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# THE 2010 EUROPE & EURASIA HEALTH VULNERABILITY ANALYSIS

SIXTH REPORT | MARCH 2010



THE 2010  
EUROPE & EURASIA  
HEALTH VULNERABILITY ANALYSIS

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# Acronyms

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<b>AIDS</b>	Acquired Immune Deficiency Syndrome
<b>AMR</b>	Adult Mortality Rate
<b>ARV</b>	Antiretroviral
<b>CAR</b>	Central Asian Republics
<b>DOTS</b>	Directly Observed Treatment, Short Course
<b>E&amp;E</b>	Europe and Eurasia
<b>EU</b>	European Union
<b>EU-27</b>	The 27 countries in the European Union in 2007
<b>GDP</b>	Gross Domestic Product
<b>HALE</b>	Health-Adjusted Life Expectancy
<b>HIV</b>	Human Immunodeficiency Virus
<b>IDU</b>	Injecting Drug Use, Injecting Drug User
<b>LSHTM</b>	London School of Hygiene & Tropical Medicine
<b>MDG</b>	Millennium Development Goal
<b>MDR-TB</b>	Multidrug-Resistant Tuberculosis
<b>MMR</b>	Maternal Mortality Ratio
<b>MSM</b>	Men Who Have Sex with Men
<b>NCDI</b>	Noncommunicable Disease and Injury
<b>NT</b>	Northern Tier
<b>PRB</b>	Population Reference Bureau
<b>RUMB</b>	Russia, Ukraine, Moldova, Belarus
<b>SE</b>	Southeastern Europe
<b>SS+</b>	Sputum Smear-Positive
<b>TB</b>	Tuberculosis
<b>U5MR</b>	Under-5 Mortality Rate
<b>UNAIDS</b>	Joint United Nations Program on HIV/AIDS
<b>UNFPA</b>	United Nations Population Fund

<b>UNGASS</b>	United Nations General Assembly Special Session
<b>UNICEF</b>	United Nations Children's Fund
<b>UNODC</b>	United Nations Office on Drugs and Crime
<b>UNPD</b>	United Nations Population Division
<b>USAID</b>	United States Agency for International Development
<b>USG</b>	United States Government
<b>WDI</b>	World Development Indicator
<b>WHO</b>	World Health Organization
<b>WHOSIS</b>	World Health Organization Statistical Information System
<b>XDR-TB</b>	Extensively Drug-Resistant Tuberculosis

# Executive Summary

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The *2010 Europe and Eurasia Health Vulnerability Analysis* identifies those countries in the Europe and Eurasia (E&E) region of the United States Agency for International Development (USAID) where health status is the poorest and where the transition to democracy and free market economies may be most vulnerable because of health factors. Tracking the region's health vulnerabilities informs our understanding of the social conditions of its countries and the economic and democratic transitions taking place within the region. Poor health diminishes society's productive capacity, deteriorates the strength of civil society, and tarnishes people's perceptions of the benefits of democracy and free market economies. Poor health is, therefore, not only a threat in its own right; it is also a threat to economic and democratic progress.

The analysis also highlights health issues that may warrant special or increased attention by United States Government (USG) policymakers. The seminal analysis of this type was conducted in 2003. This is the sixth report that provides USG policymakers and USAID health staff in E&E countries and Washington, D.C., with an overview of health status and vulnerability in the region. Today, it is all the more important to understand the impact of the current global economic crisis on the health spending of both donors and countries themselves and the quality of health in E&E countries. Given the growth in infectious diseases alongside high levels of adult mortality, the impact of the economic crisis is of increasing concern.

This analysis shows the general health picture across 29 E&E countries, 14 of which – Albania, Armenia, Azerbaijan, Belarus, Georgia, Kosovo, Moldova, Russia, Ukraine, and the five Central Asian republics (CAR)\* of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan – currently receive USAID health funding. The analysis is based on readily accessible data that are regularly provided by international organizations, thus permitting comparisons among countries, and is most useful for comparing subregions within E&E. This enables the E&E Bureau and USAID Missions to raise awareness of major health issues relevant to the region.

The foundation of this analysis is a Health Vulnerability Index that ranks the health status of E&E countries using aggregated data for six indicators. Annex A defines these six indicators

and explains the rationale for choosing them. The report analyzes recent health trends in E&E using these indicators, making comparisons with E&E's former "Northern Tier" subregion (comprising the Czech Republic, Hungary, Poland, Slovakia, and Slovenia) and the 27 members of the European Union in 2007 (EU-27) to see how well E&E countries and subregions are progressing relative to these "ideals" for the region.

Overall, the 2010 analysis finds the five most vulnerable countries in terms of health to be Turkmenistan, Kazakhstan, Tajikistan, Russia, and Kyrgyzstan. Excluding the CAR countries, the five most vulnerable E&E countries are Russia, Ukraine, Azerbaijan, Moldova, and Georgia.

The primary findings of the analysis and conclusions line up with the six indicators of the Health Vulnerability Index and the demographic changes that are taking place in the E&E region. The seven key vulnerabilities plus a final recommendation for improved health data collection are as follows:

## **Changing Demographics in the E&E Region – A Shrinking and Aging Population**

Many countries in the E&E region are undergoing an important demographic transition characterized mostly by increasing life expectancy of their populations, although several continue to experience slow or even negative growth. Compared with Western European countries, Eastern European countries show varying signs of vulnerability in which fertility, premature mortality and disabilities, and migration patterns are not in balance, resulting in shrinking and increasingly aging populations. Older populations encounter long-term illness or disability, and as the older population grows so does the number of people afflicted by these conditions. With shrinking populations, over time there are fewer economically active people to support a growing number of older dependents in future years. This transition creates a need for migrant labor as well as additional demographic and economic pressures that require attention and policies for managing potential effects on health and welfare systems.

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\* To provide context and continuity of comparison with previous reports, this E&E health analysis continues to include the CAR, although in 2009 these countries were put in USAID's Asia region under the responsibility of the USAID Asia Bureau.

## Uneven Gains in Life Expectancy

The health status of the population in the E&E region has mostly improved in the past decade, as indicated by longer life expectancy at birth. Nevertheless, important differences in the degree and pace of improvement exist among subregions and countries. Moreover, growing inequality in longevity is associated with gender and with social, economic, and lifestyle factors. Gender gaps in life expectancy in the E&E subregions have increased in recent decades because of changes in the risk-taking behaviors of men and women and their uptake of preventive and curative health services, which in turn have responded to socioeconomic shifts.

Modest overall gains in life expectancy in many countries have been attributed to overall decreasing mortality, mainly from declining communicable diseases in early childhood and delays in premature death among adults due to improved health care, at least in the Southeastern Europe and Northern Tier countries. However, unhealthy lifestyles and behaviors have precluded more significant declines in adult mortality and the burden of disease, with chronic noncommunicable conditions, injuries, and violence affecting health more strongly. The Russia-Ukraine-Moldova-Belarus (RUMB), Caucasus, and CAR subregions in general have had higher mortality and disease rates and stagnating or even decreasing life expectancies since the late 1990s. Several countries (such as Armenia, Bosnia and Herzegovina, Croatia, and Tajikistan) have been able to improve life expectancy by several years from their 1990 levels. This may indicate that recent changes in national policies have made a difference in people's longevity.

## Unhealthy Lifestyles and Stagnating or Increasing Adult Mortality

The overall mortality rate from all causes of death in the E&E region seems to have peaked around the year 2000 and then gradually declined. This trend was largely driven by RUMB, Caucasus, and CAR countries with their large populations – especially Kazakhstan, Russia, Ukraine, and Uzbekistan – while Southeastern Europe and Northern Tier countries showed a steady decline in adult mortality since the 1980s and '90s. Rates varied significantly between subregions and countries. In the region as a whole, male mortality for all causes was roughly twice as high as female mortality. This gender difference, as well as stagnating or increasing mortality rates, has been documented as being associated with lifestyle and behavioral factors, especially male alcohol consumption and smoking patterns and failed control policies.

Noncommunicable diseases produce the largest burden of mortality in the E&E region, accounting for more than 93 percent of the 5.5 million estimated deaths between 2003 and 2007. Cardiovascular diseases, cancer (malignant neoplasms), external causes of injury and poisoning, and digestive diseases are the four major causes of death in the region. The direct, indirect, and intangible costs of illness place burdens on individuals, families, and societies, especially in shrinking and aging populations.

## Substantial Drop in Under-5 Mortality in Most Countries

Under-5 mortality, especially infant mortality, indicates the quality of living conditions and access to health care. In the region as a whole, under-5 mortality has fallen by more than 50 percent since 1990, from about 50 child deaths per 1,000 live births to fewer than 23. Although rates declined substantially in the region, several countries, especially in the CAR subregion, have rates that are more than five times higher than countries in other subregions, suggesting possible socioeconomic problems that particularly affect newborns and the need for better health care. These countries are unlikely to reach their Millennium Development Goal 4 targets or will do so only with additional effort.

## Tuberculosis: The Growing Threat of Drug Resistance

Although communicable diseases are not among the leading causes of death and illness in the E&E region, substantial and sustainable resources are needed to maintain preparedness and enable countries to respond to and control diseases. Tuberculosis (TB) and HIV/AIDS are of great public concern to countries, the entire region, and the world.

TB accounts for nearly 50 percent of the E&E region's mortality from infectious and parasitic diseases among people aged 25 to 64 years. It is a main reason for increasing mortality from these diseases in the region since 1990, especially in the RUMB, Caucasus, and CAR countries, where the rate has more than doubled. The mortality rate from TB increases with age in most subregions, except for the RUMB countries, where younger people have higher mortality. This suggests the effects of such factors as poor diet and alcohol intake, which are aggravated by poor socioeconomic conditions, and co-infection with sexually transmitted infections, especially HIV. TB control in the region is far from optimal, with case detection and treatment success rates sharply behind international targets.

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High rates of multidrug-resistant TB (MDR-TB) – the highest in the world – and extensively drug-resistant TB are the main challenge for TB control in the region. Among the world's 27 high-TB priority countries, which collectively account for 85 percent of estimated MDR-TB cases globally, 15 are in the E&E region. MDR-TB is not only vastly more expensive to treat but also poses greater challenges to patient compliance. Both factors impact the delivery of TB care, especially in the resource-constrained environments that exist in several E&E countries, especially the CAR.

### **HIV/AIDS: Increasing Incidence Related to Drug Use**

HIV is increasing in the region among youth and young adults under 30 years of age. More than one-quarter (27 percent) of newly diagnosed HIV infections in E&E are in people aged 15 to 24 years. Injecting drug use (IDU) and accompanying unsafe sexual practices are the primary means of HIV transmission in the E&E region.

High youth unemployment and a boom in drug trafficking have stimulated IDU in the E&E region. Unless these factors are controlled, IDU will most likely continue to increase in E&E countries. Co-infections and gaps in antiretroviral treatment are still significant and increasing. Furthermore, injecting drug users, the most severely affected group in the region, face major challenges in access to prevention and treatment. The targeting of HIV efforts still urgently needs to be scaled up and improved to reduce inequity and to promote greater harmonization of the highest standards of prevention and treatment programs and policies.

### **Insufficient Public Expenditures for Health and Rising Costs**

Several countries, including Albania, Georgia, Russia, and Uzbekistan, have seen a decline in health expenditure as a percentage of gross domestic product (GDP) since 2002, while others, such as Serbia, Slovenia, and Turkmenistan, have seen a fall in the amount of public sector funding as a percentage of GDP. Azerbaijan and Tajikistan have among the lowest public health expenditure levels in the world. Overall, however, the picture shows continued growth in health care spending per capita across the region, more than doubling between 2002 and 2006. Health care costs are projected to

increase by several percentage points of GDP by 2050. Corruption – amenable to corrective action when the political will exists – is a primary impediment to the use of health funds and success of health systems in the E&E region.

Out-of-pocket health expenditure as a percentage of private expenditure on health is more than 80 percent in the region and has been climbing steadily between 2002 and 2006. Closely linked to the goal of financial protection is the goal of equity in finance, which means that people with lower incomes should not pay more as a percentage of income for health services than people with higher incomes. Effective health services are one crucial element in addressing the relationship between the social determinants of health and inequity in health and in counteracting the rising inequity in health in both high-income and low-/middle-income countries in the region. Research evidence from a broad range of countries suggests that policies affecting the socioeconomic circumstances in which people live and work have as much influence as policies related solely to health care. The global economic downturn gives greater urgency to identifying options for action.

### **Better Health Intelligence**

A final recommendation concerns the need for a more systematic collection of health and socioeconomic data of greater accuracy and reliability. This concerns vital statistics; epidemiologic, socioeconomic, and behavioral risk factor data; and health service information. Under-registration of births and deaths is an issue in the region that calls for better data collection systems to confirm trends and determine the targeting of interventions. Several E&E countries with high frequencies of risk factors do not provide information to allow further analysis. Comparative analysis is also needed to identify specific policies that have lowered health vulnerabilities. This could include equity-focused health impact assessment of regional development plans to identify their potential effects on equity in health and recommend how they can be strengthened to maximize and distribute potential health gains more equitably. Greater specificity is needed in health intelligence about how country actions affect inequity, especially in terms of measuring the scale or magnitude of inequity, making relevant data available, and identifying which actions or policies are most effective.

# Introduction

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At the beginning of the 1990s, in the wake of the Soviet Union's dissolution, USAID assistance programs to Europe and Eurasia (E&E) were based largely on two assumptions. The first assumption was that social sector conditions, including health conditions, had been adequate during the Soviet era. The second assumption was that the Soviet Union's collapse would bring about a pattern of democratic reforms and free market economic growth that would not only sustain but also improve those social conditions.

However, the evidence that has emerged since the 1990s has not validated these assumptions. What has become clear in retrospect is that within the Soviet Union – decades before its collapse – the practice of medicine, the stewardship of public health, and actual health conditions had been deteriorating relative to the West. Today, health conditions in many countries of the E&E region are little better than they were in the early 1990s, and several countries have experienced declines. In this context, USAID programs currently invest health funds in nine E&E countries (Albania, Armenia, Azerbaijan, Belarus, Georgia, Kosovo, Moldova, Russia, and Ukraine) and the five Central Asian republics (CAR) of Kazakhstan, Kyrgyzstan, Turkmenistan, Uzbekistan, and Tajikistan (which in 2009 were transferred to the responsibility of USAID's Asia Bureau). USAID discontinued health assistance to Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia before they joined the European Union (EU).

It is now clear that the task of achieving major health sector progress in E&E countries still receiving assistance will not be quick or easy. Moreover, USAID resources, and those of other donors, available for this task are scarce. Consequently, USAID must be strategically rigorous in determining how best to deploy resources so they are invested in the most pragmatic and cost-effective means. This report seeks to further such analysis and thinking by calling attention to areas of current and future vulnerability within the region and individual countries alike.

The current report covers 24 E&E countries, plus the five CAR for continuity and comparability with previous reports prepared when the CAR were part of USAID's E&E region.

Kosovo is included in this year's report in the narrative sections but is excluded from statistical calculations because it lacks reliable data. Therefore, the calculation of the Health Vulnerability Index in this report is based on data from 28 countries. (Previous analyses reported on 27 countries because Serbia and Montenegro were counted as one. With Montenegro's independence in 2006, it is now counted separately.) The Index ranks the countries from least to most vulnerable both in terms of overall health status and specific health sector weaknesses.

The analysis provided in this report performs several important functions, serving to:

- Track health trends
- Examine special areas of concern that might not be evident from the data or casual observation
- Compare countries individually with the "ideal" performance for the region (thus hinting at an appropriate level of progress after which USAID's assistance will no longer be required)<sup>1</sup>
- Spark innovative thinking about evolving health needs
- Provide a convenient reference for USAID staff and other development partners and policymakers

Tracking the region's health vulnerabilities informs our understanding of the social conditions of its countries and the economic and democratic transitions taking place within the region. Poor health diminishes society's productive capacity, deteriorates the strength of civil society, and tarnishes people's perceptions of the benefits of democracy and free market economies. Poor health is, therefore, not

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<sup>1</sup> For this benchmark, we use the "Northern Tier" E&E countries that have joined the EU – the Czech Republic, Hungary, Poland, Slovakia, and Slovenia. Comparisons are also made to the longer list of the 27 EU countries: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

only a threat in its own right; it is also a threat to economic and democratic progress.

Based upon historical, political, and social ties, the countries analyzed in this report have traditionally been

assigned into six subregions – the “Northern Tier” countries; the Baltics; the Russia, Ukraine, Moldova, Belarus (RUMB) subregion; Southeastern Europe; the Caucasus; and the CAR. Figure 1 provides a map of the subregions and lists each country in them.

**FIGURE 1. Map of Europe and Eurasia Region**



<p><b>Baltics</b> Estonia* Latvia* Lithuania*</p>	<p><b>Northern Tier</b> Czech Republic* Hungary* Poland* Slovakia* Slovenia*</p>	<p><b>Central Asian Republics (CAR)</b> Kazakhstan Kyrgyzstan Tajikistan Turkmenistan Uzbekistan</p>	<p><b>Southeastern Europe</b> Albania Bosnia and Herzegovina Bulgaria* Croatia* Kosovo Macedonia Montenegro Romania* Serbia</p>
<p><b>Caucasus</b> Armenia Azerbaijan Georgia</p>	<p><b>Russia, Ukraine, Moldova, Belarus (RUMB)</b> Belarus Moldova Russia Ukraine</p>		

\* Countries that have graduated from USAID health assistance

## ANALYTICAL PROCESS

There is no single standard measure of health status for individuals or population groups. Therefore, in the *2010 Health Vulnerability Analysis*, we aggregate data for six indicators to develop a Health Vulnerability Index that acts as an overall indicator of health status of the population of countries in the E&E region. These six indicators are life expectancy, adult mortality rate, under-5 mortality rate, tuberculosis (TB) incidence rate, HIV incidence rate, and public health expenditure as percentage of gross domestic product (GDP). These indicators were selected because they capture health conditions in four specific areas that affect the health of individuals in the E&E region: noncommunicable diseases and injuries (NCDs), child health, infectious disease, and public commitment and capacity to improve health. Mortality in particular is a robust, widely used indicator of a population's health situation. We expect that an improvement or worsening of these indicators is a good measure of the health of E&E populations, which is tied to increasing economic productivity and wealth at the individual and societal levels.

Given the record growth rate of HIV in the region, the dangerous synergistic effects of combined HIV and TB epidemics, and the havoc these two diseases have wrought in other parts of world, HIV/AIDS and TB are growing health threats to the E&E region and are chosen to be the two infectious diseases relevant to this report.

The components of the Health Vulnerability Index are:

- **Life expectancy at birth**, which captures how long people can expect to live if prevailing patterns of age-specific mortality at birth remain constant throughout their lives. Until 2007, the report used “health-adjusted life expectancy” (HALE) to discount years that people lived suffering from disease or disability. This indicator was changed to life expectancy in the 2007 analysis because HALE was updated infrequently. Life expectancy is also included in the calculation in the Index because it captures health vulnerabilities of the region at a high level. The long-term impacts of NCDs, poor child health, incidence of infectious diseases such as TB and HIV, and a

country's investments in health are reflected in health status and subsequently the life expectancy of the country's population.

Life expectancy, however, is not a good measure of health system performance. Studies have found a constant rate of annual increase in life expectancy in industrialized countries over long periods of time, regardless of the structure and functioning of health systems, suggesting that other factors may be more important determinants of life expectancy. Therefore, it is not easy to demonstrate the effects of health system reforms on life expectancy.

- The **adult mortality rate**, which is a proxy for the burden of NCDs in the E&E region because more than 93 percent of adult deaths are due to NCDs.
- The **under-5 mortality rate**, especially infant mortality, which indicates the quality of living conditions and access to health care. This rate reflects a country's prevailing communicable disease epidemiology, levels of undernutrition, perinatal conditions, and adequacy of care before, during, and after the birth of a child.
- **TB incidence** (estimated new cases per year), which reflects the growth of the most prevalent infectious disease in the E&E region.
- **HIV incidence** (newly diagnosed cases per year), which shows how fast HIV is spreading and is a more useful indicator than HIV prevalence (cumulative cases) because prevalence is still very low in most of the region.
- **Public health expenditure as a percentage of GDP**, which represents the amount of resources spent on health care apart from a population's private spending and insurance. It is also a proxy for the extent to which health care is emphasized by the public sector relative to a country's total income and expenditure priorities.

Although the six indicators are not of equal importance, they were weighted equally for simplicity and because there currently

is no rigorous method to construct appropriate weights. Annex A lists each indicator and provides the definition and rationale for using each indicator in the vulnerability analysis.

Three steps were involved in determining the health vulnerability of countries in the E&E region:<sup>2</sup>

1. The Health Vulnerability Index was created using the six aggregated indicators to assess E&E countries and determine which among them had the poorest overall health status (tables 1, 2a, and 2b). The Index ranks the E&E countries (excluding Kosovo) from 1 to 28, with 1 having the best and 28 having the poorest health. While the differences between two country rankings may be negligible (21 and 23, for instance), specific rankings are useful for quickly assessing a country's relative standing and presenting this standing clearly and concisely. The rankings, though, are most useful when considered in groups of five, each representing roughly one-sixth of the countries included in the calculation of the Index. For instance, if a country moves from the top five to the 5–10 or 10–15 ranking group, this represents a significant decline in health status.
2. Trends in data over time for key indicators in the E&E region were examined.
3. Each country's status for the six vulnerability indicators was compared with the mean of the 27 EU countries (EU-27) and the mean of the Northern Tier countries by using radar charts.

This report covers the current and past situation with regard to each of the above-mentioned indicators. The first chapter on demographics provides background context on the countries in the region, describing their current population and changes in fertility levels. The subsequent chapters in turn discuss the patterns and trends in the six components of the Health Vulnerability Index – life expectancy, adult mortality, under-5 mortality, TB, HIV, and health expenditure. Each of these chapters identifies the five most vulnerable countries from high to low levels of vulnerability.

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2 In 2007, qualitative field knowledge was obtained from an online survey to compare subregional and national statistics reported by multilateral organizations with locally available expert knowledge. This survey was not repeated for the 2010 report.

## DATA SOURCES AND RELIABILITY

Data for the six indicators in the Health Vulnerability Index were collected from the following sources:

- **Life expectancy and health expenditures:** World Bank. (2009). *World Development Indicators (WDI)*. <http://ddp-ext.worldbank.org/ext/DDPQQ/member.do?method=getMembers&userid=1&queryId=135>
- **Adult mortality and under-5 mortality:** World Health Organization (WHO). (2009). *World Health Statistics Report*. <http://www.who.int/whosis/whostat/2009/en/index.html>
- **Tuberculosis:** WHO. (2009). *Global Tuberculosis Control: A Short Update to the 2009 Report*. [http://www.who.int/tb/publications/global\\_report/en/](http://www.who.int/tb/publications/global_report/en/)
- **HIV:** EuroHIV. (2007). *HIV/AIDS Surveillance in Europe: End-Year Report 2006*. [http://www.eurohiv.org/reports/report\\_75/pdf/report\\_eurohiv\\_75.pdf](http://www.eurohiv.org/reports/report_75/pdf/report_eurohiv_75.pdf)

These sources were chosen because they are internationally recognized; their databases are easily accessible; they regularly report on the chosen indicators; and they are likely to continue reporting on these indicators in the future. Consequently, it should be possible to update the analysis regularly and easily using consistent data sources. Since data for Kosovo are limited, this report includes health information for the country using sources beyond those mentioned above. These and other additional sources used are cited in the text.

There are, however, limits to the accuracy, validity, and timeliness of reporting for the indicators in this report. Data quality varies by country, and in some parts of the E&E, data registries have poor coverage, requiring that available figures be treated with a degree of caution. In order to estimate mortality and life expectancy, WHO develops life tables based on vital statistics, censuses, and surveys that are then adjusted for known biases in national vital statistics. Research shows that the Soviet health care system left a lack of reliable health statistics and an unreliable system for collecting them, which makes it harder to compare data from former Soviet states with data from other countries (Nichol & McHugh, 2001).

Problems of data quality are greatest in the countries of the CAR and Caucasus subregions, where official infant and child mortality estimates in particular are considered to be severely underestimated (Rechel, Shapo, & McKee, 2004). The poor quality of official health statistics from these areas is well known, and they contradict WHO estimates, particularly in Turkmenistan. In addition, government statistics from Turkmenistan show an improvement in infant and maternal mortality despite the dismissal of 15,000 health workers and a large decrease in health funding (Rechel & McKee, 2005).

Under-registration of births and deaths is a serious concern in E&E countries. Particularly in the case of child mortality, different estimates are available from different sources. Outdated definitions for calculating infant mortality rates that differ from that recommended by WHO may also be a cause for differences between data sources (WHO, 2008a). Moreover, when new data become available, international agencies that estimate child mortality trends, such as the United Nations Children's Fund (UNICEF) and WHO, may use different techniques that produce slightly different estimates. As a result, data on under-5 mortality from this region are sometimes difficult to interpret.

In reviewing the health expenditure information in this report, readers should keep in mind that reported levels of expenditure may have been overstated in the source materials. Information on private spending is not always report-

ed because it is not generally available. In addition, it is not always possible to compare estimates of public expenditure as a percentage of GDP between countries. Such analysis requires comparable and valid estimates of GDP that are not always available.

It is also important to recognize the potential for disparities between official statistics collected through routine health information systems and information from those in the field. For example, such disparities can result when minority groups are excluded from national statistics and health surveys. Moreover, in the E&E region, NCDs are the biggest killers, and co-morbidity is frequent. Therefore, it is generally difficult to assign a single underlying cause of death.

Another concern is that reliable data are not available for every year. Estimates for indicators are calculated by organizations such as WHO and UNICEF based on household surveys. Therefore, it is more appropriate to focus on long-term trends than on short-term spikes or sudden upturns or downturns in the data for specific indicators. These are difficult to interpret and could be artifacts of irregularities in reporting. This is clearly an issue for HIV/AIDS statistics, as the numbers reported depend on the degree to which population groups are tested and reported. Turkmenistan, with its poor reliability of HIV data, is a good example of this problem.

# Health Vulnerability Index

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Table I presents the complete Health Vulnerability Index for the E&E countries, excluding Kosovo. Application of the Health Vulnerability Index methodology shows that of the 28 countries included in the analysis, four CAR – Turkmenistan, Kazakhstan, Tajikistan, and Kyrgyzstan – and Russia are the five most vulnerable countries in the E&E region. The CAR also dominate the listing of most vulnerable countries for health status indicators such as life expectancy, adult mortality, and under-5 mortality, while HIV is most prevalent in countries of the RUMB region. The Caucasus are the most vulnerable in the health expenditure indicator. It is interesting to note that Russia, despite having a higher level of economic performance compared with other E&E countries, is among the five most vulnerable countries in the region. If the CAR countries were excluded, the five most vulnerable countries in 2010 would be Russia, Ukraine, Azerbaijan, Moldova, and Georgia.

Although Moldova is not among the poorest five performers, it still ranks quite low among the 28 countries. In five of the six components of the Index, it ranks in the list of top 10 vulnerable countries. TB and HIV incidence are particularly high in Moldova. Despite its better performance in terms of health expenditure, the combined Index ranks Moldova at 20 on the list of 28 countries. Not surprisingly, the least vulnerable countries are predominantly in the Northern Tier and Southeastern Europe subregions. These countries are Slovenia, the Czech Republic, Croatia, Montenegro and Slovakia. Some of these countries also joined the EU in the last five years (Slovenia, the Czech Republic, and Slovakia). Among the recent EU countries, some health vulnerabilities remain. For example, TB incidence in Romania is high compared with other countries in the region. Despite Slovenia's top ranking in the Index, HIV incidence levels are of some concern.

The Caucasus countries of Azerbaijan, Georgia, and Armenia, though not in the bottom five countries in terms of overall vulnerability, remain in the bottom half. These countries rank 21, 19, and 17, respectively. A driving factor in this pattern is their poor performance in terms of under-5 mortality and health expenditure. The three Baltic states (Estonia, Latvia, and Lithuania) perform at a slightly better level than the Caucasus countries. HIV incidence and the level of adult

mortality are key health concerns in the Baltics. HIV incidence is especially high in Estonia compared with other countries in the E&E region.

It is possible that Kosovo stands somewhat in the middle of the range of 28 countries. However, this cannot be established for sure given the very limited availability of data. Therefore, Kosovo was not included in the calculation of the Index and no strong conclusions can be made.

Tables 2a and 2b compare the five most vulnerable countries in 2001 and 2010 in overall health as well as the six indicators discussed in this report.<sup>3</sup> With regard to overall health, Tajikistan is now the third most vulnerable country in the region, replacing Azerbaijan, which was among the top five countries in 2001. The countries qualifying as most vulnerable under a given health indicator have remained relatively constant. In most cases, the countries listed as most vulnerable in 2010 vary from those listed in 2001 by one or two countries. The one exception is in adult mortality, where the same five countries (Russia, Kazakhstan, Turkmenistan, Ukraine, and Kyrgyzstan) were most vulnerable both in 2001 and 2010.

Despite the relative constancy of the countries listed as most vulnerable, the exact rankings of some countries have changed for different indicators. Slovenia's listing as one of the most vulnerable countries in the region for health expenditure in 2001 is no longer the case in 2010. However, despite its entry into the EU in 2004 and its standing as least vulnerable on the 2010 Health Vulnerability Index, Slovenia's HIV incidence rank of 12 out of 28 is to be noted.

Additional comparisons can be viewed in annex B, which provides regional maps that present the extent of health vulnerability for E&E countries overall and their vulnerabilities by specific indicators, and annex C, which presents radar graphs that illustrate each country's status for the six vulnerability indicators relative to both the EU-27 mean and the mean for the E&E Northern Tier countries.

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<sup>3</sup> In practical terms, this is a six-year comparison because the data for the 2010 *Health Vulnerability Analysis* are primarily from 2007. The rankings for 2001 presented in the tables reflect data for 2001.

**TABLE I. Vulnerability Index 2010 – Country Ranking**

Country	LIFE EXPECTANCY			ADULT MORTALITY (per 1,000 population)			UNDER-5 MORTALITY (per 1,000 live births)			TB INCIDENCE (new cases per 100,000 population)		
	Year	Source		Year	Source		Year	Source		Year	Source	
	2007	WDI	Adjusted Score	2007	World Health Statistics	Adjusted Score	2007	World Health Statistics	Adjusted Score	2008	Global TB Report	Adjusted Score
	Value	Rank		Value	Rank		Value	Rank		Value	Rank	
Albania	76	3	9.1	117	6	9.6	15	17	8.6	16	4	10.2
Armenia	72	15	6.6	166	14	7.4	24	21	7.3	73	18	7.4
Azerbaijan	67	24	3.5	176	17	7.0	39	25	5.1	110	20	5.5
Belarus	70	19	5.3	223	21	4.9	7	5	9.8	43	12	8.9
Bosnia & Herzegovina	75	5	8.4	106	2	10.1	14	15	8.8	51	15	8.5
Bulgaria	73	10	7.2	155	13	7.9	12	13	9.1	43	12	8.9
Croatia	76	3	9.1	110	4	9.9	6	3	9.9	25	9	9.8
Czech Republic	77	2	9.7	106	2	10.1	4	1	10.2	9	1	10.6
Estonia	73	10	7.2	186	19	6.6	6	3	9.9	34	11	9.3
Georgia	71	16	6.0	150	11	8.2	30	22	6.4	110	20	5.5
Hungary	73	10	7.2	174	15	7.1	7	5	9.8	16	4	10.2
Kazakhstan	66	27	2.9	307	27	1.2	32	23	6.1	180	27	2.0
Kyrgyzstan	68	21	4.1	243	24	4.0	38	24	5.3	160	25	3.0
Latvia	71	16	6.0	213	20	5.4	10	11	9.4	50	14	8.5
Lithuania	71	16	6.0	231	22	4.6	7	5	9.8	71	17	7.5
Macedonia	74	8	7.8	115	5	9.7	17	19	8.3	24	8	9.8
Moldova	69	20	4.7	232	23	4.5	18	20	8.2	170	26	2.5
Montenegro	75	5	8.4	133	7	8.9	10	11	9.4	23	7	9.9
Poland	75	5	8.4	145	10	8.4	7	5	9.8	25	9	9.8
Romania	73	10	7.2	154	12	8.0	14	15	8.8	130	23	4.5
Russia	68	21	4.1	312	28	1.0	12	13	9.1	110	20	5.5
Serbia	73	10	7.2	139	9	8.6	8	9	9.6	18	6	10.1
Slovakia	74	8	7.8	133	7	8.9	8	9	9.6	12	2	10.4
Slovenia	78	1	10.3	102	1	10.3	4	1	10.2	12	2	10.4
Tajikistan	67	24	3.5	175	16	7.0	67	28	1.0	200	28	1.0
Turkmenistan	63	28	1.0	292	26	1.9	50	27	3.5	68	16	7.6
Ukraine	68	21	4.1	273	25	2.7	16	18	8.5	100	19	6.0
Uzbekistan	67	24	3.5	183	18	6.7	41	26	4.8	130	23	4.5
Standard Deviation	3.7			61.8			32.3			56.9		
Average	71.5		6.3	180.4		6.8	18.7		8.1	71.9		7.4
E&E Worst	63.0			312.0			67.0			200.0		
EU-27 Average	77.5		10.0	108.1		10.0	5.6		10.0	20.3		10.0

Sources:

Life expectancy and public health expenditure: World Bank, World Development Indicators (WDI), 2009

Adult and under-5 mortality: WHO, World Health Statistics Report, 2009

TB: WHO, Global Tuberculosis Control: A Short Update to the 2009 Report

HIV/AIDS: EuroHIV, HIV/AIDS Surveillance in Europe. End-Year Report 2006

**TABLE I. Vulnerability Index 2010 – Country Ranking (continued)**

Country	HIV INCIDENCE (new cases per 1,000,000 population)			PUBLIC HEALTH EXPENDITURE (% of GDP)			Avg score	Rank	FINAL OUTCOMES	
	Year	Source	Adjusted Score	Year	Source	Adjusted Score				
	2006	EuroHIV Report		2006	WDI					
Albania	10.2	8	11.4	2.4	22	3.4	8.7	11	1	Slovenia
Armenia	21.9	14	11.2	1.9	25	2.6	7.1	17	2	Czech Republic
Azerbaijan	28.6	15	11.0	1.1	28	1.0	5.5	21	3	Croatia
Belarus	75.6	20	10.0	4.8	10	7.7	7.8	13	4	Montenegro
Bosnia & Herzegovina	4.3	1	11.5	5.2	8	8.5	9.3	8	5	Slovakia
Bulgaria	11.9	10	11.4	4.1	14	6.4	8.5	12	6	Macedonia
Croatia	14.5	11	11.3	7.1	1	11.8	10.3	3	7	Serbia
Czech Republic	9.1	7	11.4	6.1	2	10.0	10.3	2	8	Bosnia & Herzegovina
Estonia	504.2	27	1.0	3.8	17	5.9	6.7	18	9	Hungary
Georgia	62.2	19	10.3	1.8	26	2.3	6.4	19	10	Poland
Hungary	8.0	4	11.4	5.9	5	9.6	9.2	9	11	Albania
Kazakhstan	117.8	22	9.1	2.3	24	3.2	4.1	27	12	Bulgaria
Kyrgyzstan	45.8	18	10.7	2.8	20	4.0	5.2	24	13	Belarus
Latvia	130.3	23	8.9	3.9	15	6.1	7.4	16	14	Lithuania
Lithuania	29.3	16	11.0	4.3	12	6.9	7.6	14	15	Romania
Macedonia	8.3	5	11.4	5.7	7	9.2	9.4	6	16	Latvia
Moldova	148.0	24	8.5	4.4	11	7.0	5.9	20	17	Armenia
Montenegro	6.4	3	11.5	6.0	4	9.8	9.6	4	18	Estonia
Poland	19.5	13	11.2	4.3	12	6.9	9.1	10	19	Georgia
Romania	8.3	5	11.4	3.5	18	5.3	7.5	15	20	Moldova
Russia	275.1	25	5.8	3.4	19	5.1	5.1	25	21	Azerbaijan
Serbia	11.8	9	11.4	5.7	6	9.4	9.4	7	22	Uzbekistan
Slovakia	5.0	2	11.5	5.0	9	8.1	9.4	5	23	Ukraine
Slovenia	17.3	12	11.3	6.1	3	10.0	10.4	1	24	Kyrgyzstan
Tajikistan	31.0	17	11.0	1.1	27	1.1	4.1	26	25	Russia
Turkmenistan	-*	-	-	2.5	21	3.6	3.5	28	26	Tajikistan
Ukraine	288.3	26	5.5	3.8	16	5.9	5.5	22	27	Kazakhstan
Uzbekistan	81.7	21	9.9	2.4	23	3.3	5.5	23	28	Turkmenistan
Standard Deviation	113.0			1.6						
Average	73.1		10.1	4.0		6.2				
E&E Worst	504.2			1.1						
EU-27 Average	76.8		10.0	6.1		10.0				

1 = least vulnerable  
28 = most vulnerable

\* Turkmenistan reported zero HIV cases, and its HIV score is excluded from the overall average. Rankings thus go through 27.

**TABLE 2a. Most Vulnerable Countries in Europe and Eurasia, 2001**  
(listed in order of vulnerability, starting with the most vulnerable)

Overall Health	Life Expectancy	Adult Mortality	Under-5 Mortality	TB Incidence	HIV Incidence	Health Expenditure as % of GDP
Turkmenistan	Turkmenistan	Russia	Azerbaijan	Kazakhstan	Russia	Azerbaijan
Kazakhstan	Russia	Kazakhstan	Tajikistan	Kyrgyzstan	Estonia	Slovenia
Russia	Tajikistan	Turkmenistan	Turkmenistan	Romania	Latvia	Georgia
Azerbaijan	Kazakhstan	Ukraine	Uzbekistan	Russia	Belarus	Kyrgyzstan
Kyrgyzstan	Uzbekistan	Kyrgyzstan	Kyrgyzstan	Moldova	Ukraine	Kazakhstan

**TABLE 2b. Most Vulnerable Countries in Europe and Eurasia, 2010\***  
(listed in order of vulnerability, starting with the most vulnerable)

Overall Health	Life Expectancy	Adult Mortality	Under-5 Mortality	TB Incidence	HIV Incidence	Health Expenditure as % of GDP
Turkmenistan	Turkmenistan	Russia	Tajikistan	Tajikistan	Estonia	Azerbaijan
Kazakhstan	Kazakhstan	Kazakhstan	Turkmenistan	Kazakhstan	Ukraine	Tajikistan
Tajikistan	Azerbaijan**	Turkmenistan	Uzbekistan	Moldova	Russia	Georgia
Russia	Tajikistan**	Ukraine	Azerbaijan	Kyrgyzstan	Moldova	Armenia
Kyrgyzstan	Uzbekistan**	Kyrgyzstan	Kyrgyzstan	Romania, Uzbekistan**	Latvia	Kazakhstan

\* Data for the 2010 Health Vulnerability Analysis are primarily from 2007. The 2001 rankings use data from 2001.

\*\* Azerbaijan, Tajikistan, and Uzbekistan ranked equally for life expectancy; Romania and Uzbekistan ranked equally for TB incidence.

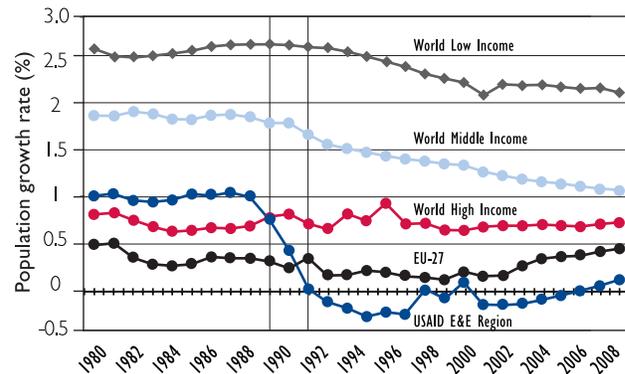
Note: Turkmenistan not included in HIV rankings due to lack of data

# Population Growth and Fertility

This report focuses on the various health vulnerabilities of countries in the E&E region. The disease burden characteristics and population age profile have a direct impact on health care costs and state expenditures on health. Although demographic indicators are not included in the calculation of the Health Vulnerability Index, population dynamics are closely related to the improvement or decline in the level of adult and child mortality and infectious diseases that influence these mortalities. A higher level of mortality among economically active adults combined with very low fertility levels and emigration leads to a declining and aging population in the long term. Consequently, a higher dependency ratio results in fewer wage earners supporting the health care costs and pensions of more people 65 and older. All of these effects need to be understood in the context of poorly functioning markets coupled with low levels of economic growth in several E&E countries.

In this context, this chapter presents information on the current demographic status in the countries of the E&E region, focusing on population growth and fertility levels. This chapter examines population growth (or decline) in the E&E countries, measured as the sum of natural changes in the population and net migration. For the E&E region, below-replacement fertility rates (defined as fewer than 2.1 lifetime births per woman), high adult mortality, and emigration during the economic crisis of the post-Communist transition in the 1990s caused negative population growth and a decline in life expectancy in a majority of countries. However, since 2003, some countries in the E&E region have seen positive rates of growth in the population. Particularly in the CAR subregion, fertility rates have continued to remain above the replacement rate. Population growth was well over 10 percent between 1997 and 2008 in four of the five countries (Kazakhstan being the exception). In more than half of the E&E countries, however, the population declined during the same period, with Moldova and Georgia seeing declines of greater than 10 percent. In a majority of E&E countries, the old-age dependency ratio is increasing as well. This is not yet the case in the CAR countries, where the impact of increasing dependency ratios is expected to be limited because the CAR working-age populations are expected to increase.

**FIGURE 2. Population Growth Trends in the USAID E&E Region Compared with EU-27 and Overall World Population Growth Rates by Income Level, 1980–2008**



Source: World Bank, World Development Indicators, 2009

Figure 2 shows trends in population growth rates for the E&E region and for World Bank income groups (World Bank, 2009). Urbanization, though low in CAR, RUMB, and the Caucasus, is projected to continue to rise in the region, with as many as 80 percent of people living in urban areas. In general, urban and rural areas differ by population structure, educational levels, lifestyles, occupational backgrounds, and exposure to environmental factors, all of which may affect a population's health status and access to health care.

## E&E REGIONAL OVERVIEW

High rates of adult mortality and below-replacement fertility rates are largely responsible for contracting populations in 16 of the E&E countries (Merson, Black, & Mills, 2004). The population changes in 28 countries are presented in table 3. In a majority of countries, the population declined between 1997 and 2008, with Moldova showing the highest rate of decline at 14.8 percent. In 2008, Eastern Europe's population was estimated at 295 million. By 2050, it is projected to decline by nearly 22 percent to 231 million (Bird et al., 2009). Extremely low fertility rates of 1.2 to 1.3 in 15 of the 28 countries, combined with increasing life expectancy and the emigration of working-age adults, have led to declining workforces and a changing age distribution of the population, which is responsible for a greater old-age dependency ratio. By 2025, the median age of the population will be more than 10 years older than it is currently in

**TABLE 3. Population Growth and Fertility in the E&E Countries, 1997–2008**

Country	Percent Population Change, 1997–2008	Fertility Rate, 2006	Total Population, 2008	Country	Percent Population Change, 1997–2008	Fertility Rate, 2006	Total Population, 2008
Moldova	-14.8%	1.4	3,633,369	Armenia	-1.8%	1.3	3,077,087
Georgia	-10.7%	1.4	4,364,461	Poland	-1.4%	1.2	38,122,972
Ukraine	-8.6%	1.2	46,258,200	Slovakia	0.4%	1.2	5,406,030
Bulgaria	-8.3%	1.3	7,623,395	Czech Republic	1.2%	1.2	10,427,869
Latvia	-7.5%	1.8	2,266,013	Albania	1.8%	2.2	3,143,291
Lithuania	-6.2%	1.3	3,358,371	Kazakhstan	2.2%	1.3	15,674,833
Romania	-4.6%	1.3	21,512,646	Slovenia	2.7%	2.1	2,039,400
Belarus	-4.3%	1.3	9,680,850	Macedonia	2.7%	1.5	2,037,688
Estonia	-4.2%	1.3	1,340,638	Azerbaijan	10.7%	1.2	8,678,851
Serbia	-3.9%	1.5	7,350,221	Kyrgyzstan	11.7%	1.7	5,277,900
Russia	-3.7%	1.2	141,800,000	Bosnia and Herzegovina	12.1%	2.5	3,773,100
Montenegro	-3.3%	1.3	622,344	Tajikistan	15.1%	3.5	6,836,083
Croatia	-3.0%	1.8	4,434,189	Uzbekistan	15.4%	2.6	27,313,700
Hungary	-2.5%	1.3	10,037,637	Turkmenistan	16.0%	2.6	5,028,041

Sources:

Percent population change and total population: World Bank, World Development Indicators, 2009

Fertility rate: WHO Statistical Information System (WHOSIS), 2009

Note: A recent population estimate in Kosovo was 2.2 million persons in mid-2008 (PRB, 2008).

nearly half of the countries in the E&E region (Chawla, Betcherman, & Banerji, 2007). This trend in the increasing percentage of the population 65 years and over is evident in the CAR subregion as well, although it is not as serious an issue there as in Eastern European countries such as Hungary, Bulgaria, the Czech Republic, Croatia, and Slovenia.

The consequences of population aging, which are also felt by many high-income countries, are not necessarily negative, but current structures related to health care and labor in the E&E region will require major reorganization. Health and social support systems that sustain dependent populations will be stressed as smaller birth cohorts support larger and older populations. With fewer working-age adults to replace the older generation, labor markets will also be affected.

## SUBREGIONS

### RUSSIA, UKRAINE, MOLDOVA, AND BELARUS (RUMB)

Russia is the world's sixth most populous nation, and in terms of sheer numbers, it is experiencing the most striking case of population decline in the region, followed by Ukraine. Having already fallen from 148 million in 1991 to 142 million in 2008, Russia's population is projected to fall to 116 million by 2050 if current trends persist (UNPD, 2009).<sup>4</sup> Net immigration, mostly consisting of ethnic Russians returning from other countries of the former Soviet Union, has prevented Russian population losses from being even greater (DaVanzo & Gramlich, 2001), although it is not expected to stabilize the population size. The

<sup>4</sup> United Nations Population Database, medium variant projections.

reduction of the working-age population is of concern, as it increases the old-age dependency ratio and makes it more difficult to fill critical jobs or even meet military recruiting targets. The World Bank estimates that the proportion of the population aged 65 and over in Russia was 14 percent in 2005 and is growing rapidly. At the same time, there are fewer young people.

Moldova and Ukraine are also experiencing rapid population decline. Low fertility and high adult mortality remain a concern for population growth in both countries (World Bank, 2009). Moldova experienced the largest percentage population decline in the region – 14.8 percent – from 1997 to 2008.

### CENTRAL ASIAN REPUBLICS (CAR)

Other than Azerbaijan and a few countries in Southeastern Europe, CAR is the only E&E subregion where population size has continued to grow and fertility rates remain above the 2.1 replacement rate. With the exception of Kazakhstan, the CAR countries have significantly higher rates than other E&E countries for both indicators. The average rates for fertility and population growth in the CAR were 2.3 lifetime births per woman and 12.1 percent population growth from 1997 to 2008. Turkmenistan's population increased 16.0 percent from 1997 to 2008, the largest population growth among E&E countries. Uzbekistan (15.4 percent), Tajikistan (15.1 percent), and Kyrgyzstan (11.7 percent) were also among the region's fastest-growing countries over this time period.

### CAUCASUS

Georgia continues to face challenges associated with depopulation and aging. As a result of large undocumented outmigration to other countries due to high poverty and unemployment, along with low fertility levels, Georgia's population has declined by 10.7 percent since 1997 (European Policy Center, 2007; PRB/UNFPA, 2007; World Bank, 2009). The proportion of adults aged 65 and over is projected to increase from 14.3 percent in 2010 to 20.8 percent by 2030, and the dependency ratio will increase from 21 to 33 per 100 persons 15 to 64 years of age during the same period (UNPD, 2009). Armenia has experienced emigration-associated population loss as well, though not to the same extent as Georgia. Azerbaijan, the only Muslim-majority country in the subregion, has seen a 10.7 percent increase in population size since 1997.

### BALTICS

Between 1997 and 2007, the Baltic countries experienced an average negative population growth of 6.0 percent. In 2006, the subregion had a fertility rate of 1.5 lifetime births per woman. Although the Baltics are still experiencing negative population growth, the rate of decline has slowed since 2003.

### SOUTHEASTERN EUROPE

Since the breakup of Yugoslavia, political and economic challenges as well as postconflict plights of refugees and displaced persons have persisted in the subregion, particularly in Serbia, Montenegro, and Macedonia. These factors have caused large shifts in population within the subregion. Since 2006, Serbia's population has decreased by 8.3 percent, while Montenegro's has remained stable. Both countries have a fertility rate below replacement levels. Bulgaria's



An adolescent couple in Russia. Young couples in Russia – and many other E&E countries – have been having fewer children over the years, contributing to a shrinking population.

© Irina Gushin/CCP, Courtesy of Photoshare

population decline of 8.3 percent between 1997 and 2008 is the highest in Southeastern Europe. Other countries in the subregion have experienced an increase in their population. In Macedonia, refugees from the 1992 conflict have returned to their homes (DaVanzo & Grammich, 2001). As a result, the country has experienced a 2.7 percent increase in population since 1997. Bosnia and Herzegovina had the highest population growth in the subregion at 12.1 percent. Except for Albania, which is right at fertility replacement levels, all of the countries in this subregion are experiencing below-replacement fertility rates. Although little information is available for Kosovo, the most recent population estimate was 2.2 million in 2008, with a fertility rate of 2.5 children per woman (PRB, 2008). It is also important to note that the number of international migrants of Kosovar origin is estimated at about 400,000 individuals (World Bank, 2007).

#### **NORTHERN TIER**

With an average 0.1 percent population growth since 1997 and a below-replacement fertility rate of 1.4, the Northern Tier countries have experienced demographic trends comparable with those of Western industrialized countries. Although most of the countries have experienced positive

but minimal population growth, Hungary's and Poland's negative percentages (-2.5 percent and -1.4 percent, respectively) drive the regional average into the negatives. The most recent data on migration from the World Bank in 2005 showed that all of the countries except Poland had positive migration, which may account for the increase in population (World Bank, 2009).

#### **SUMMARY**

In the past decade, with the exception of CAR, combinations of persistently low birth rates, high premature death rates, and emigration (especially among youth and working-age populations) have contributed to declining populations in the E&E region as a whole. The largest absolute declines in population were in Russia and Ukraine. Accompanying current trends in fertility and mortality is an overall aging of the population. By 2025, the median age of the population will be more than eight years older than it is currently in a third of the E&E countries (UNPD, 2009). A larger dependent population presents additional economic and social challenges to the region, including the need for higher levels of pension and possibly public health spending.

# Life Expectancy

Life expectancy at birth is a health status measure that depends heavily on adult and under-5 mortality rates to estimate the average number of years a newborn is expected to live. Life expectancy is calculated by applying age- and sex-specific mortality rates of the population to a hypothetical birth cohort of 100,000 individuals. It is influenced by changing trends in disease frequency in the population. A decline in infant and adult mortality rates are responsible for an increase in the life expectancy of the population. In 2007, life expectancy in the developed world reached 82 years for females and 77 years for males (World Bank, 2009). Figure 3 shows life expectancy trends in all regions of the world. Low government health expenditures and unhealthy lifestyles affect not only life expectancy but also the quality of life of the population. The latter is measured by indicators such as HALE. These data, however, are not easily available over time for all countries and are not included in this report.

## Five Most Vulnerable Countries

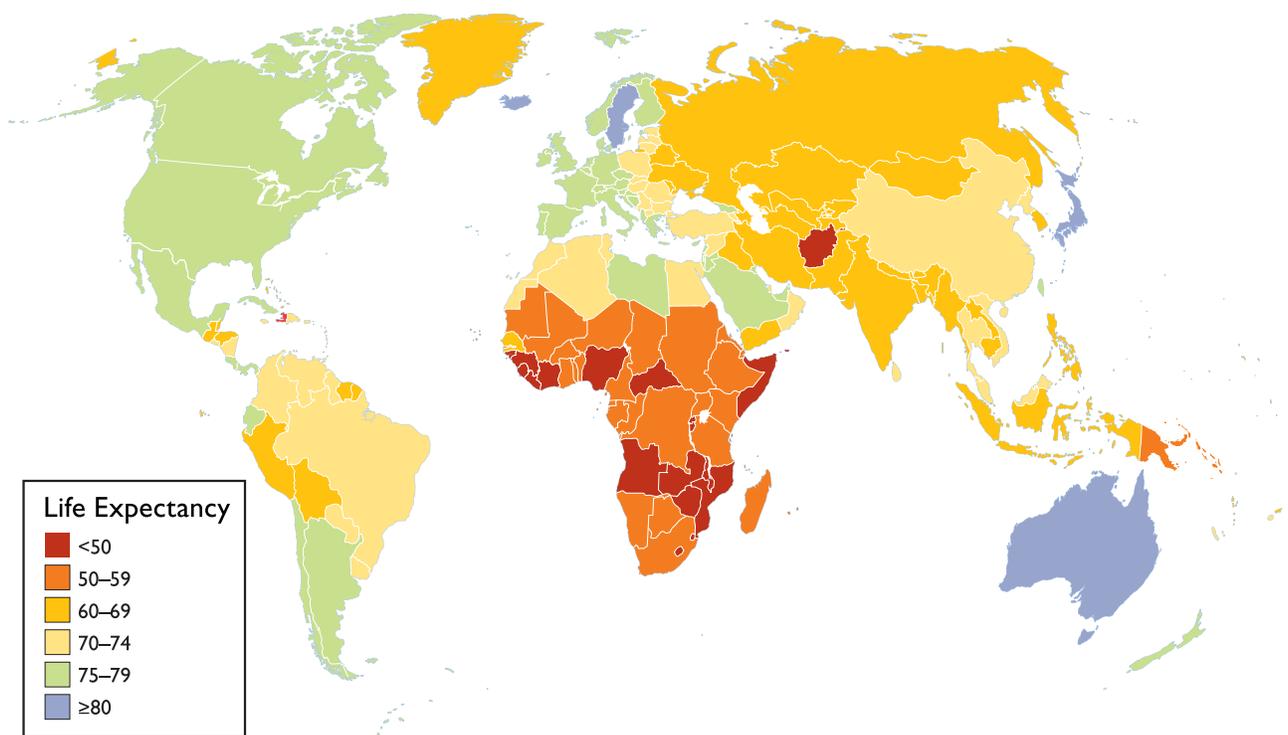
1. TURKMENISTAN
2. KAZAKHSTAN
- 3.\* AZERBAIJAN, TAJIKISTAN, UZBEKISTAN

\* Ranked equally for life expectancy

## E&E REGIONAL OVERVIEW

The weakening of the region's health care infrastructure following the collapse of the Soviet Union contributed to a rise in adult and under-5 mortality and the re-emergence and spread of infectious diseases (Nolte, McKee, & Gilmore, 2005). This difficult transition and limited progress in health care reforms contributed to low gains in life expectancy in

FIGURE 3. Life Expectancy, 2007



Source: World Bank, World Development Indicators, 2009

many countries of the region. Between 2000 and 2007, the average life expectancy at birth in the E&E countries increased gradually from 70.5 years to 71.5 years (World Bank, 2009). As of 2007, life expectancy in the E&E region was six years shorter than in the EU-27 nations (77.5 years in 2007), despite a slight decline in the EU-27 average in 2006 after Bulgaria and Romania were added to the Union. Although the E&E regional average is lower than the EU average, several upper middle-income countries of Central Europe have had marked gains in life expectancy. Between 2000 and 2007, life expectancy in the Czech Republic and Slovenia in particular increased from 75 and 76 years, respectively, to 77 and 78 years. Poland was not far behind, with an increase from 74 to 75 years over the same period.

NCDs pose the most serious challenge to E&E countries and are responsible for impeding increases in life expectancy. NCDs – many of them caused by unhealthy lifestyles – are responsible for 93 percent of adult deaths in the region, with males disproportionately affected (WHO, 2008). The highest life expectancy gender gaps in the world are in Eurasia, where males on average live 8.5 fewer years than females, as seen in figure 4. Women in the EU-27 live 6.9 years longer than men, and globally, women live 4.7 years longer than men.

## SUBREGIONS

### RUSSIA, UKRAINE, MOLDOVA, AND BELARUS (RUMB)

RUMB has the second lowest average life expectancy in E&E after CAR. From 1997 to 2002, the average life expectancy in RUMB remained static at 67.2 years, with a marginal increase by 2007. At 68 years, Russia and Ukraine had the lowest life expectancy at birth in 2007. In 2007, men in the subregion died on average 10.3 years earlier than women – a difference that is 2.3 years more than the E&E average. In Russia, the difference was 12 years. Declines in mortality in the 1980s are attributed to the Gorbachev anti-alcohol campaign. Since then, the increases in mortality in 1991–1994 and in 1998–2003 paralleled the critical socioeconomic situation in those periods, and the relative declines in mortality in 1994–1998 and 2003–2006 were associated with relative economic improvement (LSHTM, 2004). At an individual level, excessive alcohol intake by a large segment of the population was partly responsible for much of the premature mortality, particularly among men (Men et al., 2003). Many alcohol-related deaths were often wrongly attributed to diseases of the circulatory system. Significant gender differences in life expectancy are also observed in the countries of this subre-



Elderly beneficiaries of a USAID-supported soup kitchen in Armenia. Although life expectancy has increased in the E&E region since 2000, it remains six years shorter than in Western Europe.

USAID/Armenia

gion, unhealthy lifestyles being the most plausible cause for the difference.

### CENTRAL ASIAN REPUBLICS (CAR)

With an average of 66.2 years, CAR had the region's lowest life expectancy in 2007, and Turkmenistan had the lowest life expectancy of the CAR countries – 63 years, which is comparable with that of Yemen. The most likely explanation for these levels is the high under-5 mortality rates in the CAR. Turkmenistan's male and female life expectancies in 2007 were 59 and 68 years, respectively.

The gender gap among the CAR countries varied considerably, from five years in Tajikistan to 11 years in Kazakhstan. The main reason for this difference is the rising mortality rate of working-age men, which is increasing 3.5 times faster than for women (Euromonitor International, 2008). The increase is much greater among urbanites, the main reason being the falling safety standards in industries where urban males predominate. Behavioral factors also play a role, with smoking, alcohol abuse, poor nutrition, and lack of physical activity all causing men's health to deteriorate.

### CAUCASUS

The Caucasus had an average life expectancy of 70 years in 2007, comparable with those of Guatemala, Honduras, and the Middle East and North Africa regions. Possible factors influencing this average are the lower adult mortality rates than in other subregions. Azerbaijan had the lowest life

expectancy at 67 years, possibly because of its high under-5 mortality rate of 39 deaths per 1,000 live births.

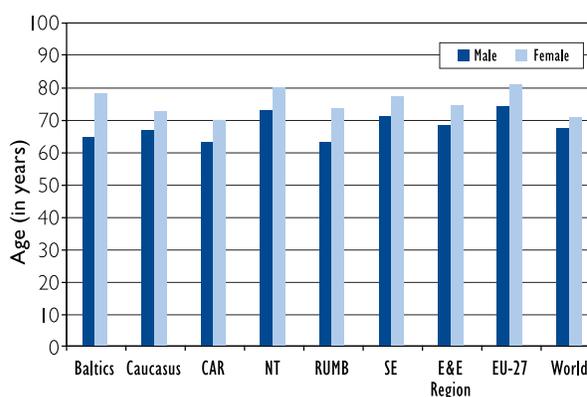
### BALTICS

This subregion has not experienced a significant change in overall life expectancy during the last five years, and the sub-regional average was 71.7 years in 2007. While overall life expectancy changed little, the life expectancy gender gap is the largest among the E&E subregions (men live 11.7 fewer years on average than women). Since 2000, male life expectancy has declined in Lithuania and fluctuated in Estonia. In contrast, life expectancy for females in these two countries has increased. In 2007, this trend led to a gender gap of 12 years for both Lithuania and Estonia. Lithuania is the only country in the region that has continuously experienced a decline in male life expectancy since 2000. The main reason for the gender difference in life expectancy is the high level of male mortality, especially among the working-age population, in all three countries (State Public Health Agency, Latvia, 2007; Zvidrins, 2009). Especially in the post-independence era of the 1990s, mortality in the Baltics increased significantly, primarily because of reduced levels of medical care and the inability of many people to adapt to new economic situations. During this time of deteriorating economic circumstances and mass unemployment, men were most affected.

### SOUTHEASTERN EUROPE AND NORTHERN TIER

Southeastern Europe and the Northern Tier countries have the highest life expectancies in the E&E region: 74.3 and 75.4 years, respectively. At 78 years – greater than the EU-27 average of 77.3 years – Slovenia had the highest life expectancy in the E&E. According to WDI, Hungary had the lowest average life expectancy in 2007 at 73 years (World Bank, 2009). In Kosovo, a 2003 United Nations Population Fund (UNFPA) survey estimated life expectancy at 69 years (UNFPA, 2004). Poland currently has the largest gender gap in these subregions (nine years), which is due mainly to steadily rising female life expectancy without a concurrent rise in male life expectancy. One explanation for this difference is the increasing gender gap in heart disease in Poland (Weidner & Cain, 2003).

**FIGURE 4. Life Expectancy by Gender, 2007**



Source: World Bank, World Development Indicators, 2009

### SUMMARY

Life expectancy roughly but comprehensively measures overall population health, as it summarizes, in a standardized format, current information on the health situation of all age and sex groups of populations. As such, it reliably indicates overall health performance in a society at a specific time. This broad indicator reflects a society's performance in improving health and not solely the performance of health systems. It reflects a consistent reduction in mortality rates at all ages in many, but not all, countries in the E&E region due to such factors as higher living standards and educational levels, healthier lifestyles, and improved access to and quality of health services. In general, life expectancy has increased in much of the E&E region since 1990, yet the current mean level is six years lower than that of countries in the EU-27 (77.5 years in 2007).

Reducing child mortality in the CAR and the Caucasus countries, particularly Azerbaijan, could result in an increase in life expectancy. The E&E region also has the world's greatest gender gap in life expectancy. Adult mortality rates are high, especially among working-age men, thus affecting productivity, economic growth, and the need for health care spending and greater investments in pension systems to support the elderly. Tackling the problem of NCDs and high adult mortality among working-age men is critical to bringing about an increase in life expectancy and reducing the gender gap in life expectancy.

# Adult Mortality

The adult mortality rate (AMR) – the probability of dying between the ages of 15 and 60 years – is an important measure in understanding the overall health of adult populations (Merson, Black, & Mills, 2004).<sup>5</sup> Globally, 183 out of every 1,000 15-year-olds will die before reaching age 60. The average adult mortality rate for the EU-27 countries is 180 deaths per 1,000 population (180/1,000<sup>6</sup>). For 10 countries in the E&E region, the AMR surpasses the global average, with AMRs ranging from 186/1,000 to 312/1,000, which means that up to one-third of all 15-year-olds in these countries will die before the age of retirement.<sup>7</sup> Only sub-Saharan Africa has a higher AMR. However, significant gender differences prevail. AMRs for women are less than half those for men.

The E&E regional overview that follows focuses on the population aged 15 to 44, which is the most productive group in the labor market and supports both younger and older generations. Because of this, maintaining the health of this population is of concern to governments and families. Data on women and men are presented separately throughout this section because there are significant differences between the causes of mortality and related issues faced by men and women.

Data for the subregions presented later in this chapter are for the 15 to 60 age group, as country-level data for the 15- to 44-year-old populations are not available from *The Global Burden of Disease: 2004 Update* (WHO, 2008). Since cardiovascular diseases and alcohol consumption play significant roles in causing adult deaths in the E&E countries, the last part of this chapter focuses on NCDIs.

5 Data for adult mortality are taken from the 2009 World Health Statistics Report (WHO, 2009) rather than the WHO online database. As a result, the numbers may vary somewhat from those presented in the 2007 *Health Vulnerability Analysis*, where an average was calculated from data available separately for men and women.

6 In this chapter, AMR is designated as XXXX/1,000 (XXXX deaths per 1,000 population).

7 Belarus, Estonia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Turkmenistan, Russia, and Ukraine

## Five Most Vulnerable Countries

1. RUSSIA
2. KAZAKHSTAN
3. TURKMENISTAN
4. UKRAINE
5. KYRGYZSTAN

## E&E REGIONAL OVERVIEW

The high rates of adult mortality in the E&E region have been attributed to a variety of causes, one being the unemployment that resulted from the implementation of mass privatization as an economic transition strategy. The effect of this unemployment was found to be especially strong for adult males of working age in the countries of the former Soviet Union, where unemployment was associated with higher rates of adult mortality and declines in life expectancy in the short term (Stuckler, King, & McKee, 2009). Lifestyle choices, in particular those related to alcohol use, smoking, poor diet, and lack of exercise, are key factors in the high levels of adult mortality in the region (Greenberg, Leeder, & Raymond, 2005). These choices increase the risk of developing one or more of the conditions that are among the primary causes of adult mortality. Although the E&E AMR is high, data show that the general trend was downward between 1990 and 2007. In comparison, the average AMR for the EU-27 countries is considerably lower but remained somewhat steady during the same period.

In the region as a whole, 93 percent of adult mortality is due to NCDIs (WHO, 2008). Table 4 reveals that in 2004 there were nearly 1.6 million more deaths due to all causes in the E&E region than in Western Europe. A majority of the deaths in the region were due to cardiovascular diseases and injuries. Cardiovascular disease causes more than 57 percent of deaths in the E&E region, while in Western Europe it accounts for 40 percent of deaths. This gap between the two regions' percentages of NCDIs remains prominent when disaggregated by gender.

Overall, among individuals 15 to 44 years old, the number of male deaths in the E&E countries is more than twice as

**TABLE 4. Mortality Gap between E&E Region and Western Europe: Selected Causes of Death, Ages 15–44 Years, 2004**

Cause of Mortality, 2004	E&E Region*	Western Europe**	Excess Mortality
<b>Total Population, 2008 (in 1,000s)</b>	<b>458,131</b>	<b>424,385</b>	
<b>Total All-Cause Deaths (in 1,000s)</b>	<b>5,525</b>	<b>3,968</b>	<b>1,556</b>
<b>Selected NCDs</b>			
	<b>Deaths in 1,000s (%)</b>		
Cardiovascular Disease	3,165 (57.3)	1,602 (40.4)	1,564
Diabetes Mellitus	55 (1.0)	100 (2.5)	-45
Trachea/Bronchus/Lung Cancers	156 (2.8)	215 (5.4)	-60
<b>Selected Infectious Diseases</b>			
Tuberculosis	73 (1.3)	4 (0.1)	69
HIV/AIDS	25 (0.5)	6 (0.1)	19
<b>Injuries</b>			
All-Cause Injuries	594 (10.7)	195 (4.9)	398
Poisonings	100 (1.8)	7 (0.2)	93
Violence	60 (1.1)	5 (0.1)	55

Sources:

Cause of death: WHO Global Burden of Disease: 2004 Update, 2008

Total population: World Bank, World Development Indicators, 2009

\* Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Russian Federation, Serbia and Montenegro, Slovakia, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan

\*\* Andorra, Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom

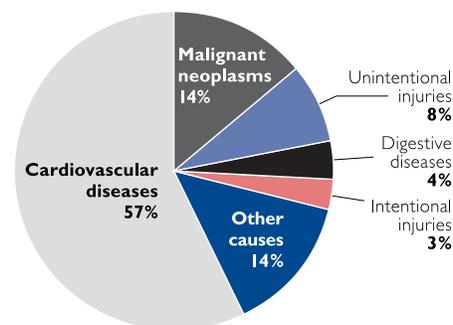
high as the number of female deaths. However, the region's maternal mortality ratio (MMR) merits attention.<sup>8</sup> Several countries, especially in the CAR subregion, are characterized by limited access to modern contraception and other reproductive health products and by poor quality of antenatal coverage and skilled birth assistance, often resulting (especially in rural areas) in obstetric complications. All of

8 WHO defines maternal mortality as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes." MMR is expressed as the number of maternal deaths per 100,000 live births during the same time period.

these have an impact on maternal mortality. Although the E&E MMR of 46 maternal deaths per 100,000 live births is much lower than the rates in other developing regions, it is still five times higher than the MMR of Western Europe and other industrialized countries (eight maternal deaths per 100,000 live births). In four of the five CAR countries, the MMR in 2005 was greater than 120 maternal deaths per 100,000 live births (WHOSIS, 2009).<sup>9</sup>

9 The CAR countries and corresponding MMRs are Kazakhstan (140), Kyrgyzstan (150), Tajikistan (170), and Turkmenistan (130).

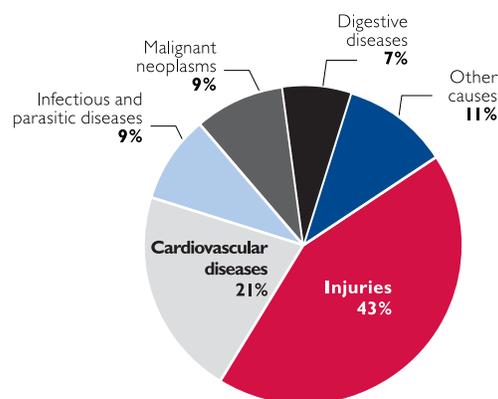
**FIGURE 5a. Causes of Mortality in the E&E Region, All Ages, 2004**



Source: WHO. Global Burden of Disease: 2004 Update, 2008

Note: Other causes include other NCDs and all communicable, maternal, perinatal, and nutrition conditions.

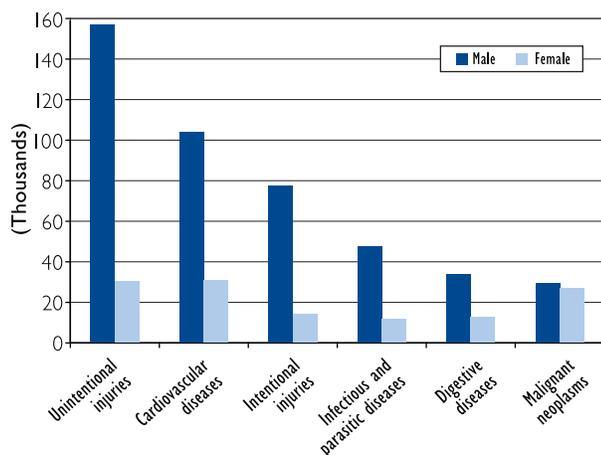
**FIGURE 5b. Causes of Mortality in E&E Region, Ages 15–44, 2004**



Source: WHO. Global Burden of Disease: 2004 Update, 2008

Note: Other causes include other NCDs and respiratory, communicable, maternal, perinatal, and nutrition conditions.

**FIGURE 6. Causes of Mortality by Gender, Ages 15–44, 2004**



Source: WHO. Global Burden of Disease: 2004 Update, 2008

Recent data show, however, that the number of women in the E&E region dying from complications in childbirth and pregnancy has declined by more than half over the last 10 years (UNFPA, 2009). In Azerbaijan, for instance, the MMR now stands below 35 deaths per 100,000, compared with earlier estimates of 82 deaths per 100,000, although under-reporting of maternal deaths is a concern. Data for Kosovo are not reported by WHO, and recent MMR estimates from other organizations vary widely. The abortion rate in the E&E region, which is another cause of maternal mortality, remains the highest in the world. However, significant advances were made in the last 15 years, resulting in a drop in the number of induced abortions from 1,049 per 1,000 live births to 493.

Figure 5a shows the mortality burden in the region for the entire population. Overall, cardiovascular diseases are the leading cause of death for the population as a whole (57 percent), with the next most important cause being malignant neoplasms (cancer) (14 percent). Among the estimated 47 percent of the population in the E&E region aged 15 to 44, NCDs cause a significant portion of the deaths. The leading causes of death are injuries (43 percent) and cardiovascular diseases (21 percent), as shown in figure 5b. Malignant neoplasms (cancer) affect a smaller proportion of this group (9 percent). Nonmedical causes of death such as injuries are a more serious concern for those 15 to 44 years than for the overall population. Of the fatal injuries, 67 percent were classified as unintentional injuries, predominantly road accidents and poisonings (WHO, 2008).

Disaggregating by gender, unintentional injuries were responsible for 32 percent of deaths in 2004 among men aged 15 to 44, with road accidents and poisonings being the leading causes (figure 6). Tobacco and alcohol use are the predominant risk factors for most of the six causes of death. For example, the effect of alcohol is evident among digestive disorders, the fifth leading cause of death. Cirrhosis accounts for 53 percent of all such deaths. As the figure indicates, the proportion of women dying due to these risky behaviors is considerably smaller. Although cardiovascular diseases and unintentional injuries (primarily road accidents) are the two main causes of death among women, the proportion affected by these causes is also less than for men. Malignant neoplasms (cancer) are of concern among women. Breast and cervical cancer were the most common forms of cancer, which ranked third as the cause of death among women. Unlike other developing parts of the world, infectious and parasitic diseases were not among the main causes of mortality.

For the entire European region, projections for the burden of disease to 2030 predict that with an aging population the balance will shift to a relative increase in neuropsychiatric conditions (22.1 percent), cancer (13.7 percent), and sense organ disorders (7.3 percent), with cardiovascular diseases at 22.3 percent (WHO, 2009c). While mostly not fatal, mental disorders are an important cause of lost years of healthy life and affect at least one in four people at some time in life. Unipolar depressive disorder is the leading contributor to the burden of disease among women aged 15 to 44 years in countries at all levels of income in the European region and contributes 5.8 percent of the total burden (third leading cause) in the region. Depression is frequently underdiagnosed and a major cause of suicide. While these projections apply to all of the European region, similar trends can be expected for E&E.

## SUBREGIONS

### RUSSIA, UKRAINE, MOLDOVA, AND BELARUS (RUMB)

In 2007, the AMR in all four RUMB countries was well above the global average of 183/1,000 and the EU-27 average of 108/1,000. Compared with other subregions, average AMR has been the highest in the RUMB countries since 2000 and was 260/1,000 in 2007. Russia had the highest adult mortality in the E&E region in 2007, followed by Ukraine. Both countries have experienced a relatively steady increase in mortality rates since 1990, with patterns of brief decline between 2004 and 2006. Adult mortality in



A doctor in Shengin, Albania, checks a patient's blood pressure. Cardiovascular disease causes more than 57 percent of deaths in the E&E region.

USAID/Albania

Moldova and Belarus, despite recent decreases, also remains high. From 2005 to 2007, Belarus had the subregion's largest decrease in adult mortality (250/1,000 to 223/1,000), which is attributed mainly to the country's decrease in male adult mortality (366/1,000 to 329/1,000).

The principal cause of increased adult mortality in this subregion, and corresponding reduced life expectancy, is lifestyle-related disease, especially diseases related to high rates of alcohol consumption and smoking (Greenberg, Raymond, & Leeder, 2005). In 2002, 19 percent of male mortality in Russia was attributed to alcohol, compared with 3 percent in Western Europe (Rehm, Taylor, & Patra, 2006). Moreover, studies show that the consumption of non-beverage alcohols (i.e., substances not made for consumption such as perfumes) also contributes to mortality (Leon et al., 2007).

#### CENTRAL ASIAN REPUBLICS (CAR)

The CAR subregion continues to have the E&E's second highest adult mortality levels. Except for Turkmenistan, all

the CAR saw small decreases in AMRs from 2000 to 2007. Declines were most prominent in Tajikistan (from 199/1,000 to 175/1,000) and Uzbekistan (202/1,000 to 183/1,000). On the other hand, adult mortality increased in Turkmenistan from 277/1,000 in 2000 to 292/1,000 in 2007. The gender difference in AMRs of men and women is also evident in all countries of the region. In Kazakhstan, Kyrgyzstan, and Turkmenistan in particular, adult mortality among men has been consistently double that of women since 2000.

#### CAUCASUS

Overall, the AMR declined between 1990 and 2007 in the Caucasus. In 2007, the AMR stood at 164/1,000 for countries in this subregion, with Azerbaijan having the highest rate (176/1,000). Significant gender differences can be observed, however. Average male mortality was more than double that for women (226/1,000 in 2007 for men, compared with 108/1,000 for women). Possibly due to the high level of maternal mortality, the gender difference was smallest in Azerbaijan – 82/1,000 compared with gender differences of more than 130/1,000 in Armenia and Georgia. More recent estimates from other sources, however, indicate that the MMR in Azerbaijan is now less than 35 maternal deaths per 100,000 live births (UNFPA, 2009).

#### BALTICS

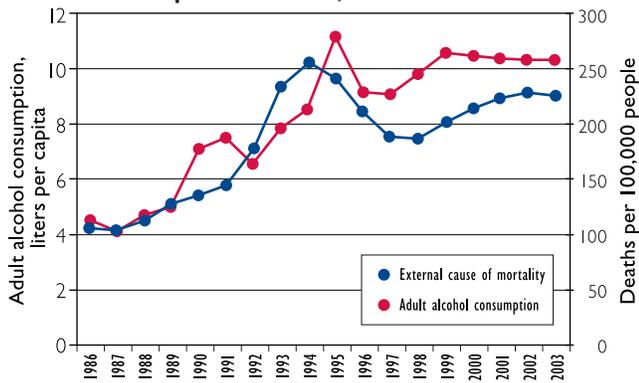
All of the Baltic countries have an AMR above the global average of 183/1,000. Lithuania is the only country in the Baltic subregion where adult mortality increased between 2000 and 2007, from 197/1,000 to 231/1,000. This increase may be attributable to a significant rise in male mortality in the country, mainly through cardiovascular disease – 51 more deaths per 1,000 in 2007 than in 2000.<sup>10</sup> While the female AMR also increased during this period, the increase in male mortality was more than four times that of women.

#### SOUTHEASTERN EUROPE

Southeastern Europe has the lowest AMR in the E&E region. Like the Northern Tier, Southeastern Europe (AMR of 129/1,000 in 2007) experienced continuous declines in AMRs from 1990 to 2007 and continues to approach the rates of its EU-27 neighbors (108/1,000). A notable exception is found in Bosnia and Herzegovina, which experienced an increase in the AMR between 2000 and 2003, though it

<sup>10</sup> Male mortality rates for 2000, unlike other years, were not extracted from the World Health Statistics Report (WHO, 2009) but from the WHOSIS 2009 database (WHOSIS Web site).

**FIGURE 7. External Causes of Mortality Due to Injury or Poisoning and Alcohol Consumption in Russia, 1986–2003**



Source: Total recorded adult (15+ years) per capita in liters taken from the WHO Global Information System on Alcohol and Health, January 2010; mortality data are from the European Health for All database, WHO/Europe, 2009.

has otherwise continuously declined since 1990. Although little current data are available for Kosovo, war-related mortality from 1998 to 1999 was a significant cause of adult mortality, especially among men (Spiegel & Salama, 2000).

#### NORTHERN TIER

Most countries in the Northern Tier of E&E experienced decreases in adult mortality between 1990 and 2007. In 2007, the average AMR for these five countries was 132/1,000, with Slovenia having the lowest rate (102/1,000) and Hungary the highest (174/1,000).

#### NONCOMMUNICABLE DISEASES AND INJURIES

Lifestyle factors associated with poor diet, alcohol consumption, and smoking are major risk factors for the onset of chronic cardiovascular and respiratory diseases, which explains some of the striking mortality trends in the region,

especially among adults (LSHTM, 2004; Treml, 1997; WHO, 2008). Alcohol consumption is a factor in 40 to 60 percent of all injury deaths in the E&E region, which has the world's highest per capita consumption of alcohol (USAID/Johns Hopkins, 2006). Figure 7 shows a very close relationship between alcohol consumption in Russia and external causes of death (e.g., injuries from automobile accidents and poisoning, primarily alcohol poisoning). In Russia, hazardous drinking by consuming non-beverage alcohols, such as manufactured ethanol-based liquids not intended to be drunk, are identified as potential contributors to mortality (Leon et al., 2007). The E&E region also has high rates of violence, such as suicide and homicide, compared with Western Europe and the Americas. The countries in Eurasia also have the highest overall unintentional injury mortality rates in the world. Within Europe, death rates due to injuries are 60 percent higher in Eastern Europe than in Western Europe, unintentional injuries being the main cause (Hyder & Aggarwal, 2009).

#### SUMMARY

Adult mortality is a concern in the E&E region, with high and even increasing male mortality rates in several countries. The RUMB subregion had the highest AMRs in 2007, with particularly high rates among men in Russia and Ukraine. NCDs are a major cause of death in the region, accounting for 93 percent of deaths among all ages in the region and 88.4 percent of deaths among 15- to 44-year-olds. High levels of alcohol consumption and smoking are key risk factors. A significant gender gap also exists. Cardiovascular diseases and unintentional injuries are of concern among women. Maternal mortality rates in the E&E region are considerably higher than in Western Europe. Recent data, however, show that the number of women in the E&E region dying from complications of childbirth and pregnancy has declined by more than half over the last 10 years.

# Under-5 Mortality

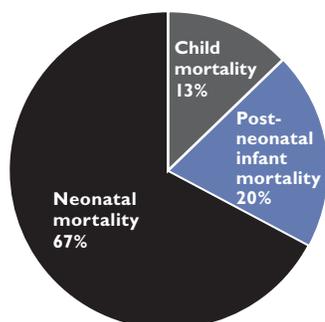
The under-5 mortality rate (U5MR) is a leading indicator of child health and overall development in a country because it is influenced by a wide variety of inputs such as maternal health, immunizations, family income, education, and nutrition (Merson, Black, & Mills, 2004). It is defined as the probability (expressed as a rate per 1,000 live births) of a child dying before reaching the age of 5 years. In 2004, almost 9.2 million children worldwide died before their fifth birthday. Although under-5 mortality is declining globally, the pace of progress has been uneven across developing regions, including Eurasia (UNICEF, 2009).

## E&E REGIONAL OVERVIEW

U5MRs are relatively low in most of the E&E countries compared with those in many developing countries, but the overall E&E regional average is still slightly more than three times higher than in the EU-27. According to UNICEF, Kosovo is estimated to have the highest U5MR in the region, with 69 deaths per 1,000 live births (69/1,000<sup>11</sup>) (UNICEF Kosovo Web site). In Eurasia, as in most countries with low under-5 mortality, the majority of deaths before age 5 occur during the neonatal and infant periods (WHOSIS, 2009).

Figure 8 shows that more than 85 percent of child deaths occur during infancy. Neonatal death is the predominant cause for infant mortality in the region. The exact propor-

**FIGURE 8: Percent Distribution of Child Deaths by Age Group, 2007**



Source: WHO, World Health Statistics Report, 2009

Note: Data for neonatal mortality are for 2004.

<sup>11</sup> In this chapter, U5MR is designated as XX/1,000 (XX deaths per 1,000 live births).

## Five Most Vulnerable Countries

1. TAJIKISTAN
2. TURKMENISTAN
3. UZBEKISTAN
4. AZERBAIJAN
5. KYRGYZSTAN

tion of neonatal and infant deaths, however, is not clear, as there may be a significant number of deaths that are uncounted in the former Soviet Union countries. As mentioned earlier, under-registration of births and deaths remains of concern in the CAR and Caucasus subregions as well as in some other countries, including Albania and Bosnia and Herzegovina. Outdated definitions for calculating infant mortality rates, as well as different techniques used by UNICEF and WHO to estimate child mortality trends, also produce slightly different estimates of mortality rates making data on under-5 mortality from this region sometimes difficult to interpret.

## SUBREGIONS

### RUSSIA, UKRAINE, MOLDOVA, AND BELARUS (RUMB)

The average U5MR in the RUMB subregion of 13/1,000 in 2007 was relatively low and comparable with that of countries in Southeastern Europe (12/1,000). Overall, the subregion has experienced a decrease in U5MRs since 1990. The most significant decline in U5MR between 1990 and 2007 was in Moldova, where U5MR declined from 37/1,000 to 18/1,000.

### CENTRAL ASIAN REPUBLICS (CAR)

The highest U5MRs in the E&E region, excluding Kosovo, are observed in the CAR. A majority of these deaths occur during the first year of life and, in many countries, during the first month. In 2007, the subregion's average U5MR of 46/1,000 was more than eight times higher than the EU-27 average of 5.6/1,000. However, there were significant declines in U5MR in all of the CAR countries from 1990 to 2007, with rates declining by half in most countries in the subregion. WHOSIS data show that a significant portion of this decline took place after 2004. The highest U5MRs in CAR in 2007 were in Tajikistan and Turkmenistan (67/1,000

and 50/1,000, respectively). All CAR countries except Tajikistan are on track to achieve the child health Millennium Development Goal (MDG) of reducing the U5MR by two-thirds between 1990 and 2015.

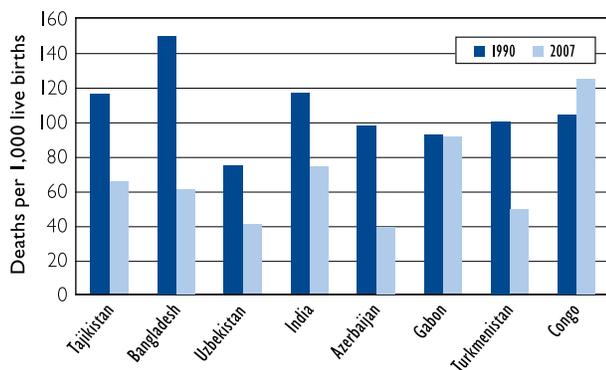
### CAUCASUS

The Caucasus subregion had the second highest U5MR in E&E, more than twice the RUMB average. Although its rate is lower than the rate observed in CAR, the subregion's average of 31/1,000 is five times higher than the EU-27 average. Yet much progress has been made, with U5MRs declining consistently between 2003 and 2007. Even in Azerbaijan, which has the subregion's highest rate, under-5 mortality dropped significantly from 2006 to 2007 (from 89/1,000 to 39/1,000) as shown in figure 9.<sup>12</sup> Additional insight on Azerbaijan's U5MR comes from the first Azerbaijan Demographic and Health Survey (State Statistical Committee, Azerbaijan & Macro International Inc., 2008). Conducted in 2006, the survey showed a rate of 50/1,000.

### BALTICS

The average U5MR in this subregion continues to decline. From 1990 to 2007, the Baltic's average U5MR dropped by nearly half, from 15.3/1,000 to 7.7/1,000. Latvia has the subregion's highest rate, although it is still low at 10/1,000.

**FIGURE 9: Under-5 Mortality Rates, Country Comparisons, 1990 and 2007**



Source: WHO, World Health Statistics Report, 2009

<sup>12</sup> Azerbaijan's official mortality figures differ from WHO figures because the country continues to use a Soviet-era definition of live births that is not compatible with the WHO definition (State Statistical Committee, Azerbaijan & Macro International Inc., 2008).

### SOUTHEASTERN EUROPE

Making an improvement in child health is one of the major challenges for Kosovo. Although reliable data are not easily available, UNICEF estimates indicate that it has the highest U5MR in the region (69/1,000), twice that of neighboring countries (UNICEF Kosovo Web site). The infant mortality rate is between 35/1,000 and 49/1,000 live births, the highest in Europe. The main causes of mortality include perinatal conditions, respiratory diseases, and diarrhea. The inefficiencies of the health system and other social, economic, and environmental factors are responsible for the poor health of children in the country. Although immunization coverage rates have improved to greater than 90 percent, the coverage remains low among minority groups such as the Roma, Ashkalia, and Egyptians. Almost one-fifth of children under 5 years are estimated to be chronically malnourished (stunted).

Other countries in the subregion have some of the lowest U5MRs in the E&E region, with significant declines since 1990. Croatia had the lowest U5MR in the Southeastern Europe subregion in 2007 – 6/1,000 – a rate comparable with that of the United Kingdom and other industrialized Western countries. Serbia follows closely behind with a rate of 8/1,000.

### NORTHERN TIER

Countries in the Northern Tier continue to have the lowest U5MRs in the E&E region. In 2007, the Czech Republic and Slovenia had the lowest rates of all E&E countries – 4/1,000 in each country. U5MRs in Hungary, Poland, and Slovakia are higher, but still only 7/1,000 to 8/1,000.

### SUMMARY

Declines in under-5 mortality are evident in RUMB. However, despite improvements in recent years, the average subregional U5MRs of the CAR and Caucasus in particular are considerably higher than the 2007 EU-27 average. Under-registration of births and deaths is an issue in the region that calls for the need for better data collection systems to determine the targeting of interventions.

# Tuberculosis

Tuberculosis continues to be a threat to public health. In 2008, with a global incidence rate of 13.9 new cases per 100,000 population, there were 9.4 million incident cases globally, of whom 3.6 million were women and 1.4 million were people living with HIV (WHO, 2009b). Most of the estimated number of cases in 2008 occurred in Asia (55 percent) and Africa (30 percent), with small proportions of cases in the Eastern Mediterranean region (7 percent), the European region (5 percent), and the Americas (3 percent). In 2007, there were 1.32 million TB-related deaths among HIV-negative individuals and an additional 456,000 TB-related deaths among HIV-positive individuals (WHO, 2009a).<sup>13</sup> Although over the years TB incidence rates have stabilized or have been very slowly falling, the number of active cases worldwide continues to rise, mainly because of population growth. Figure 10 presents the estimated TB incidence rates for 2008 across all countries, showing that sub-Saharan Africa and most of Asia continue to be heavily burdened by TB (WHO, 2009b).

<sup>13</sup> TB deaths in HIV-positive and HIV-negative people are presented separately because TB deaths in HIV-positive people are classified as HIV deaths in the International Statistical Classification of Diseases (ICD-10).

**Five Most Vulnerable Countries**

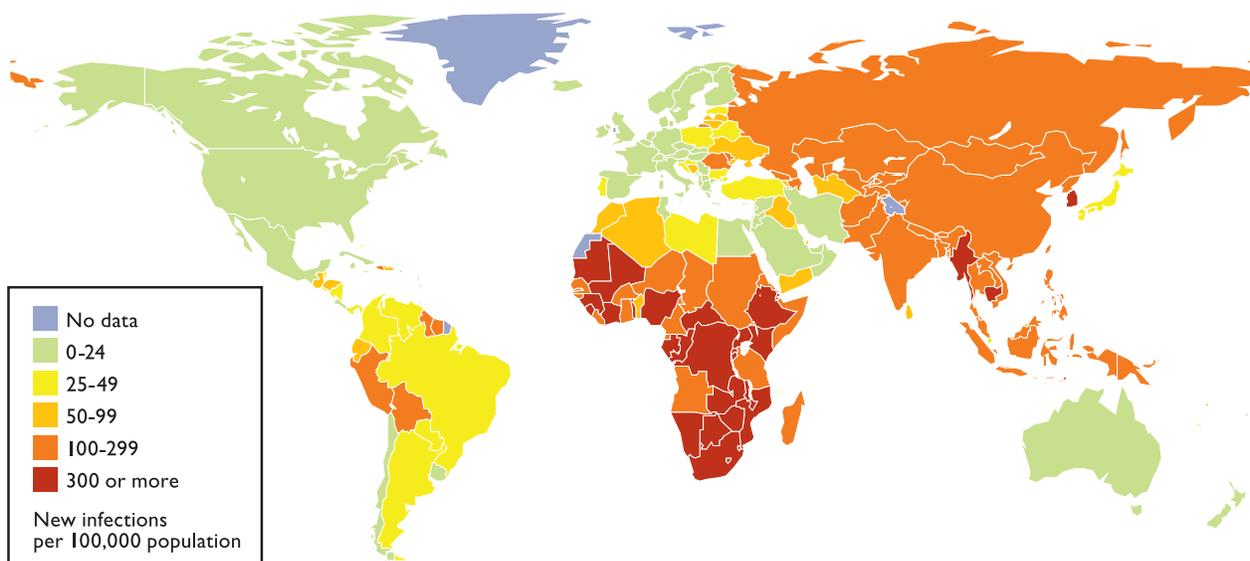
1. TAJIKISTAN
2. KAZAKHSTAN
3. MOLDOVA
4. KYRGYZSTAN
- 5.\* ROMANIA, UZBEKISTAN

\* Ranked equally for TB incidence

## E&E REGIONAL OVERVIEW

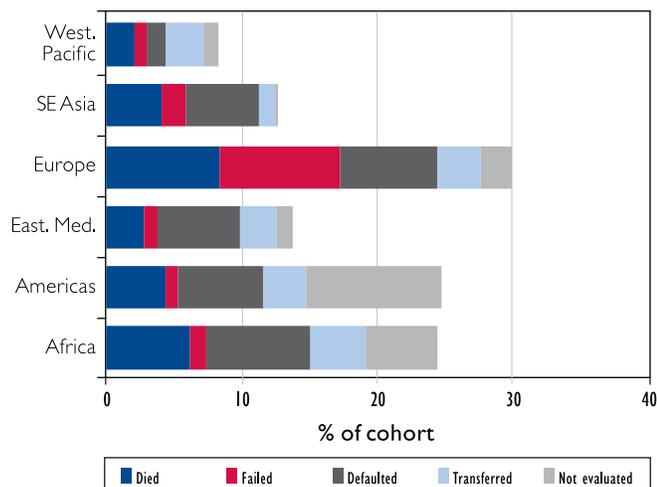
After the dissolution of the Soviet Union, the health care systems of its former states were left with overstuffed, overspecialized hospitals that did not provide adequate primary health care. Once they became independent, the former Soviet Union countries were unable to sustain the previous TB infrastructure, drug supply, and health systems. Impoverished health systems, weakened TB control activities, and reduced socioeconomic status of populations combined to facilitate the spread of TB and, more recently, multidrug-resistant TB (MDR-TB) (USAID, 2009; WHO, 2008c). As a consequence, TB rates began to increase at an alarming rate throughout the E&E region.

**FIGURE 10: Estimated TB Incidence Rates, 2008**



Source: WHO, Global Tuberculosis Control, 2009 Short Update

**FIGURE 11: WHO Regional Comparison of Outcomes for TB Patients Not Successfully Treated with DOTS, 2006**



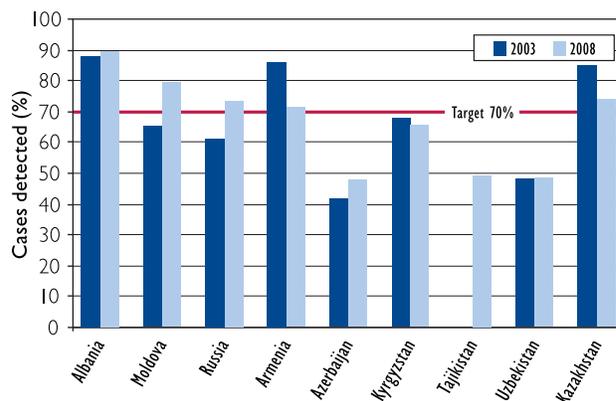
Source: WHO, Global Tuberculosis Control Report, 2009

TB incident cases in 2008 were more than three times higher in E&E than in EU-27 countries. The estimated TB incident rate in 2008 was 72 per 100,000 for the E&E countries, compared with 22 per 100,000 for the EU-27 countries (WHO, 2009b). The higher E&E rates are largely attributed to MDR-TB, highly infected prison populations, and growing TB-HIV co-infections.

Weak health care systems and the limited ability to identify, treat, and follow up on initial treatment have led to an increase in drug-resistant TB. Because of particularly poor results in Eastern Europe and Eurasia, WHO's European region has the worst treatment outcomes, with 8.4 percent of patients dying, 8.9 percent failing treatment, and only a 70 percent treatment success rate. Treatment failure rates across WHO regions are presented in figure 11. In many of the E&E countries, case detection rates (figure 12) and treatment success rates (figure 13) have not met global targets of 70 percent and 85 percent, respectively.

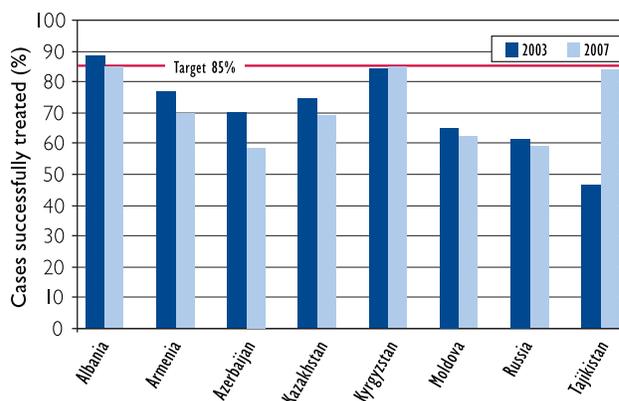
The incidence of HIV/AIDS in Eastern Europe and Central Asia has grown exponentially over the past 10 years, leading to increased rates of TB-HIV co-infection. In 1995, TB-HIV co-infection was reported in only 0.3 percent of new TB cases. Ten years later, that figure was reported to be 4.6 percent of all new cases (WHO, 2007). Recent estimates show that 5.6 percent of incident cases were HIV positive in 2008 in WHO's European region (WHO, 2009b).

**FIGURE 12: New Smear-Positive TB Detection Rate for Selected E&E Countries, 2003–2008**



Source: WHO, Global Tuberculosis Control, 2009 Short Update  
Note: Zero cases reported for Tajikistan in 2003.

**FIGURE 13: New Smear-Positive Treatment Success Rate for Selected E&E Countries, 2003–2007**



Source: WHO, Global Tuberculosis Control, 2009 Short Update

## MULTIDRUG-RESISTANT AND EXTENSIVELY DRUG-RESISTANT TB

MDR-TB is on the increase in the E&E region. MDR-TB cases made up 10 percent of new TB cases and 38 percent of previously treated cases in Eastern European and Central Asian countries (WHO, 2008c). MDR-TB is much worse in countries of the former Soviet Union. In Russia, for example, MDR-TB cases in prisons range from 12 to 55 percent of previously treated TB cases (WHO, 2008b). Research studies show that MDR-TB rates in prisons are even higher in Georgia (78 percent) and Azerbaijan (89 percent).

A 2002 questionnaire sent to 52 members of EuroTB, a TB surveillance network, found that prisoners had 84 times higher TB prevalence than civilians, with a median prevalence of 393 cases per 100,000 population (Aerts et al., 2006). The number of MDR-TB cases is also higher among the prison population (Bobrik et al., 2005). Prisons are overcrowded, and both the rates of injecting drug use and the prevalence of HIV/AIDS are high, particularly in Central Asia. In fact, AIDS and TB incidence and death rates are much higher among prisoners than in the civilian population, and these rates continue to increase at an alarming rate (Walcher, 2005). Moreover, inmates are often malnourished, which can reduce the success of TB treatment and increase the risk of active disease. Upon release from prison, former inmates with untreated TB contribute to the spread of disease within the general population.

Countries of the former Soviet Union account for almost half of all MDR-TB cases in the region, and every fifth TB case in these countries is resistant to TB drugs. In addition to the MDR-TB problem, extensively drug-resistant TB (XDR-TB) has been increasing at an alarming rate in the region. According to the fourth global report of the Global Project on Anti-Tuberculosis Drug Resistance Surveillance of WHO and the International Union Against Tobacco and Lung Disease, the E&E region has the highest proportions of XDR-TB in the world, with the majority of XDR-TB cases concentrated in the countries of the former Soviet Union (WHO, 2008c). Among the 27 priority MDR-TB and XDR-TB countries, which represent 85 percent of the global burden of MDR-TB, 15 are in the E&E region (Armenia, Azerbaijan, Belarus, Bulgaria, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Ukraine, and Uzbekistan (WHO, 2009b). In 2008, the overall incidence of XDR-TB in these 15 countries was 10 percent of all MDR-TB cases, with XDR-TB rates ranging from 4 percent of all MDR-TB in Armenia to almost 24 percent in Estonia (WHO, 2008c).

In Estonia and Latvia, the prevalence of MDR-TB among TB cases has declined considerably in recent years, although both countries are still considered MDR-TB “hot spots.” In 1999, the prevalence of MDR-TB cases per 100,000 population was 23 percent in Estonia and 13 percent in Latvia. Improvements have since been made in controlling TB and the spread of MDR-TB. With DOTS<sup>14</sup> initiated countrywide in Latvia in 1995 and in Estonia in 2000, the total number of MDR-TB cases detected per 100,000 population annually between

2002 and 2007 decreased by an average of 6 percent per year in Estonia and 14 percent in Latvia (WHO, 2009a).

It is critical that the challenges presented by MDR-TB and XDR-TB are addressed. MDR-TB and XDR-TB are, however, much more expensive and difficult to treat. They do not respond to the standard six-month treatment using first-line drugs. Treatment can take two years with drugs that are more toxic and a hundred times more expensive than standard treatment drugs (WHO, 2008e). Many patients stop treatment because they are unable to tolerate the drugs. In 2007, it was estimated that countries and technical agencies would need US\$2.15 billion worldwide in the next two years to address MDR-TB and XDR-TB (WHO, 2007a). In order to address the issue of high cost, the Stop TB Partnership's Green Light Committee was created in 2000 to increase access to second-line anti-TB drugs worldwide and ensure their proper use to prevent increased drug resistance.

## SUBREGIONS

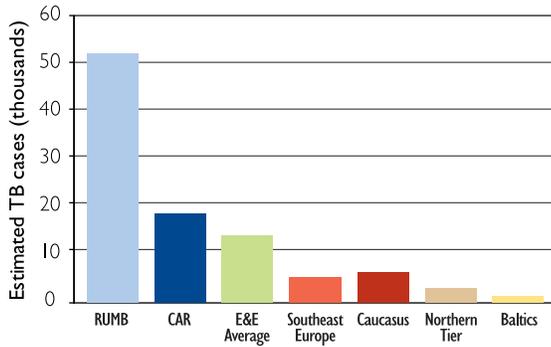
### RUSSIA, UKRAINE, MOLDOVA, AND BELARUS (RUMB)

Russia ranks 11th among the 22 countries with the highest TB burden in the world, the only European country on the list. It had an estimated 150,898 incident cases in 2008 and more than a third of the incident TB cases of the entire WHO region (WHO, 2009b). In 2007, Russia had an estimated 137,338 TB cases, 11.4 times the TB burden of the CAR, the subregion with the next highest number of TB cases. Figure 14 contrasts the number of new TB cases in RUMB with the number in the other E&E subregions. RUMB is also characterized by an increasing number of MDR-TB cases. All four countries are among the 27 high-priority MDR-TB countries. With 43,000 MDR-TB cases in 2007, Russia ranked third after India and China in the number of MDR-TB cases (WHO, 2009b).

Ukraine also has a significant TB problem that includes an increasing number of MDR-TB cases. WHO estimates that in 2007, Ukraine had the 11th highest number of MDR-TB cases globally (WHO, 2009a). Nineteen percent of all TB cases and 16 percent of new TB cases were MDR-TB. In both Ukraine and Russia, TB mortality, excluding HIV co-infection, is 15 deaths per 100,000 population (WHO,

<sup>14</sup> Directly Observed Treatment, Short Course. It is an internationally recommended strategy used to reduce the number of TB cases. Under DOTS, health care workers observe patients as they take their medicine.

**FIGURE 14: Average New TB Cases, All Forms (Subregional), 2008**



Source: WHO, Global Tuberculosis Control, 2009 Short Update

2009b). To exacerbate matters, Ukraine also has one of the fastest-growing HIV/AIDS epidemics in the world. HIV prevalence in incident TB cases is high – 20 percent in Ukraine and 16 percent in Russia in 2007 (WHO, 2009a).

In Moldova, TB is an increasing public health threat. The country had an estimated new TB incidence rate of 170 per 100,000 people in 2008, which is much higher than the incidence rates of Western European countries and one of the highest among the countries of the former Soviet Union (WHO, 2009b). The estimated HIV prevalence in incident TB cases is low, however, at 3.7 percent (WHO, 2009a).

#### CENTRAL ASIAN REPUBLICS (CAR)

The CAR subregion had the highest overall estimated TB incidence rate in the E&E region (147.6 per 100,000), a rate nearly double the E&E mean and seven times higher than the EU-27 mean. Moreover, Tajikistan has the highest TB incidence rate in WHO's European region, with Kazakhstan close behind. All CAR countries except for Turkmenistan are on WHO's list of the 27 priority MDR-TB countries. In Kazakhstan, more than 14.2 percent of newly diagnosed TB cases and more than 24.8 percent of all TB cases are MDR-TB (WHO, 2008c).<sup>15</sup>

CAR also had the second highest number of HIV-positive cases among new TB cases in the E&E region, behind RUMB. In this subregion, HIV prevalence in new TB cases was highest in Tajikistan (4 percent) (WHO, 2009a).

<sup>15</sup> CAR countries rank 10 (Kazakhstan), 12 (Uzbekistan), 16 (Tajikistan), and 20 (Kyrgyzstan) on a list of the 27 priority countries for MDR-TB in WHO's 2009 global TB control report (WHO, 2009a).

#### CAUCASUS

The estimated TB incidence rates are high in the Caucasus, especially in Azerbaijan and Georgia. MDR-TB is a serious issue in these countries. In 2007, approximately 22 percent of all newly diagnosed TB cases in Azerbaijan, and 56 percent of all previously treated TB cases, were reported as having MDR-TB. These are the highest rates reported in the world (WHO, 2008c). Azerbaijan, Georgia, and Armenia are all among WHO's 27 priority MDR-TB countries, ranked 18, 22, and 23, respectively (WHO, 2009a). Although a national problem in all three countries, MDR-TB is of particular concern in the prison systems in Azerbaijan and Georgia.

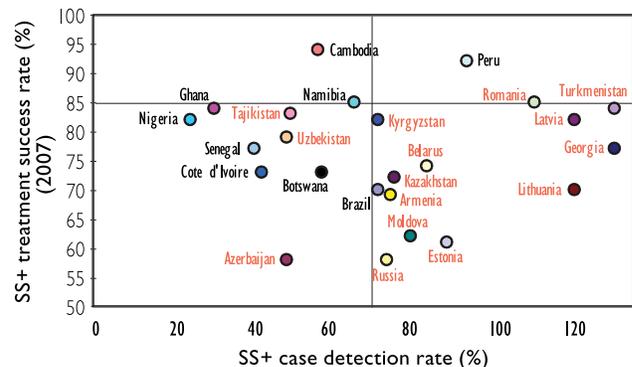
#### BALTICS

The Baltics have been targeted by WHO as priority MDR-TB countries, with Lithuania, Latvia, and Estonia ranked at the 24, 26, and 27 positions, respectively. Estonia has the fourth highest proportion of MDR cases among TB cases (20.3 percent) (WHO, 2008c). All three countries have case detection rates higher than the WHO global case detection target of 70 percent, but their treatment success rates are below the WHO target of 85 percent (figure 15).

#### SOUTHEASTERN EUROPE

In 2007, Romania was the fourth most vulnerable country in the E&E region and had the highest estimated TB incidence in Southeastern Europe. Although the incidence rate has been declining steadily since 2001, TB remains a serious public health threat in the country. The current incidence rate is estimated at 130 per 100,000 population (WHO, 2009b). Kosovo has been a success story in meeting WHO case

**FIGURE 15: Progress toward WHO Detection and Treatment (70/85) Targets, Country Comparisons, 2008**



Source: WHO, Global Tuberculosis Control, 2009 Short Update

detection and treatment success targets through the efforts of the National Tuberculosis Program and the implementation of DOTS throughout the country (Tigani et al., 2008).

#### **NORTHERN TIER**

TB incidence in all the Northern Tier countries has declined every year since 2001. Today, Poland has the highest estimated incidence rate at 25 cases per 100,000 population, amounting to 9,300 cases (WHO, 2009b).

#### **SUMMARY**

TB incidence rates are considerably higher in the E&E region than in the EU. The growth of MDR-TB and XDR-TB is also a clear threat in the E&E region. Among the 27 priority MDR-TB and XDR-TB countries, which represent 85 percent of the global burden of MDR-TB, 15 are in the E&E region. The high cost and difficulty in treating these resistant strains are a challenge to the region. With high rates of incarceration, high-risk groups such as prison populations are disproportionately affected by TB. TB-HIV co-infections are also increasing rapidly.



DOTS supervision in Georgia.

USAID/Georgia

Globally, 33.4 million people are infected with HIV, with an estimated 2.7 million new infections having occurred in 2008 (UNAIDS, 2009a). In the E&E region, the high efficiency of HIV transmission through injecting drug use (IDU), drug-related sexual behaviors, and the highest prevalence of heroin use in the world have been the main factors behind the rise of HIV. One-third of the world's opiate and heroin users live in Europe, and the majority of them reside in Central and Eastern Europe (WHO, 2006). A large number of the opiate and heroin users in all countries of the region are injecting drug users (IDUs), many of whom are infected by HIV and are at risk of spreading HIV.

## E&E REGIONAL OVERVIEW

HIV incidence is on the increase in Eastern Europe and Central Asia. About 110,000 new infections were estimated to have been reported in 2008, raising the number of people living with HIV to 1.5 million, a 66 percent increase from 2001 (UNAIDS, 2009a). Figure 16 shows the number of new cases of HIV infection in the E&E region over the years. In 2006, 27 percent of newly diagnosed HIV infections in this region were in people aged 15 to 24 years, and 41 percent were female (EuroHIV, 2007).<sup>16</sup>

IDU is the primary mode of transmission. In the Eastern European countries of WHO's European region that had information available on mode of transmission, 62 percent of newly diagnosed HIV cases in 2006 were reported among IDUs (EuroHIV, 2007a) (figure 17).<sup>17</sup> Recent estimates show that 3.7 million people in the entire region currently inject drugs, about a quarter of whom are HIV infected (Mathers et al., 2008). The risk of HIV transmission increases when IDUs share contaminated drug equipment (van de Laar et al., 2008) or put their sexual partners at higher risk of infection, especially if they do not use contraception (Des Jarlais et al., 2009). This is especially relevant as IDUs also often engage in sex work with non-injecting partners. As a result, many countries in the region are slowly experiencing a transition from an epidemic that was heavily concentrated among IDUs to one based on sexual transmission (Des

<sup>16</sup> It is possible that some of these new infections were not reported until infected individuals fell sick.

<sup>17</sup> Data are for cases for whom the transmission route was known.

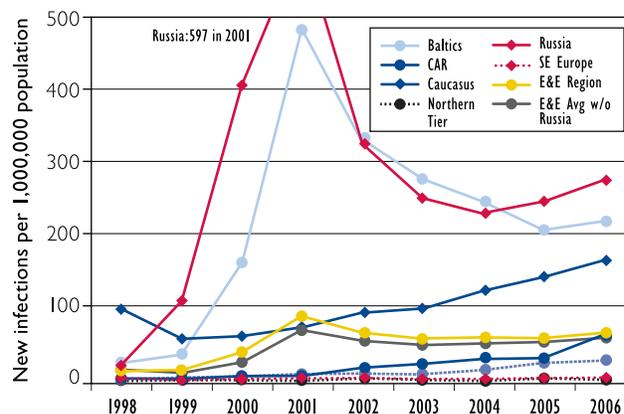
### Five Most Vulnerable Countries

1. ESTONIA
2. UKRAINE
3. RUSSIA
4. MOLDOVA
5. LATVIA

Jarlais et al., 2009). In 2006, 37 percent of reported HIV cases were estimated to occur via unprotected sexual intercourse, primarily among the sexual partners of HIV-infected IDUs (EuroHIV, 2007a). It is also suspected that HIV transmission as a result of unsafe injections in health care settings is also on the increase in the region (UNAIDS, 2009a).

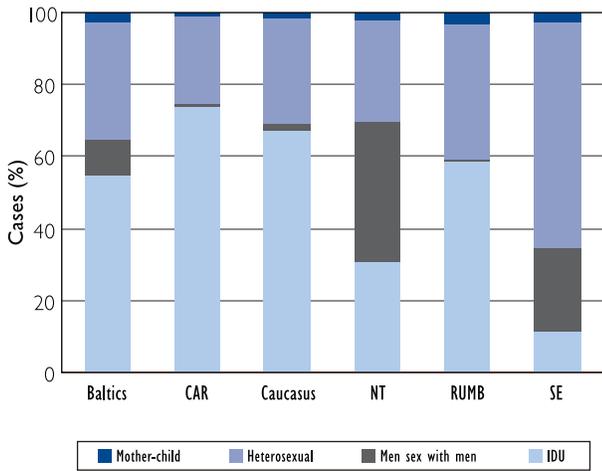
Official numbers show the small role of men who have sex with men (MSM) in HIV transmission. However, health experts and activists suspect that the official figures of MSM and the number of HIV cases among MSM in E&E grossly underestimate the numbers of MSM living in the region (UNAIDS, 2009). Various organizations, such as the Joint United Nations Program on HIV/AIDS (UNAIDS), WHO, and the International HIV/AIDS Alliance, estimated that in 2006 there were between 177,000 and 430,000 MSM in

**FIGURE 16: HIV Incidence Rates by Subregion, 1998–2006**



Source: EuroHIV, End-Year Report 2006

**FIGURE 17: Reported HIV Transmission Pathways in the E&E Region (Subregional), 2005**



Source: EuroHIV, End-Year Report 2006

Ukraine, between 3 and 15 percent of whom are currently living with HIV. These percentages of HIV infection among MSM are several hundred times higher than the figures cited by official studies.

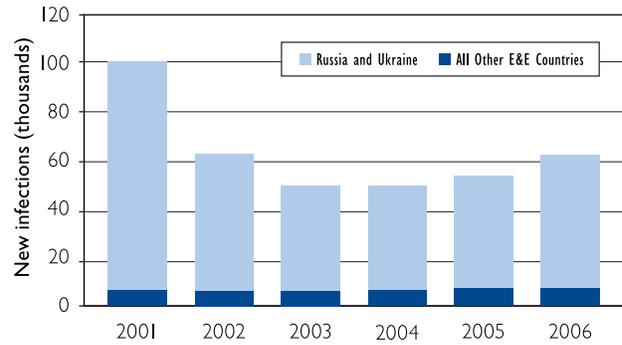
Overall, treatment coverage with antiretroviral drugs (ARVs) remains inadequate in E&E. Progress in ARV delivery is still being made in the region. The region's IDU population is highly marginalized and often lacks access to effective prevention and treatment services. Although a number of countries now have greater access to coverage, only 22 percent of adults in need of ARVs receive them, compared with the global 42 percent average for low- and middle-income countries (UNAIDS, 2009a). Overall, 85,000 people received ARV by the end of 2008, an increase from 54,000 people by the end of 2007 (UNAIDS, 2009b). However, IDUs in particular appear to be the least likely group to receive ARV therapy when they are medically eligible (International Harm Reduction Development Program, 2008). A lack of access to ARVs among IDUs may partly result from laws, regulations, or policies that present obstacles to HIV treatment. These obstacles exist in 16 of the countries in the region for which data are available through country reports to the United Nations General Assembly Special Session (UNGASS) (UNAIDS, 2008).

## SUBREGIONS

### RUSSIA, UKRAINE, MOLDOVA, AND BELARUS (RUMB)

Russia and Ukraine together account for approximately 86 percent of all people newly reported to be living with HIV in the E&E region (figure 18). Both countries are experiencing

**FIGURE 18: Reported New HIV Infections in the E&E Region, 2001–2005**



Source: EuroHIV, End-Year Report 2006

rapidly growing national epidemics where IDUs form a key group of infected persons. The number of new HIV cases in Russia alone rose rapidly in the late 1990s, peaked in 2001, and then declined sharply, with a slow increase following after 2004 (see figure 16). Today, 37 percent of Russia's 1.8 million IDUs are estimated to be HIV positive (Mathers et al., 2008).

Ukraine's HIV epidemic is rapidly increasing. Annual HIV diagnoses have more than doubled since 2000, bringing adult prevalence to 1.6 percent (UNAIDS, 2008). IDUs form a significant group of infected persons, with 38.5 to 50 percent of IDUs in Ukraine believed to be HIV positive (Kruglov et al., 2008). Overall, 300,000 to 400,000 people 15 years and older live with HIV in Ukraine (UNAIDS, 2009a). Although new sexually transmitted HIV infections are on the rise, increasing from 22.7 percent of all reported cases in 1999 to 42.6 percent in 2006, IDU remains the major risk factor (54 percent of new cases) (EuroHIV, 2007).

As mentioned earlier, there is much overlap between IDU and sex work, and HIV is increasingly being transmitted through non-injecting sexual partners of IDUs. In Ukraine alone, as many as 552,500 IDUs have reported sexual partners, thus increasing the potential for HIV transmission (Kruglov et al., 2008). A recent study in Russia also shows that the odds of acquiring HIV increased by 3.6 times if a person had sex with an IDU (Burchell et al., 2008). Transmission through sex work is also key. In Ukraine, reported HIV prevalence among sex workers ranges from 13.6 to 31.0 percent (Kruglov et al., 2008). Seroprevalence surveys also show evidence of HIV prevalence among MSM in Russia and Ukraine (Kruglov et al., 2008; van Griensven et al., 2009).

HIV interventions are now being scaled up in Ukraine. In 2008, 95,000 of the estimated 230,000 to 360,000 IDUs in Ukraine were reached by various HIV prevention activities such as needle and syringe programs, voluntary HIV testing and counseling, testing and treatment of sexually transmitted infections, and counseling and referral (UNAIDS, 2009b).

The rate of newly diagnosed HIV infections in Moldova, though not as high as in Russia and Ukraine, stood at 148 per 1 million population in 2006. Unlike Russia, where there has been a decline since the peak in 2001, Moldova's rate has increased almost fourfold since 2001 (EuroHIV, 2007). Belarus had 733 new cases in 2006, or 75.6 per 1 million population (EuroHIV, 2007). This rate has remained steady since 2003. In all four countries in the region, smaller subnational studies in cities show even higher rates of HIV prevalence.

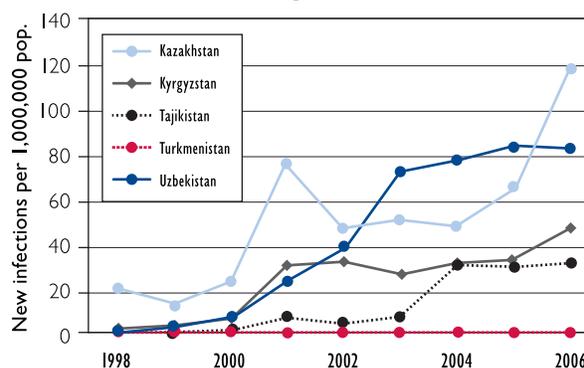
### CENTRAL ASIAN REPUBLICS (CAR)

HIV/AIDS is a relatively new phenomenon in the CAR, where it remains a concentrated epidemic in the most-at-risk populations. Discounting Turkmenistan (which reported zero cases over the given time period), all CAR countries experienced increasing rates of newly diagnosed HIV cases from 2000 to 2006, as seen in figure 19. Kazakhstan and Uzbekistan bear the largest HIV burden in the CAR subregion (117.8 and 81.7 new cases per 1 million population, respectively), constituting 72 percent of the subregion's HIV cases. The high rates of HIV infection in Kazakhstan, accompanied by low levels of health financing and proximity to Afghanistan and heroin and opium drug trafficking routes, make the distribution of opiates and their abuse that much easier.

### CAUCASUS

From 2005 to 2006, Georgia experienced the largest increase (15 percent) in the rate of newly diagnosed HIV infections (54.1 to 62.2 per 1 million population) in the subregion. This increased rate was part of a three-year increase from 21.9 new infections per 1 million population in 2003, a nearly threefold rise due mainly to infections among IDUs. Recent studies also show evidence of HIV prevalence among MSM in Georgia (Baral et al., 2007). Azerbaijan was not far behind with a 16.2 percent increase in the rate of newly diagnosed HIV infections between 2005 and 2006 (EuroHIV, 2007). Data from Armenia, however, showed some signs of progress, with a 12 percent decrease in newly diagnosed HIV infections (24.9 to 21.9 per 1 million population) between 2005 and 2006 (figure 20).

**FIGURE 19: HIV Incidence Rates in the CAR Subregion, 1998–2006**



Source: EuroHIV, End-Year Report 2006

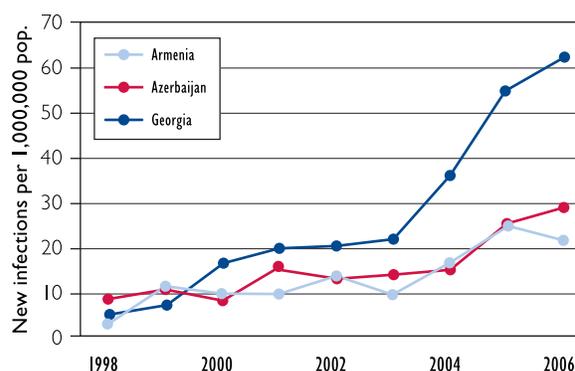
### BALTICS

In the Baltics, the rate of new HIV diagnoses steadily declined from 2003 to 2006 (172.9 to 130.3 per 1 million population in Latvia, 31.8 to 29.3 per 1 million in Lithuania, and 626.3 to 504.2 per 1 million in Estonia). Nevertheless, the HIV incidence rate in Estonia remains the highest in WHO's European region, and the country's estimated adult prevalence in 2007 of 1.3 percent was the second highest in the E&E region (UNAIDS, 2008). In recent years, HIV infections among IDUs in Estonia have also increased (Mathers et al., 2008). One-third of Latvia's HIV-positive population is believed to be prisoners (UNODC/WHO/UNAIDS, 2008).

### SOUTHEASTERN EUROPE AND NORTHERN TIER

The epidemics in Southeastern Europe and the Northern Tier countries remain small in comparison with the rest of Eastern Europe and Central Asia. Only two of the 12 coun-

**FIGURE 20: HIV Incidence Rates in the Caucasus Subregion, 1998–2006**



Source: EuroHIV, End-Year Report 2006



An AIDS campaign in Ukraine brings HIV/AIDS education to young people.

USAID/Ukraine

tries in these subregions reported more than 100 new HIV diagnoses in 2006: Poland (750) and Romania (180). Poland and Bulgaria are the only countries in Central Europe with an HIV epidemic fueled by IDU. In recent years, the HIV incidence rate in Bulgaria has almost tripled due to IDU. There were 13 newly diagnosed HIV cases in 2005 and 34 in 2006.

According to the UNGASS country progress report, there are 43 known cases of persons with HIV in Kosovo, the majority of whom are males aged 30 to 39 years; however, the actual number is thought to be much higher (Kosovo AIDS Committee, 2008). Based on the limited data available on HIV in Kosovo, the country is categorized as having a low HIV epidemic. The country's focus is on special groups such as youth and high-risk groups such as MSM and sex workers.

## NOSOCOMIAL HIV INFECTION

Few cases of HIV transmitted through blood transfusion have been reported in East European countries. In the CAR countries of Kazakhstan and Kyrgyzstan, however, HIV outbreaks have been linked to blood transfusions. In 2007, 17 health workers in Kazakhstan were convicted of criminal negligence for the outbreak that began in the summer of 2006 and infected 143 children (Henry J. Kaiser Family Foundation, 2007). In Kyrgyzstan, nine doctors were convicted in July 2008 of negligence that led to HIV infections in at least 24 children and one adult, according to Reuters (August 2008). In 2006, the prevalence of HIV in blood donations ranged from 0 (i.e., no HIV-positive blood donations detected) in six countries to 49 per 100,000 donations in Moldova and 127.1 per 100,000 donations in Ukraine. In Eastern Europe, the prevalence of HIV in blood donations has increased dramatically, from fewer than 1 per 100,000 donations in 1995 (with 10 countries reporting) to 37.6 per 100,000 blood donations in 2006 (with 11 countries reporting) (EuroHIV, 2007a).

## SUMMARY

HIV incidence is increasing in the E&E region, and IDU remains the primary means of transmission. Even though sexual transmission of HIV has increased, it is often related to unprotected sex in IDU populations. Estonia, Russia, and Ukraine lead in the number of newly diagnosed HIV infections among E&E countries. In other countries, the tremendous growth of HIV due to IDU in Georgia and the CAR, especially Kazakhstan, is of concern.

# Health Expenditures

Health system financing is a key determinant of population health and successful social and economic transition. Research suggests that public expenditure on health is strongly correlated with better health outcomes (Suhrcke, McKee, & Rocco, 2007). Yet in many developing countries, the level of government spending on health is still insufficient to ensure equitable access to essential health services. In the E&E region, out-of-pocket payment is often the main means by which households pay for health care, and thus the level and quality of care is greatly limited by their immediate financial resources (USAID, 2008). It is possible that some countries with low public expenditures will have good health outcomes. However, this requires sound policy choices and investments in appropriate health services targeted toward the right population (WHO, 2008d).

Overall, investments in the health system have been low in E&E countries, with spending in several countries comparable with that of developing countries such as Afghanistan, Bangladesh, Chad, and Cameroon. High levels of poverty, especially in households with children, and the combination of low public spending with high out-of-pocket costs make populations within the region highly vulnerable to poor health outcomes.

The administration of health care in E&E further exacerbates the limited resources for health. The 2008 *World Health Report* (WHO, 2008d) identifies five common shortcomings in health care delivery, all of which are applicable to the E&E region:

- **Inverse care**, where people with the most means and often the fewest needs consume a majority of the care available, with public health spending therefore benefiting the rich more than the poor
- **Impoverished care**, where payment for health care is primarily through out-of-pocket expenses, resulting in catastrophic health care expenditures for individual persons and families and an increase in their poverty
- **Fragmented and fragmenting care**, where health care is highly specialized rather than holistic, making it

## Five Most Vulnerable Countries

1. AZERBAIJAN
2. TAJIKISTAN
3. GEORGIA
4. ARMENIA
5. KAZAKHSTAN

disproportionately difficult for poor and marginalized groups to access appropriate services

- **Unsafe care**, which includes poor system design and poor hospital hygiene, resulting in increased infections in hospitals
- **Misdirected care**, where the allocation of health resources is focused more on curative services than preventive care

This chapter focuses on three key indicators often used to assess different facets of health system financing:

- **Government health expenditure (percentage of GDP)**, which measures a government's commitment to health by the percentage of national GDP dedicated to the health system
- **Per capita government expenditure on health**, which measures a government's capacity for effective health financing by the amount of federal spending on health per person
- **Out-of-pocket expenditure**, which measures the total burden of health costs on the individual

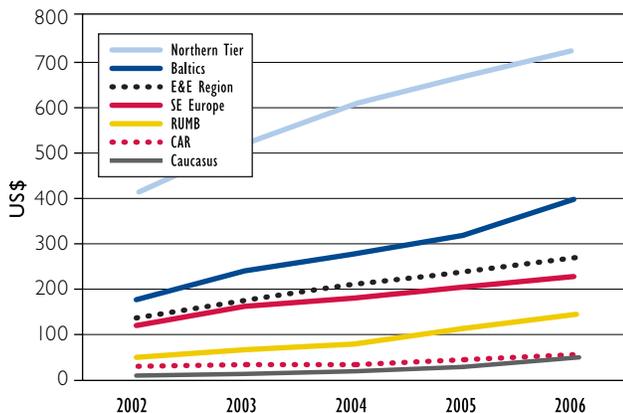
## E&E REGIONAL OVERVIEW

The post-Communist transition and the consequent move from free health care under the Soviet system to inadequate national health care financing has affected the health sectors of countries in the E&E region. E&E countries differ significantly in the amount they can afford to invest in

health care, with richer countries in general spending more both on public health as a percentage of GDP and per capita (Shakarishvili, 2006). In 2006, the EU countries contributed 6.1 percent of GDP to health, whereas the E&E region contributed 4 percent of a much smaller GDP. Although that gap may not appear large, the disparity between health spending and disease burden in the EU and in E&E is sizeable, and inequities in health care costs and quality are pronounced (Shakarishvili, 2006). Although each E&E country has engaged to a varying degree in health care finance reform, challenges remain, especially for the Caucasus and CAR countries.

On average, per capita government expenditure on health in the E&E countries was US\$264 in 2006. This is far below the EU-27 average for that year, when per capita expenditure was estimated at US\$1,824. The E&E per capita spending is heavily influenced by the five countries in the Northern Tier. Between 2002 and 2006, the Northern Tier was substantially and consistently ahead of other E&E subregions in terms of government per capita health expenditure. As a result, the average per capita government health expenditure for the E&E region as a whole appears higher than the expenditures for four of the six subregions would suggest (figure 21).

**FIGURE 21: Per Capita Government Expenditure on Health (Subregional), 2002–2006**



Source: World Bank, World Development Indicators, 2009

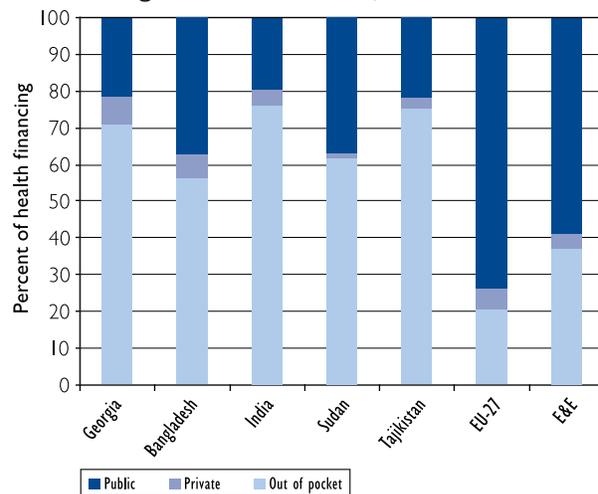
In the majority of E&E countries, citizens pay a high share of total health expenditures privately through both formal and “informal” out-of-pocket payments. In 21 of the 28 countries, individuals pay 25 percent or more of health care costs out of pocket, and in six of the 28, they pay more than 50 percent – comparable with some less-developed

countries, including Bangladesh, India, and Sudan, as seen in figure 22. In comparison, individuals in the EU-27 paid on average 20.8 percent of health care expenditures out of pocket in 2006.

Research shows that there is a positive correlation between the proportion of households facing catastrophic health expenditures and the share of out-of-pocket payments in the total health care system (Xu et al., 2003). Furthermore, 100 million people around the world are pushed into poverty each year because of catastrophic health care expenditures (WHO, 2008d). The inadequate levels of public health expenditure and the increased pressure on households to cover these expenses through out-of-pocket payments have reduced the economic status of households in E&E countries. Catastrophic expenditures, where out-of-pocket expenses reach more than 40 percent of a household’s capacity to pay, lead many families and individuals into continued poverty (WHO, 2007b). Thus, many people are deterred from utilizing the health care system.

In the E&E region, government failure to provide health services effectively has been linked to corruption (Lewis, 2000; Vian, 2002). Corruption is responsible for the poor quality of health care systems in many countries of the E&E region. It can either take the form of 1) physician acceptance of informal payments that households make in cash or in kind outside official channels for services covered by the public health care system or 2) misallocation of government funds through improper disbursement of committed budgetary

**FIGURE 22: Primary Sources of Health Financing in High-Burden Countries, 2006**



Source: WHOSIS, 2009

allocations. The poor growth of health systems in turn has negative consequences for the improvement of overall health in many E&E countries (Radin, 2009). The health sector is particularly vulnerable to corruption for several reasons, including the diversity of commodities and expenses and the inelastic demand for services.

## SUBREGIONS

### RUSSIA, UKRAINE, MOLDOVA, AND BELARUS (RUMB)

In 2006, the RUMB governments spent an average of 4.1 percent of their GDP on health. Although the percentage of GDP that the RUMB countries allocate to health does not appear high, it has been steadily increasing since 2002. Between 2002 and 2006, the RUMB subregion experienced the second largest increase (175 percent) in per capita public spending on health after the Caucasus. Despite its increasing investments in health, mortality in this subregion, especially among adults, continues to remain high due to the unhealthy lifestyle choices of many adults. In Russia and the other former Soviet states, it will take more time for the weak health care systems to respond to these public health problems and improve life expectancy in the long term. Moreover, investments in health may not necessarily go to the programs needed most to reduce adult mortality. Donors can potentially play an important role in ensuring that government programs address the diseases and behaviors with the greatest impact on the disease burden.

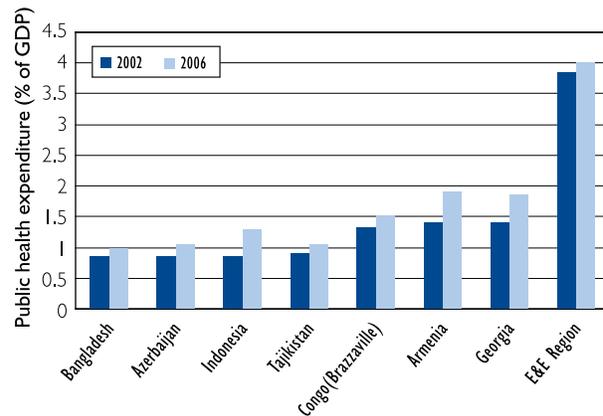
Large variations in out-of-pocket payments were seen in this subregion. In 2006, the people of Belarus were responsible for 17.3 percent of their health care costs, less than the EU-27 average of 20.8 percent. Moldovans and Ukrainians, on the other hand, pay more than 40 percent of their health care costs out of pocket.

### CENTRAL ASIAN REPUBLICS (CAR)

CAR spent an average of 2.2 percent of its GDP on health expenditures, with Tajikistan demonstrating the lowest fiscal support for health – 1.1 percent of GDP in 2006, which ranked 14th lowest out of 189 countries worldwide reporting to WHO.

Annual per capita government health expenditure in the subregion averaged US\$53 in 2006, which is 2.9 percent of the EU-27 average, with three CAR countries spending US\$35 or less per person – Kyrgyzstan and Uzbekistan each spending US\$15, comparable with Benin and Malawi) and Tajikistan spending US\$5, comparable with Niger and

**FIGURE 23: Low Public Health Expenditures, Country Comparisons, 2002–2006**



Source: World Bank, World Development Indicators, 2009

Togo). With minimal government assistance, people in CAR countries on average cover almost half of their health care costs out of pocket. In Tajikistan, the population is responsible for 75 percent of health care costs, the highest out-of-pocket payment in the E&E region (figure 23).

Low levels of health spending are associated with large inequities in health care in CAR countries. Though Tajikistan has increased its health spending and the country's child mortality rate has fallen, great disparities still exist in health care. Health spending as percentage of GDP in Tajikistan remains one of the lowest in the world. Moreover, poverty, chronic illness, and disability are important determinants of health care utilization (Fan & Habibov, 2009). High out-of-pocket costs deter many impoverished people from seeking medical care in the first place. Government funding for health care makes up only 18 percent of total health care expenditures, while households contribute as much as 72 percent of total health care funding, including expenditures for drugs.

USAID and other donors have been playing and should continue to play critical roles in supporting government initiatives toward health sector reform to increase health care financing. The USAID-funded ZdravPlus project in Kyrgyzstan has developed a system in which an oblast-level health department functions as a purchaser, paying hospitals variable costs based on 23 diagnostic-related groups. Improved health information systems were also developed. The Kyrgyz Government began engaging in health sector reform in 1996, and 83 percent of the population was covered by mandatory health insurance by 2001. Other health



USAID's Medical Outreach Team project in Armenia reached 123 remote and vulnerable communities with essential primary care services.

USAID/Armenia

financing and service delivery reforms were also introduced in 2001 (Jakab & Manjjeva, 2008).

### CAUCASUS

The Caucasus is the poorest-performing subregion in health financing. The level of public health expenditures observed in this subregion raises serious doubts as to whether a basic health system can be maintained (Suhrcke, Rocco, & McKee, 2007).

Countries in the Caucasus subregion have the lowest level of public spending for health in the E&E region, ranging between 1 and 2 percent of GDP. Spending in Azerbaijan was 1.1 percent of GDP in 2006 (11th lowest of the 189 WHO-reporting countries), 1.9 percent in Armenia, and 1.8 percent in Georgia (figure 23). These countries are similarly among the poorest performers in annual per capita government health expenditure, spending an average of US\$33 per person and leaving the majority of health care costs to the household: 72.1 percent in Georgia, 51.5 percent in Armenia, and 57.7 percent in Azerbaijan. Individuals in these countries are paying between half and three-quarters of their total health care costs.

A recent study in Georgia revealed that due to such high out-of-pocket expenses, 40 percent of the population did not seek medical attention for chronic or acute conditions. Moreover, 11.7 percent of the population faced catastrophic health care expenditures. This percentage was even higher (17.7 percent) among the poorest groups (Gotsadze,

Zoidze, & Rukhadze, 2009). Another study concerning catastrophic health expenditures in Georgia found that 19 percent of households seeking health care had to borrow money or sell personal items to finance their care, and 16 percent could not afford to pay for medications prescribed (Skarbinski et al., 2002).

### BALTICS

On average, the governments of the Baltics spent 4 percent of GDP on health care in 2006; that percent decreased slightly after 2002 due largely to a reduction in spending by Lithuania (4.8 percent of GDP in 2002 to 4.3 percent in 2006). Estonia maintained expenditure levels around 3.8 percent, while Latvia increased from 3.2 to 3.9 percent. This subregion has seen a steady increase since 2002 in per capita health expenditure. In 2006, it had the second highest percent of per capita health expenditure – US\$393 – in the E&E region.

While out-of-pocket payment rates in Estonia were comparable with those of the EU-27 (20.8 percent), household out-of-pocket payments were considerably higher in Latvia (35.8 percent) and Lithuania (29.5 percent).

### SOUTHEASTERN EUROPE AND NORTHERN TIER

Southeastern Europe and the Northern Tier spend the largest portion of GDP on health: 5 percent and 5.5 percent, respectively. The countries with the highest public health expenditure as a percentage of GDP in 2006 were Croatia (7.1 percent), Czech Republic (6.1 percent), and Slovenia and Montenegro (6.0 percent). These percentages were higher than or near the 2006 EU-27 average of 6.3 percent.

Overall, the level of government spending, as well as the relative strength of Southeastern Europe and Northern Tier economies (as represented by GDP), has been responsible for larger per capita contributions to health and lower out-of-pocket payments for the countries in these subregions, although there are some variations.

### HEALTH SYSTEMS' ROLE IN IMPROVING POPULATION HEALTH

The role of local dietary habits, geography, and social determinants of health on mortality and health status is well established in the literature. However, as the trends in health status and patterns in life expectancy and morbidity highlighted in the earlier sections on key indicators suggest, health systems – and health-related activities and services –

can play a major role in improving the health status of populations across the E&E region.

The extent of this contribution, however, is less well accepted. The challenge is therefore whether and how to attribute indicators of population health or specific outcomes to health service interventions. Although recent research suggests that health systems have had uneven success in improving health, it also makes clear that they have the potential to provide considerable gains.

Health systems can play an important role in improving overall population health through six avenues identified by WHO as the six “building blocks” of health systems (WHO, 2007c). While public health expenditure examines the commitment of the government to improve health, it is but one component of the health system. There is a need to better understand the role of the other health system building blocks and to examine their impact on population health in conjunction with other determinants of health.

The six components of the health system include:

- **Service delivery:** Delivering effective and safe personal and nonpersonal health care interventions with minimal wastage of resources
- **Health system financing:** Collecting, pooling, and allocating funds to providers in a manner that promotes equity and transparency, protects the population from out-of-pocket costs of using health care, and provides incentives for efficient and high-quality service provision
- **Health workforce:** Investing in the appropriate human resources, given resource constraints, to secure good results
- **Leadership and governance:** Establishing policies (including those that influence the determinants of health), regulatory mechanisms, and implementation arrangements and tools, including systems for transparent monitoring and evaluation, to ensure guidance and accountability
- **Health information system:** Developing a well-functioning health information system that ensures the use of reliable and timely information on the determinants of health

- **Medical products, vaccines, and technologies:**

Ensuring equitable access to cost-effective medicines, vaccines, and technologies to all sections of the population

Many of the above-mentioned components do not work in isolation in influencing health outcomes. For example, health system financing determines the availability of human resources as well as delivery of health services. At the same time, other components such as health information systems are key to the delivery of health services. A well-functioning health system ensures that there is an equitable distribution of health services and technologies. To do this, accurate measurement of these components is important to determine whether they are effective. Countries such as Lithuania, Slovakia, and Slovenia have invested significantly in improving the assessment of policies to reduce socially determined inequity in health. Therefore, information about health systems’ actions to address inequity in health needs to be collected more systematically to provide better support to policymakers and policy development in this area. Finally, all the actions require changing the approach to designing, delivering, and evaluating health services. In turn, this has implications for human resources and requires changing methods of education and training for all who work in the health system, so that they are more aware not only of the effects of social determinants on health outcomes but also of appropriate responses that do not worsen existing inequity in health.

## SUMMARY

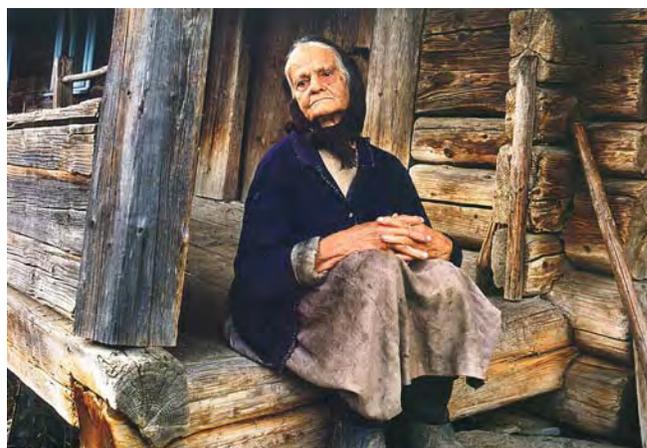
Compared with the countries of the Southeastern Europe and Northern Tier subregions, the countries of the CAR and Caucasus perform far more poorly in terms of public health financing. Average government per capita health expenditures in these subregions (US\$53 in CAR and US\$33 in the Caucasus in 2006) are the lowest in the E&E region, underscoring the need to improve their health care financing performance. Households incur high out-of-pocket expenses, sometimes leading families and individuals further into poverty, deterring individuals from seeking the health care they need, and consequently affecting the health and economic productivity of the working-age population.

# Conclusions: Health Vulnerabilities in the E&E Region\*

## Changing Demographics in the E&E Region – A Shrinking and Aging Population

Many countries in the E&E region are undergoing an important demographic transition characterized by slow or even negative growth and modestly increasing life expectancy of their populations. Compared with Western European countries, Eastern European countries show varying signs of vulnerability in which fertility, mortality, and migration patterns are not in balance, resulting in shrinking and increasingly aging populations and creating additional demographic pressures that require attention and policies for managing potential effects on health and welfare systems. Trends are not uniform across the region, however. Life expectancy has declined in some countries in the RUMB subregion, and fertility rates have been below replacement level in a majority of the E&E countries, resulting in population declines in more than half of them. Moldova and Georgia in particular have had more than 10 percent declines in population since 1997. In the CAR, however, fertility is above the replacement level, and the CAR populations are growing.

An increase in fertility and population size requires scarce public resources to cover more people and poses challenges to health and welfare systems in those countries. A shrinking population is also detrimental to economic growth, however, because it results in a decline in the size of the labor force needed to support a larger dependent population and increased dependence on migrant labor. For the most part, populations in E&E countries are aging, as shown by the increasing proportion of people aged 65 and older. Since 1980, for example, the dependency ratio for people 65 years and older has doubled in Armenia and Bosnia and Herzegovina. Many other E&E countries also saw substantial increases of between 25 and 50 percent in their dependency ratio for the elderly over the past 25 years. Even where optimistic assumptions predict more healthy life-years for the elderly and a later onset of chronic diseases, the economic burden on health systems may be substantial. Increased aging may result in a doubling of current health care costs in some countries in about 20 years. Moreover, declines in economically active populations and substantial



An elderly woman in the Ukraine. The consequences of population aging in the E&E region will require considerable restructuring of health care delivery in the near future.

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projected increases in dependency ratios by 2050 may affect the funding and sustainability of the health and welfare systems in many countries.

Given the uncertainties of estimating the impacts of aging and future decreases in the economically active populations in the E&E region, better vital statistics and health information systems will be essential for generating more complete and reliable data. Such data will be needed to monitor trends across and within countries and more accurately predict the impacts of changing demographics on health systems and the costs of health services in the region.

## Uneven Gains in Life Expectancy

The health status of the population in the E&E region has mostly improved in the past decade, as indicated by longer life expectancy at birth. Nevertheless, important differences in the degree and pace of improvement exist between subregions and countries. Moreover, growing inequality in longevity is associated with gender and with social, economic, and lifestyle factors. For example, Georgia has the same life expectancy as Latvia or Lithuania, but only 20 percent of the income and 25 percent of the health expenditure. Croatia and Latvia spend similar amounts on health and have a similar GDP, but life expectancy differs by five years. The principal driving force behind the disparities

\* The conclusions draw partly from WHO's *The European Health Report 2009: Health and Health Systems* (WHO, 2009c).

observed seems to be the different roles that socioeconomic status, lifestyles, and behaviors play as determinants of health in each country. A comparison of adult male mortality rates, which are twice as high in Latvia as in Croatia, and smoking prevalence among men (54 percent and almost 39 percent, respectively) support this assertion. These examples demonstrate considerable inequities in health across countries, but such inequities also exist – and may be even more pronounced – within countries (between, for example, socioeconomic and ethnic groups).

Another form of inequity exists between genders, with men showing much lower life expectancy and higher mortality than women. The gender gaps in E&E subregions have increased in recent decades because of changes in the risk-taking behaviors of men and women and their uptake of preventive and curative health services, which in turn have responded to socioeconomic shifts. Inequalities within countries are greater than those between countries for most factors.

For some countries, especially in Southeastern Europe and the Northern Tier, overall gains in life expectancy have been attributed to overall decreasing mortality, mainly from declining communicable diseases in early childhood and delays in premature death among adults due to improved health care. However, unhealthy lifestyles and behaviors have precluded more significant declines in adult mortality and the burden of disease, with chronic noncommunicable conditions, injuries, and violence affecting health more strongly. Since the late 1990s, the RUMB, Caucasus, and CAR subregions in general have had higher mortality and disease rates and stagnating or even decreasing life expectancies that have been linked to demographic, social, and economic transitions. Countries in these subregions have not been able to recover quickly from the rising mortality of the early 1990s. Average life expectancy in the countries of these subregions deteriorated sharply between 1991 and 1994 and then recovered only partly. Russia's large population strongly influences average life expectancy in the RUMB subregion, with excessive alcohol intake by much of the Russian population (primarily men) causing much of the subregion's premature mortality.

Several countries (such as Bosnia and Herzegovina, Armenia, Croatia, and Tajikistan) have been able to make some improvements in life expectancy by a few years from 1990 levels. These improvements have sometimes occurred only in women. Recent changes in national policies and ces-

sations of hostilities may have contributed to the increases in some of these countries. Comparative analysis is needed to identify specific policies that played a role in these countries, although research evidence from a broad range of countries suggests that policies affecting the socioeconomic circumstances in which people live and work have as much influence as policies related solely to health care. This could explain important differences in life expectancy between countries and their widely varying rates of improvement over time.

### **Unhealthy Lifestyles and Stagnating or Increasing Adult Mortality**

The overall mortality rate from all causes of death in the E&E region seems to have peaked around the year 2000 and then gradually declined. This trend was largely driven by RUMB, Caucasus, and CAR countries with their large populations – especially Kazakhstan, Russia, Ukraine, and Uzbekistan – while the Southeastern and Northern Tier countries showed a steady decline in adult mortality since the 1980s or 1990s. Rates varied significantly between subregions and countries.

In the region as a whole, male mortality for all causes was roughly twice as high as female mortality. This gender difference, as well as stagnant or increased mortality rates, has been documented as being associated with alcohol consumption patterns and failed alcohol control policies. Based on studies of behavioral risk factors it is estimated that in the countries named above, people have more than 40 percent excess risk of death than the European region average. Exposure to lifestyle and behavioral factors associated with gender may further increase mortality risk among men, and controlling these factors could reduce the burden of disease by a substantial fraction. A particular concern is the growing concentration of smoking in groups with lower socioeconomic status throughout the region. When smoking rates decline, as in Poland, life expectancy at birth increases.

Noncommunicable diseases produce the largest burden of mortality in the E&E region, accounting for more than 93 percent of the 5.5 million estimated deaths between 2003 and 2007. Diseases of the circulatory system remain the main cause of death, accounting for 57 percent of all deaths. The rise of chronic diseases presents a major challenge to health and health systems throughout the region. Modern lifestyles and behaviors are leading to increases in such conditions as obesity, hypertension, and diabetes. This,

along with aging populations and treatments that allow individuals to survive acute events, is leading to increases in the proportion of the population living with chronic disease, resulting in low productivity and high medical expenditures. Differences between Western Europe and the E&E region have been suggested to result from interaction between key lifestyle factors (diet, smoking, and physical activity) and psychosocial factors (stress), but other aspects, such as access to and quality of health care, are also thought to play a role.

Several E&E countries with high frequencies of risk factors do not provide information to allow further analysis. For alcohol abuse, studies in RUMB countries have shown that policies to limit access and reduce intake had important effects but were not sustained everywhere, and the mortality from cardiovascular diseases and injuries and violence therefore returned to a high level compared with the EU-27 countries. In contrast, Estonia, Latvia, and Lithuania, which experienced a burden of disease similar to that of the RUMB countries in the 1980s, have been able to achieve lower adult mortality rates and higher and healthier life expectancy at birth than their RUMB counterparts. This suggests that known public health policies and interventions can be effective but require stronger political will and concerted action in all sectors of society to realize them.

Diseases of the circulatory system, cancer (malignant neoplasms), external causes of injury and poisoning, and digestive diseases are some of the major causes of death in the region. Injuries and respiratory illnesses occur more frequently in the RUMB and CAR subregions. External causes of death – particularly injuries from accidents (including falls), transport-related causes, and violence, both self-inflicted and inflicted upon others – result in considerable mortality in the region, particularly among men. The relatively high rates of accidents, suicide, and homicide have been attributed to various lifestyle and socioeconomic factors, including high alcohol intake, poor conditions of roads and vehicles, and limited law enforcement.

Focusing on epidemiological facts and figures risks missing the broader social and economic effects of chronic diseases. Much evidence suggests that these diseases impose substantial costs on society. Cost-of-illness studies, for example, have estimated that the cost of chronic diseases and their risk factors ranges from 0.02 to 6.77 percent of GDP in various countries. The direct, indirect, and intangible costs of illness place burdens on individuals and families and

include treatment costs, reduced income, early retirement, and increased reliance on welfare support for ill people and/or their caretakers. Employers and wider society carry a burden of absenteeism, reduced productivity, and increased employee turnover.

Noncommunicable diseases need to be prevented by changing lifestyle behaviors, developing health-promoting environments, and taking action on the socioeconomic determinants of health. Once disease is established, such interventions, alongside effective and timely treatment and rehabilitation, are also important to prevent conditions from becoming chronic and the development of disabilities.

### Substantial Drop in Under-5 Mortality in Most Countries

Under-5 mortality, especially infant mortality, indicates the quality of living conditions and access to health care. It has fallen by more than 50 percent since 1990 in all countries of the E&E region, from about 50 child deaths per 1,000 live



A visiting nurse trained in the Integrated Management of Childhood Illness strategy examines an infant in Kyrgyzstan.

© 2006 Anara Doolotova, Courtesy of Photoshare

births to fewer than 23. Although rates declined substantially in the region, several countries, especially in the CAR subregion, have rates that are more than five times higher than countries in other subregions, suggesting possible socioeconomic problems and the need for better health care. In a majority of these countries, mortality among children occurs mostly in the first year of life and to a great extent among neonates in the first month. These countries are unlikely to reach their MDG 4 targets or will do so only with additional effort. The situation of maternal mortality and MDG 5 is more variable. Maternal mortality indicates access to and quality of health care. Similar to child mortality, several countries have higher rates and are not on track to reach the target, but others may be able to attain it if they increase their efforts. Hemorrhage, abortion, and toxemia, which are mostly preventable, are the main causes of maternal deaths in the region. Under-registration of births and deaths is also an issue in the region that calls for better data collection systems to confirm trends and determine the targeting of interventions.

### **Mitigating the Burdens of TB and HIV/AIDS**

Although communicable diseases are not among the leading causes of death and illness in the E&E region, substantial and sustainable resources are needed to maintain preparedness and enable countries to respond to and control diseases such as TB and HIV/AIDS, which are of great public concern globally as well as to countries in the region and the region as a whole. In CAR in particular, mortality rates among younger people are more than twice the rates for the region as a whole, suggesting the impact of communicable diseases. Preventing and controlling these diseases remain the fundamental public health functions of national health systems. Countries require support in designing and implementing evidence-based interventions, assessing the burden of disease and risk factors, and monitoring progress toward reducing death and disability. This can be done effectively by integrating these activities with the management and dissemination of technical knowledge to strengthen communicable disease surveillance and response systems and public health programs and services.

### **TB: The Growing Threat of Drug Resistance**

TB accounts for nearly 50 percent of the E&E region's mortality from infectious and parasitic diseases among people aged 25 to 64 years. It is a main reason for the increasing mortality from these diseases in the region since 1990, especially in the RUMB, Caucasus, and CAR countries,

where the TB incidence rate has more than doubled. The mortality rate from TB increases with age in most subregions, except the RUMB countries, where younger people have higher mortality. This suggests the effects of such factors as poor diet and alcohol intake, which are aggravated by poor socioeconomic conditions, and co-infection with sexually transmitted infections, especially HIV.

TB control in the region is far from optimal. The case detection rate for new smear-positive cases was 78 percent for WHO's European region in 2008, but the E&E countries fall short of the global target of 70 percent. In too many E&E countries, the case detection rate is woefully low (as low as 49 percent, for example, in Tajikistan). Among the high-TB priority countries of the region, the lowest treatment success rate was reported by Russia and Azerbaijan (58 percent each), followed by Ukraine (59 percent). Bosnia and Herzegovina (97 percent) and Albania (85 percent) have the most successful treatment programs.

High rates of MDR-TB – the highest in the world – and XDR-TB are the main challenge for TB control in the region. A great concern is that strains of MDR-TB were considered to account for 90,000 (more than 20 percent) of new TB cases in 2007 and more than 40 percent of re-treated cases. In addition, close to 40,000 new TB cases were also living with HIV. Among the 27 high-priority MDR-TB countries, which collectively account for 85 percent of estimated MDR-TB cases globally, 15 are in the E&E region. MDR-TB is not only vastly more expensive to treat but also poses greater challenges to patient compliance. Both factors have an impact on the delivery of TB care, especially in the resource-constrained environments that exist in several E&E countries, especially the CAR.

### **HIV/AIDS: Increasing Incidence Related to Drug Use**

HIV is increasing among youth and young adults under 30 years of age in the region. Almost one-third (27 percent) of newly diagnosed HIV infections in E&E are in people aged 15 to 24 years. In Russia, more than 80 percent of newly infected people were aged between 15 and 30 years. Ukraine's HIV epidemic is rapidly increasing as well. Russia and Ukraine together account for approximately 86 percent of all people newly reported to be living with HIV in the E&E region.

IDU and accompanying unsafe sexual practices are the primary means of HIV transmission in the E&E region. High

youth unemployment and a boom in drug trafficking have stimulated IDU, and unless these factors are controlled, IDU will most likely continue to increase in E&E countries. In 2007, almost two-thirds of all newly diagnosed HIV infections in E&E were among IDUs, for whom HIV treatment is complicated by limited access to and high costs of ARVs, a shortage of technical capacity, stigmatization, and adherence to treatment. In many countries of the region, the HIV epidemic is slowly transitioning from one concentrated among IDUs to one based on sexual transmission.

Co-infections in E&E countries and gaps in treatment with ARVs are still significant and increasing. Furthermore, IDUs, the most severely affected group in the region, face major challenges in access to prevention (especially needle and syringe exchange programs and opioid substitution therapy) and treatment services. The recent increase in newly reported cases among MSM should also be monitored closely. The importance of targeted prevention should be stressed, especially condom use, given that the epidemic has not yet spread to the general population. The targeting of HIV efforts still urgently needs to be scaled up and improved to reduce inequity and promote greater harmonization of the highest standards of prevention and treatment programs and policies.

### **Insufficient Public Expenditures for Health and Rising Costs**

Effective health services are a crucial element in addressing the relationship between the social determinants of health and inequity in health and in counteracting the rising inequity in health in both high-income and low-/middle-income countries in the E&E region. The global economic downturn gives greater urgency to identifying options for action – what can be done and what works.

In this context, policymakers are concerned that health care costs are rising more rapidly than national incomes. In many E&E countries, the public sector will not be able to afford a rise in health care costs because current funding already falls short when compared with the EU average. The proportion of total spending that can be derived from public funding sources such as taxation and social insurance is limited, especially in CAR and Caucasus countries. Azerbaijan and Tajikistan are among the countries in the region with the lowest levels of public health expenditure. Several countries, including Albania, Georgia, Russia, and Uzbekistan, have seen a decline in health expenditure overall, while others,

such as Serbia, Slovenia, and Turkmenistan, have seen a fall in the relative role of public sector funding. Overall, however, the picture shows continued growth in health care spending across the region.

Health care costs are projected to increase by several percentage points of GDP by 2050 mainly because of:

- a) Demographic factors, such as increased life expectancy and population aging.
- b) Nondemographic factors such as the effects of new technologies, rising unit costs, changes in health and disability, and associated changes in utilization. These factors are assumed to be the main determinants of future growth in costs; most of them, however, are amenable to policy action.
- c) High levels of corruption, which are a primary impediment to the use of health funds and success of health systems in the E&E region. The health sector is particularly vulnerable to corruption for several reasons, including the diversity of commodities and expenses and the inelastic demand for services.

Protection of the public from catastrophic health care costs is a major concern of policymakers. The goals of universal coverage (which does not impose out-of-pocket expenses high enough to impoverish households) and equity in finance (whereby people with lower incomes do not pay a greater percentage of income for health services than people with higher incomes) are key policy objectives in the E&E countries. A health system needs to ensure that no one becomes poor as a result of using health services and that people should not be forced to choose between their health (both physical and mental) and their economic well-being when they become sick. Furthermore, health systems are responsible for ensuring that policies and interventions do not unintentionally increase socioeconomic and health inequity. Data suggest that both fiscal context and public sector priorities are important determinants of financial protection, but the variation in health expenditures as a percentage of GDP also suggests that how health care is funded – i.e., health financing policy – matters as well.

The overall pattern of health expenditure in E&E suggests that financial protection remains a concern in the region. In general, the more affluent countries tend to have a larger

public sector and give higher priority to health in allocating public resources, leading to higher government health expenditure and hence lower out-of-pocket payments and risk of catastrophic household expenditure. There are numerous exceptions, however, and the need to ensure financial protection thus remains a concern throughout the region, not solely in lower-income countries.

Most countries in the region are making more determined efforts to increase health care financing. Even in the poorest-performing countries in the Caucasus and CAR, governments are undertaking serious, sometimes bold, reforms to increase health care financing. USAID and other donors have been playing, and should continue to play, critical roles in supporting these initiatives. An example is the USAID-funded ZdravPlus project in Kyrgyzstan, in which USAID and other partners developed and proposed an approach for introducing a case-based payment system in the form of a step-by-step implementation plan.

The scope for health sector action goes beyond health care financing and service delivery to other health system functions, especially stewardship. Addressing poverty and the wider determinants of health directly also includes such actions as working intersectorally and making impact assessments of national and/or subnational policies both within and outside the health sector.

### **Better Health Intelligence**

A final recommendation concerns the need for a more systematic collection of health and socioeconomic data of greater accuracy and reliability. This concerns vital statistics; epidemiologic, socioeconomic, and behavioral risk factor data; and health service information. Under-registration of births and deaths is an issue in the region that calls for better data collection systems to confirm trends and determine the targeting of interventions. Several E&E countries with high frequencies of risk factors do not provide information to allow further analysis. Comparative analysis is also needed to identify specific policies that have lowered health vulnerabilities. This could include equity-focused health impact assessment of regional development plans to identify their potential effects on equity in health and recommend how they can be strengthened to maximize and distribute potential health gains more equitably. Greater specificity is needed in health intelligence about how country actions affect inequity, especially in terms of measuring the scale or magnitude of inequity, making relevant data available, and identifying which actions or policies are most effective.

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## ANNEX A. Health Vulnerability Index Indicator Selection

Indicator	Rationale
<p>Life expectancy</p> <p><i>Source: World Bank, World Development Indicators, 2009</i></p>	<p>Life expectancy is a well-established indicator of national health status. This indicator is relevant to the vulnerability analysis because it reflects the overall mortality level of a population by summarizing the mortality pattern that prevails across all age groups – children and adolescents, adults, and the elderly.</p>
<p>Adult mortality per 1,000 population</p> <p><i>Source: WHO, World Health Statistics Report, 2009</i></p>	<p>Adult mortality measures the probability of dying between the ages of 15 and 60. This is an appropriate proxy indicator for noncommunicable disease and injury (NCDI) in E&amp;E countries because NCDs are responsible for more than 90 percent of deaths in this age range in the E&amp;E region. We include this indicator to reflect serious chronic vulnerabilities that often eclipse more traditional developing-country health concerns such as child health and communicable diseases. Since they occur in the most productive years, adult deaths have severe demographic, social, economic, and security-related repercussions. Economies suffer from lost productivity; families and communities suffer from absent heads of households; and militaries are challenged by dwindling numbers.</p>
<p>Under-5 mortality per 1,000 live births</p> <p><i>Source: WHO, World Health Statistics Report, 2009</i></p>	<p>The under-5 mortality rate is identified by UNICEF as its most important indicator because it reflects a wide variety of inputs, such as maternal health, immunizations, family income, education, and nutrition, and it is less prone to distortion by a better-off minority than other indicators, such as GDP per capita. The under-5 mortality rate is particularly useful for this analysis because it is a relatively straightforward and easily tracked indicator that reflects the “health” of a country’s health system.</p>
<p>Tuberculosis incidence per 100,000 population</p> <p><i>Source: WHO, Global Tuberculosis Control, 2009 Short Update</i></p>	<p>The specific TB rate used is the WHO estimated incidence rate for all forms of TB. This rate is an international standard for monitoring TB epidemics. It is reported by both the WHO and in the World Bank’s World Development Indicators. TB is one of, if not the most, serious infectious diseases in E&amp;E, and the presence of multidrug-resistant TB poses an increased threat.</p>
<p>HIV incidence (new infection rate per 1,000,000 population)</p> <p><i>EuroHIV, HIV/AIDS Surveillance in Europe: End-Year Report 2006</i></p>	<p>HIV prevalence among adults is the international standard for monitoring HIV/AIDS. However, the HIV new infection rate, or incidence, per 1,000,000 population is preferable because it offers more cross-country variation and is indicative of the speed with which the virus is spreading – a more meaningful indicator in areas where prevalence remains uniformly low.</p>
<p>Public health expenditure as a percentage of GDP</p> <p><i>Source: World Bank, World Development Indicators, 2009</i></p>	<p>The lack of public commitment to investing in health poses a grave health risk in many E&amp;E countries. This indicator is the best quantitative measure of that commitment, as well as a measure of a government’s overall interest in human capital.</p>

## ANNEX B. Regional Vulnerability and Indicator Maps

### Vulnerability Ranking, 2010



Note: No data available for Kosovo

### Population Growth Rate, 2008



Note: No data available for Kosovo

Source: World Bank, World Development Indicators, 2009

### Life Expectancy, 2007



Note: No data available for Kosovo

Source: World Bank, World Development Indicators, 2009

### Adult Mortality Rate, 2007



Note: No data available for Kosovo

Source: WHO, World Health Statistics Report, 2009

**Under-5 Mortality Rate, 2007**



Note: No data available for Kosovo  
 Source: WHO, World Health Statistics Report, 2009

**TB Incidence Rate, 2008**



Note: No data available for Kosovo  
 Source: WHO, Global Tuberculosis Control, 2009 Short Update

### HIV Incidence Rate, 2006



Note: No data available for Kosovo

Source: EuroHIV, HIV/AIDS Surveillance in Europe: End-Year Report 2006

### Public Health Expenditure, 2006

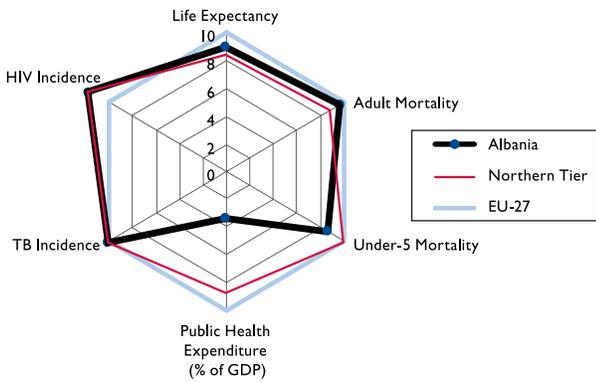


Note: No data available for Kosovo

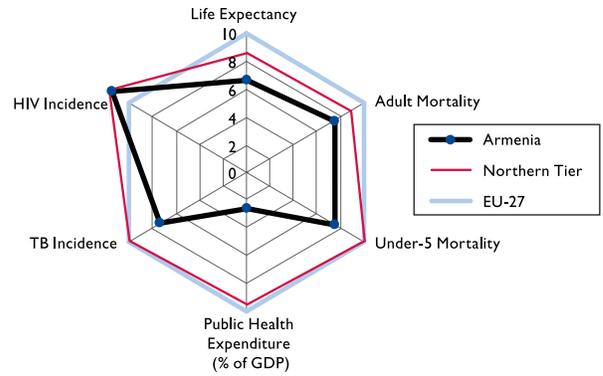
Source: World Bank, World Development Indicators, 2009

**ANNEX C. Country Radar Graphs for E&E Countries and EU-27**

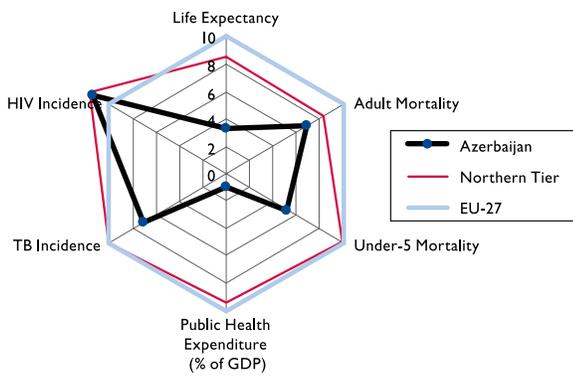
**Albania**



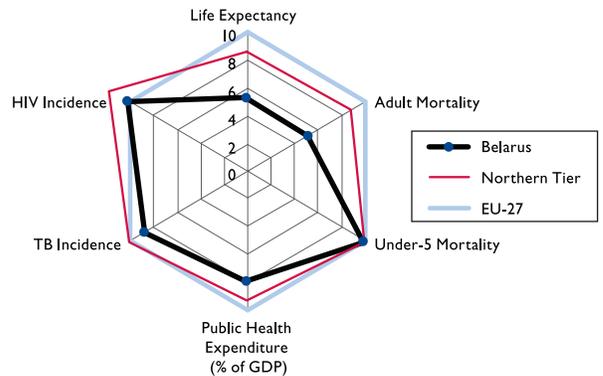
**Armenia**



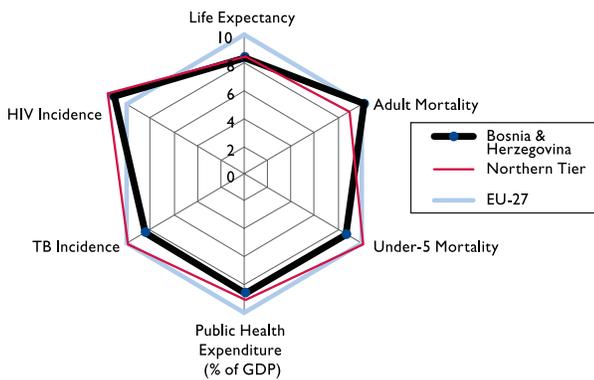
**Azerbaijan**



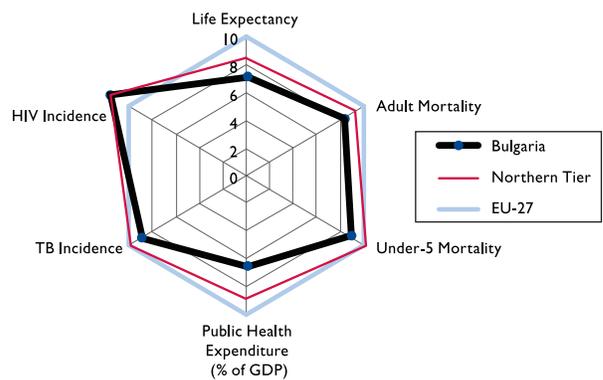
**Belarus**



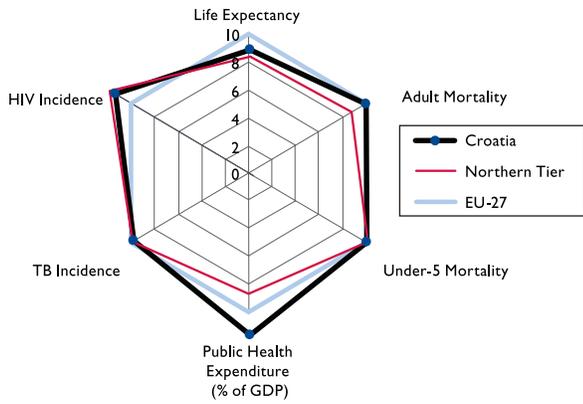
**Bosnia & Herzegovina**



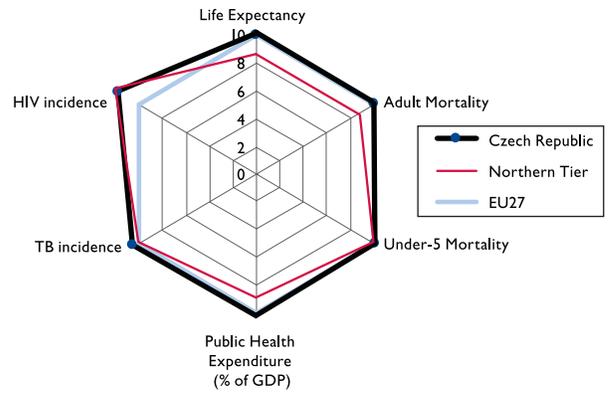
**Bulgaria**



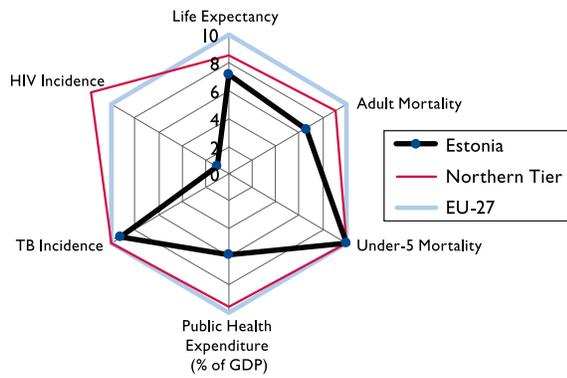
### Croatia



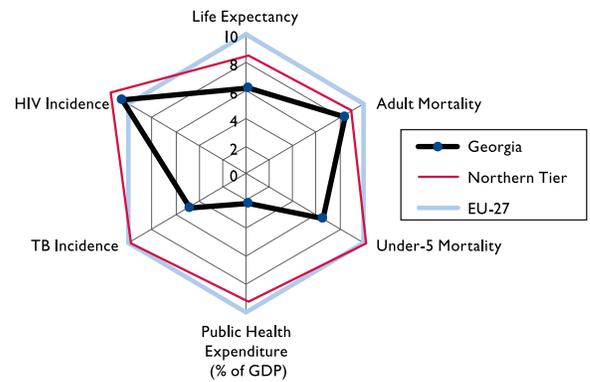
### Czech Republic



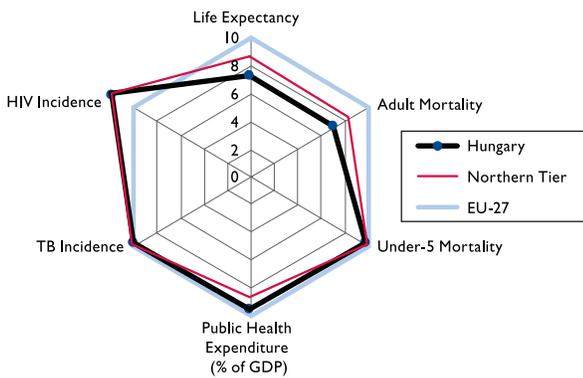
### Estonia



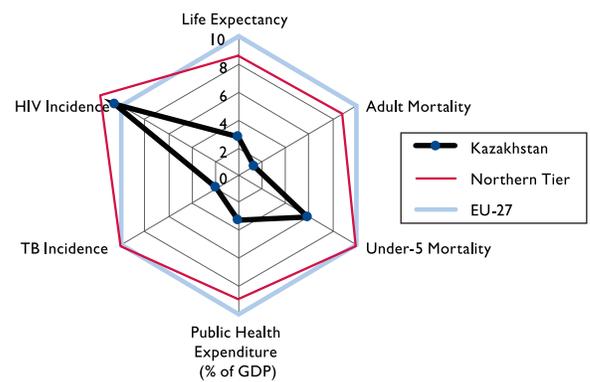
### Georgia



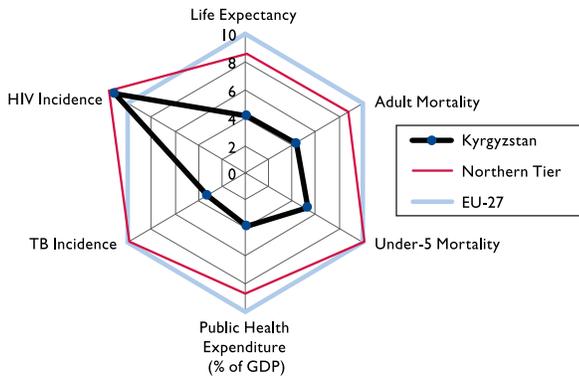
### Hungary



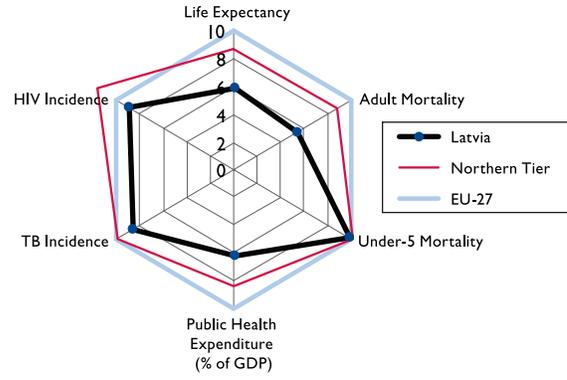
### Kazakhstan



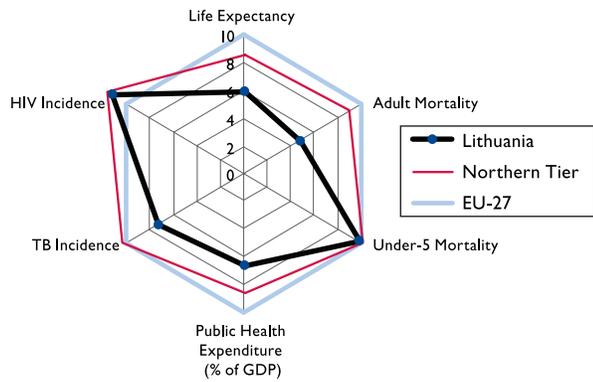
### Kyrgyzstan



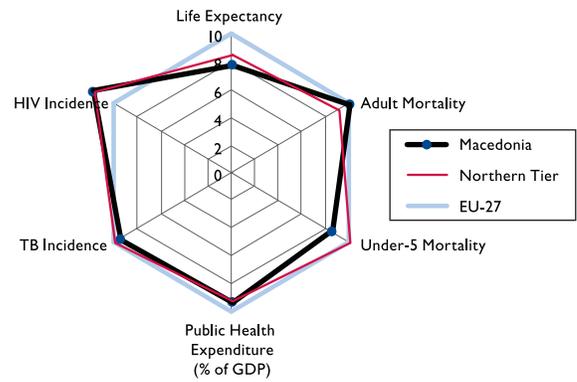
### Latvia



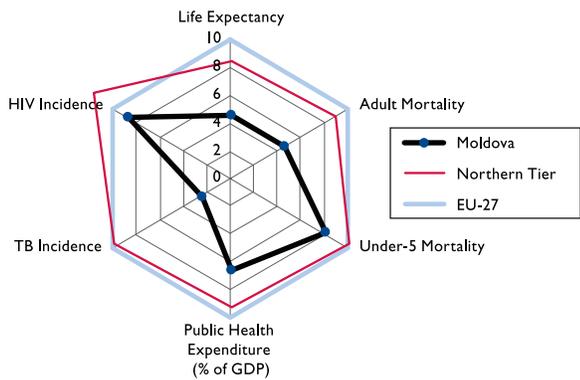
### Lithuania



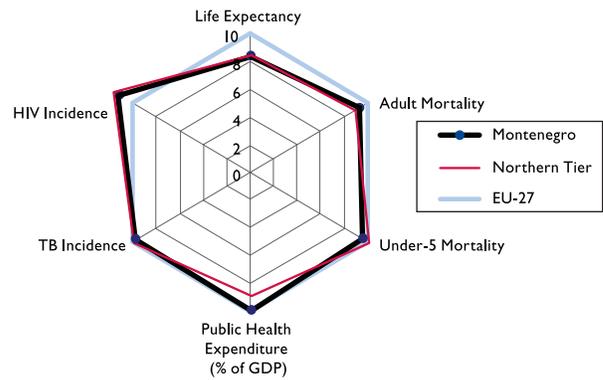
### Macedonia



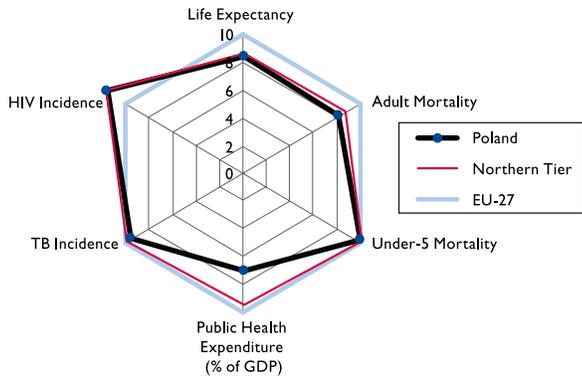
### Moldova



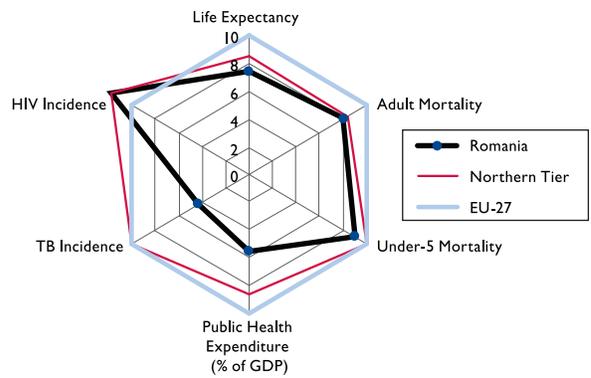
### Montenegro



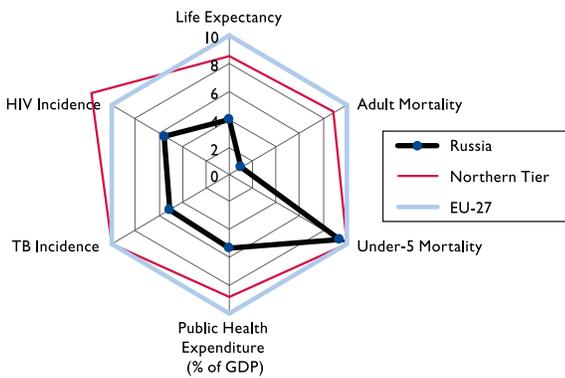
**Poland**



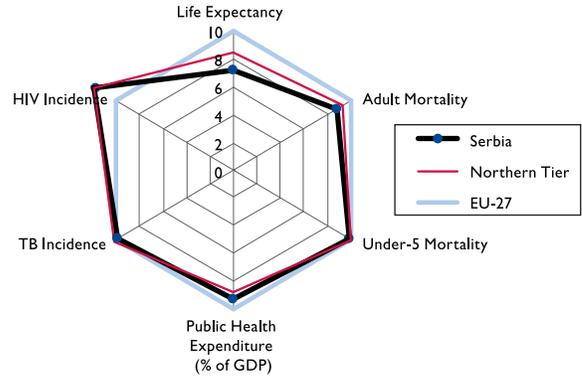
**Romania**



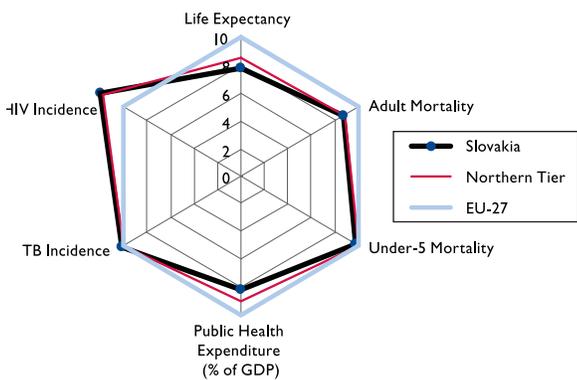
**Russia**



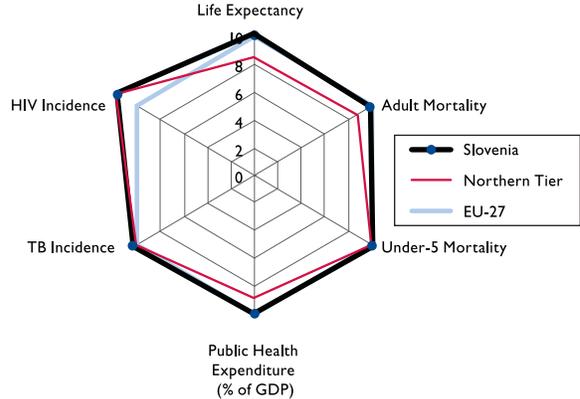
**Serbia**



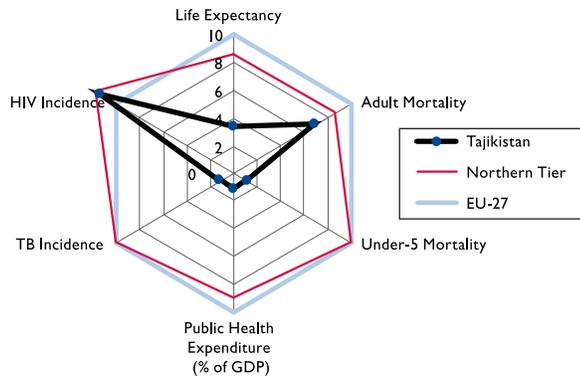
**Slovakia**



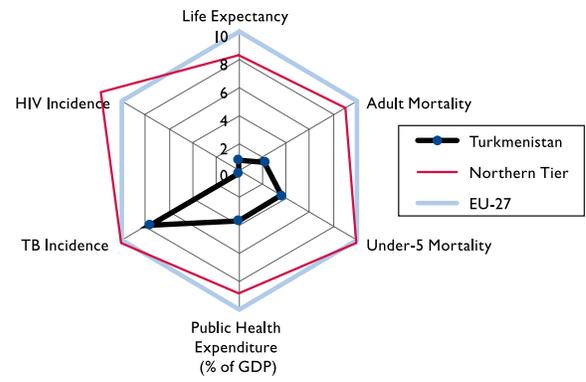
**Slovenia**



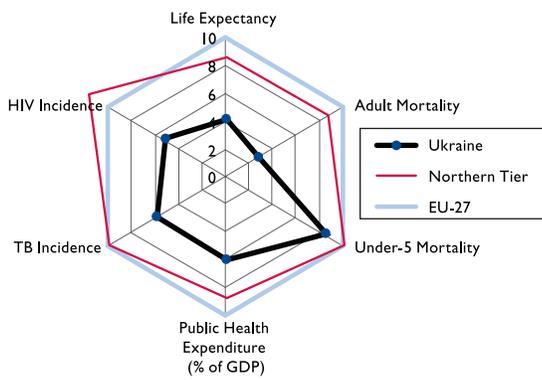
### Tajikistan



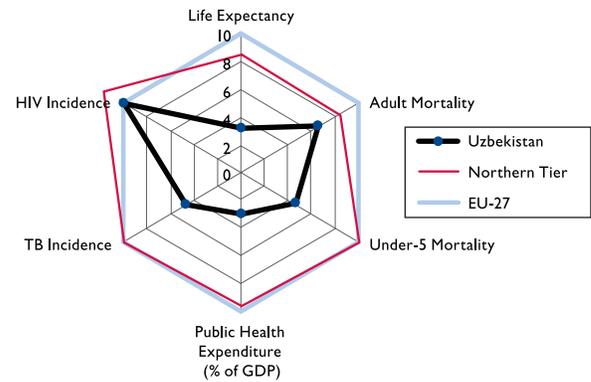
### Turkmenistan



### Ukraine



### Uzbekistan





**U.S. Agency for International Development**  
1300 Pennsylvania Avenue, NW  
Washington, DC 20523  
[www.usaid.gov](http://www.usaid.gov)