28.7 percent for health and 23.4 percent for happiness.

Notwithstanding reciprocal influence, the causal model of health is substantially different from that for happiness. For health, age is the most important influence, whereas it fails to achieve significance for happiness. Moreover, the two other human capital indicators, gender and education, are also much more influential for health than for happiness. Material wellbeing is of slight importance for health by comparison with age; and both social capital and context are insignificant influences.

By contrast, the major influences on happiness are health and material wellbeing, and the Beta for current economic satisfaction is almost as large as that for health (0.15 and 0.17 respectively). In addition, social capital registers five significant influences and context has some influence too. Since the two-stage regression reduces to insignificance the influence of control of one's life and self-confidence on happiness, happiness may be a generic tag for social psychological and psychological influences on physical health. That these psychological indicators can influence happiness but age does not shows that while older people may find that their physical health is deteriorating, their psychological state may be holding steady or even improving as, with experience, they become more confident of themselves and of their ability to control their lives or, in post-Communist countries, to respond successfully to the shocks of transformation).

Differences in the causes of two major desiderata of human life show that health and happiness are not interchangeable indicators of wellbeing and welfare but rather each is distinctive, albeit overlapping, in importance to individuals.

4. CONCLUSIONS AND PUBLIC POLICY IMPLICATIONS

4.1. Recommendations

The research project examined the impact of lifestyle and living conditions on people's health in the CIS. Some of the research questions focused on the individuals' self-reported dietary intake. This work-package is the result of the rigorous analysis of these questions along with the health assessment measures. Each part of the analysis has been deliberated upon and as a result we have formulated the following recommendations:

4.1.1 Research

We recommend that future research consider the following in more detail in order to understand the effect of diet on health in the CIS.

1. ***Replicate research into the exact dietary intakes of individuals using already validated tools and instruments, as opposed to relying solely on self-report***. The validity and reliability of existing instruments must be scrutinized, as well as their adaptability for use in the CIS. Instruments designed several years ago may not hold any relevance to current societies or reflect the boundaries of scientific discoveries.
2. ***Measure the Trans and saturated fat intakes of individuals and identify the correlation between their weight and health status***. Our study has identified that there is a high proportion of people who are either overweight or obese and there is a high intake of fat. This finding indicates that people are malnourished rather than undernourished.
3. ***A direct measure of living conditions is needed to understand their impact on dietary intake, food availability and food quality***. Our analysis clearly indicates that living conditions affect dietary intake, and this relationship needs further exploration.
4. ***Examine the micro-nutrient content of people's food intake throughout different seasons of the year***. The quality of the food was not identified in this study and because of the environmental climate, the micro-nutrient content of food may be lacking.
5. ***Examine the hygiene circumstances of food handling, food storage and cooking***. A significant proportion of people reported there was no running water, hot water or bathrooms in their homes. These variables are poverty indictors, raising the question that there may be difficulties in food handling, storage and cooking, which may be related to the high percentage (21.2%) of people reporting stomach or digestive disorders.
6. ***Further examine individuals' understanding of food nutrients and their relationship to health across the lifespan***. Knowledge of food nutrients and their importance to health was mixed, from a sound understanding to no understanding.

7. ***Examine cultural attitudes towards food intake***. Culture plays a significant role in the type of food eaten, preparation of food and the eating of food as a familiar activity.

4.1.2 Health Policy

From examining our findings, it is evident that the CIS remain in a period of transition. It is therefore important for the maintenance of health, restoration of health and health promotion that health policies be identified, developed and implemented in a systematic fashion. We recommend the following health policies addressing dietary intake as a mechanism for improving the health and well being of all people.

1. ***Promote diet as a necessary aspect of maintaining health, restoring health and preventing ill health.*** Information gained from participants indicates there is a mixed understanding of diet and its relationship to health, and what constitutes a "healthy diet".
2. ***Develop good food distribution networks that maintain the quality of food***. Lack of efficient and effective transportation of food supplies and the conditions of road surfaces negates the opportunities for a fresh supply of food.
3. ***Ensure health professionals have the relevant knowledge and understanding of diet and its relationship to health.*** The training of professional workers does not always reflect standards or the ability of professional health workers to provide consistent health advice regarding diet. Ensuring diet is addressed in the curricula using evidence of best practice will eventually support a fresh approach to preventative health care.
4. ***Focus on health prevention and a social model of care as opposed to a heavy reliance on contemporary medicine.*** The heavy reliance on institutional health care that is based on the medical model does not provide opportunities to assess and evaluate health in the context of people's lifestyle and living conditions.
5. ***Address the poverty indicators that relate to people's living conditions and their ability to purchase food of high quality.*** A significant number of respondents did not have the means to purchase basic essentials, nor did they report living conditions that were conducive to support and sustain health. As such, their ability to purchase adequate food, or quality food, may be seriously negated.
6. ***Improve environmental factors that affect people's diets***. The environment in which people live contaminates food substances that render the health-giving properties of food negatively.
7. ***Improve access to health care and review health services to meet the needs of all people.*** Some respondents criticized the level of access to health care and the quality of care received.
8. ***Ensure pharmaceutical drugs are available.*** A high proportion of people had high blood pressure that was untreated, which may eventually result in heart attacks, stroke, and death.

4.1.3 Education

There is a need to have an educational program that informs individuals, communities and health professionals about diet and its relationship to health. Such educational approaches could use both formal and informal approaches. We therefore recommend the following:

1. ***Programs need to sufficiently prepare health professionals to have evidence-based knowledge and understanding of diet and its relationship to preventing ill health, maintaining health and restoring health.*** Although mentioned as a health policy requirement, it is essential that health professionals have the knowledge and understanding of diet and its relationship to health.
2. ***Schools should teach children the nutritional value of food, and the importance of food handling, food storage and cooking to their health, using current scientific knowledge.*** Through empowering people to engage in healthy lifestyles, the education of children in the

school systems about health is an important step to take. This will begin to prepare the next generation of parents with the relevant knowledge and skill.

3. **Health education and health promotion campaigns focusing on the importance of diet should be implemented.** Such a model would begin to convey to a wide audience the importance of a balanced and nutritious diet to their health.

Concerted and urgent efforts to improve tobacco control must be made throughout the FSU to curtail current smoking patterns and prevent any further rise in female smoking. Our results suggest that public health interventions targeted at the high-risk population subgroups could have the largest effect in preventing morbidity and premature mortality due to smoking. Detailed qualitative information on how smoking is perceived, why high-risk population sub-groups take up smoking and how they could be persuaded to stop would further enable policy makers to develop the most effective smoking prevention and cessation strategies for the region.

Policymakers are ready to proclaim that the object of government is the promotion of welfare. The preamble of the American Constitution explicitly states that government was 'to promote the general welfare'. The founding fathers of the social sciences have also viewed welfare as of central importance. Two centuries ago the great utilitarian, Jeremy Bentham, declared 'the greatest happiness of the greatest number is the foundation of morals and legislation'. The term 'welfare state' is a reductionist misnomer, because it implies that welfare is solely produced by the state. This is not the case: the total sum of welfare of an individual is the product of three sources: the household, the market and the state (see Rose, 1986).

The identification of welfare as an object of government begs the question: what do we mean by welfare or wellbeing? To assume that there exists or ought to exist a political consensus about what constitutes welfare is to take the politics out of government. The definition of welfare is a political act. This is obviously the case when income equality is made the standard for welfare rather than every citizen having an income above the poverty line. Disputes about the meaning of welfare are often avoided by focusing on a narrower and more readily agreed priority: the reduction of illfare or objective illbeing.

The concept of "happiness" or "subjective wellbeing" goes far beyond a definition of welfare that is confined to the measuring rod of money, for example, including such needs as self-identity and affection (cf. Maslow, 1943 and his followers). When the political system or economy creates widespread dissatisfaction, the disjunction between attitudes toward the polity and economy and overall life satisfaction is positive for an individual's overall mental health. Thus, the economic upheavals of the 1970s, involving economic stagnation, inflation and rising unemployment, had surprisingly little influence on individual life satisfaction (Rose, 1980: 154).

Practical policymakers are looking for more than consensus on definitions; they are also looking for aspects of wellbeing or of illfare that can be stated in terms capable of being incorporated in public laws and administered by bureaucrats whose function is to deliver entitlements impartially, applying laws and rules in the same way to everyone. Happiness is an extreme example of a state of mind that cannot be reduced to statutory terms, quite apart from the fact that to offer benefits to people deemed unhappy would create the moral hazard of people shedding crocodile tears in order to claim such benefits.

According to the above evidence, there are some policy handles that government can use to have a degree of direct or indirect influence on the probability of individuals being fairly or very happy. It can do this directly by promoting better material living conditions, a particular concern of post-Soviet citizens and a priority of governors in Western market economies as well as in economies in transformation. Government can also influence the context in which individuals evaluate their wellbeing, albeit this set of influences has a very limited impact. Whilst the budget of every government shows a great deal of money spent on health, much of this goes to alleviate the consequences of ill health. Public expenditure cannot make an individual 20 or 30 years younger, nor can the actions of government give individuals the self-confidence and sense of control necessary to

develop a healthy mind in the face of adversities that are themselves the consequences of government failures.

While public policies can have some impact on the influences that make people happier, there are limits to the extent to which public policy can produce individual happiness. The foregoing demonstrates that while it is possible to improve our understanding of the causes of wellbeing, it does not follow that such knowledge will identify processes amenable to positive policy intervention by the state. Moreover, the history of the Soviet Union is a reminder of what the costs in human life are when a regime accepts no limits in its attempt to mould its population into its ideal of a "happy" new Soviet man (Clark and Wildavsky, 1990; Shlapentokh, 2001).

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6. DISSEMINATION AND/OR EXPLOITATION OF RESULTS

Dissemination and Explotation of Results (Summary)

The results of this project have been disseminated to the wider public in the following way

1. Internationally at meetings and policy workshops;
2. Nationally at meetings, seminars and through newspaper and popular articles as well as Television broadcasts;
3. Electronically through the use of the website, which has aroused substantial interest;
4. In several countries, especially the Russian Federation, Ukraine, Belarus and Moldova, the project has contributed to national debates about health and health policies.

The project has been represented at most major international conferences during the project duration and afterwards. Since the results are available mainly at the end of the project, one should take the planned output into consideration as well as publications and presentations to date, because most material will be produced after the end of the project.

In addition there has been academic dissemination through

1. Contributions to international conferences and publications, including keynote addresses;
2. Contributions to seminars and conference at the national level;
3. Articles and books published in international journals and for an international audience;
4. Articles and books published at a national level in national languages.

Full and detailed account on dissemination activities is compiled as a separate report (two volumes), which is an integral part of the given Final Scientific Report.