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THE EUROPE AND EURASIA HEALTH VULNERABILITY ANALYSIS

ANNUAL REPORT, SEPTEMBER 2007

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ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
AMR	Adult Mortality Rate
ARV	Antiretroviral
CAR	Central Asian Republics
DOTS	Directly Observed Therapy, Short Course
E&E	Europe and Eurasia
EU	European Union
EU-25	25 countries in the European Union in 2005
FSU	Former Soviet Union
GDP	Gross Domestic Product
HALE	Health-Adjusted Life Expectancy
HIV	Human Immunodeficiency Virus
HVI	Health Vulnerability Index
IDU	Injecting Drug User
IUATLD	International Union Against Tuberculosis and Lung Disease
LE	Life Expectancy
LSHTM	London School of Hygiene and Tropical Medicine
MDR-TB	Multidrug-Resistant Tuberculosis
NCD	Noncommunicable Disease
NCDI	Noncommunicable Disease and Injury
PIH	Partners in Health
PRB	Population Reference Bureau
RUMB	Russia, Ukraine, Moldova, and Belarus
SS+	Sputum Smear-Positive
TB	Tuberculosis
U5MR	Under-5 Mortality Rate
UNAIDS	Joint United Nations Program on HIV/AIDS
UNDP	United Nations Development Program

UNFPA	United Nations Population Fund
UNODC	United Nations Office on Drugs and Crime
USAID	United States Agency for International Development
USG	United States Government
WDI	World Development Indicator
WHO	World Health Organization
WHOSIS	World Health Organization Statistical Information System
WHO EURO	World Health Organization Regional Office for Europe
XDR-TB	Extensively Drug-Resistant Tuberculosis

EXECUTIVE SUMMARY

The 2007 *Europe and Eurasia Health Vulnerability Analysis* identifies those countries in USAID's Europe and Eurasia (E&E) region where health status is the poorest and where the transition to democracy and free-market economies may be most vulnerable because of health factors. 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 fifth in an annual exercise to provide USG policymakers and USAID health staff in E&E countries an overview of health status and vulnerability in the region.

This analysis shows the general health picture across 28 countries; it is not meant to provide a detailed needs assessment at the individual country level. As it is based on readily accessible data regularly provided by international organizations, it is most useful for comparing subregions within E&E and raising awareness of major health issues relevant to the region. This report also serves as a convenient reference for health indicator values in the E&E 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 paper analyzes recent health trends in E&E using these indicators and making comparisons with E&E's "Northern Tier" subregion (comprising the Czech Republic, Hungary, Poland, Slovakia, and Slovenia) and the 25 members of the European Union in 2005 (EU-25) to see how well E&E countries and subregions are progressing relative to these "ideals" for the region.

Additionally, this year the report for the first time incorporates qualitative input from field missions to assist in identifying critical subregional and national trends and to ascertain any discrepancies between international data and field knowledge.

Overall, the 2007 analysis finds the five most vulnerable countries in terms of health to be Turkmenistan, Tajikistan, Kazakhstan, Russia, and Kyrgyzstan.

The primary findings of the analysis are as follows:

Current USAID health programs are operating in the most vulnerable subregions. The Central Asian Republics (CAR) is the most vulnerable subregion in terms of health, followed by the Russia, Ukraine, Moldova, Belarus (RUMB) and Caucasus subregions.

There is increasing concern about the potential economic impact of population size and composition. There have been substantial declines in the size of the population in a majority of countries, and in many of these countries the population is expected to age at a rapid pace. The population has decreased in 18 of the region's 28 countries since 1997, with fertility rates below replacement level. By 2025, the median age of the population is expected to increase by 10 years in half the countries.

Adult mortality has rapidly grown since the early 1990s. Noncommunicable diseases, such as cardiovascular diseases, and injuries account for more than 85% of deaths in the region, with males being disproportionately affected. This contributes to a gender gap in adult mortality that is the largest in the world. The RUMB subregion has consistently had the highest adult mortality rate since 2000, with CAR a close second.

There is a rising threat of infectious diseases such as HIV/AIDS and tuberculosis (TB). The spread of HIV is particularly high in countries of the former Soviet

Union, where injecting drug use is the primary means of transmission. The steadily increasing rates of TB incidence, particularly multidrug-resistant TB (MDR-TB), alongside the growth in TB-HIV co-infection is worrisome. More attention is also needed for special populations who are vulnerable to MDR-TB, such as prisoners.

Public expenditure on health is still very inadequate in providing essential services given the current mortality and morbidity rates in the region. While per capita income in the E&E region is one-third that of the EU-25, government per capita health expenditure is just one-eighth that of the EU-25 and is particularly low in CAR and the Caucasus. In a majority of countries, individuals pay 25% or more out of pocket on health costs, in both formal and informal payments. In Tajikistan, individuals cover up to 76% of health care costs through out-of-pocket payments.

Given Russia's magnitude, its demographic and health conditions are worrisome in terms of their impact on the entire E&E region. The country is characterized by high levels of alcohol consumption; high adult mortality due to an increase in noncommunicable diseases, especially among males; and rapidly increasing rates of TB and HIV infections.

INTRODUCTION

The assumption underlying USAID assistance programs to Europe and Eurasia (E&E) at the beginning of the 1990s was that democratic reform and free-market economic growth would sustain and improve social sector conditions, including health, which were presumed to have been at least adequate under the Soviet Union. Today, the data do not support either assumption. There is now a more complete understanding of how the practice of medicine, the stewardship of public health, and health conditions themselves were deteriorating relative to the West for decades before the collapse of communism. Today, throughout the E&E region health conditions are either little better or, in several countries, worse than they were in the early 1990s.

The gap between USAID's assumptions in 1991 and regional realities in 2007 reflects the complexities of the E&E region as well as early misconceptions about the capacity of post-Soviet health care systems. It is now clear that achieving major impact against growing health challenges will not be quick or easy. Moreover, health resources are scarce. It is essential that USAID be analytically rigorous and forward thinking about its use of resources in order to invest in the most pragmatic, cost-effective ways to improve health.

This report seeks to further such analysis and thinking by calling attention to areas of current and future vulnerability within both the region as a whole and individual countries. Expanding on the previous vulnerability analyses, this year's analysis ranks the 28 E&E countries from least to most vulnerable in terms of overall health status and then in terms of specific health sector weaknesses. As an annual exercise, the *Health Vulnerability Analysis* performs several important functions, serving to:

- Provide a snapshot of regional "hot spots" where health status is poorest
- Track health trends
- Examine special areas of concern that might not be evident from the data or by casual observation
- Compare countries individually with the "ideal" performance for the region (this hints at an appropriate level of progress after which USAID's assistance is no longer required)[1]
- Spark innovative thinking about evolving future health needs
- Provide a convenient annual reference for USAID staff

Tracking the region's health vulnerabilities informs our understanding not only of social conditions but also of the economic and democratic transition. 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 a threat to economic and democratic progress.

[1] We use the Northern Tier countries (Czech Republic, Hungary, Poland, Slovakia, and Slovenia) that recently joined the European Union for this benchmark.

The Europe and Eurasia Region. The E&E countries analyzed in this report have traditionally been assigned into six subregions based upon historical, political, and social ties.

Baltics
Estonia
Latvia
Lithuania

Northern Tier
Czech Republic
Hungary
Poland
Slovakia
Slovenia

Caucasus
Armenia
Azerbaijan
Georgia

Russia, Ukraine, Moldova, Belarus (RUMB)
Belarus
Moldova
Russia
Ukraine

Central Asian Republics (CAR)
Kazakhstan
Kyrgyzstan
Tajikistan
Turkmenistan
Uzbekistan

Southeastern Europe
Albania
Bosnia and Herzegovina
Bulgaria
Croatia
Macedonia
Romania
Serbia and Montenegro [2,3]

[2] Montenegro became an independent state through national referendum.

[3] The UN protectorate of Kosovo is not included as a separate nation, both because of its noncountry status and the lack of data on the area.

METHODOLOGY

Analytical Process

The 2007 *Health Vulnerability Analysis* aggregates data for six indicators[4] meant to capture health conditions in four specific areas: noncommunicable diseases and injuries (NCDIs), child health, infectious disease, and public commitment and capacity to improving health. Indicators from each of these categories, plus indicators capturing demographic trends – population growth and fertility – combine to assess the overall health status of a given country. Annex A lists each indicator by category and provides the definition and rationale for using each indicator.

The six indicators are not considered to be of equal importance. However, they have been weighted equally for simplicity and because there currently is no rigorous method to construct appropriate weights. In order to portray a comprehensive picture of health in each country, the 2007 *Analysis* includes three types of indicators:

1) Indicators that depict the present status of health, or chronic vulnerabilities:

- **Population growth and fertility** are not actually among the *Analysis'* six primary indicators but were analyzed as demographic measures that both affect and are affected by the other three chronic vulnerabilities.
- **Life expectancy at birth** captures how long a person can expect to live if prevailing patterns of age-specific mortality at birth remain constant throughout his or her life.[5]
- **Adult mortality rate** is a sensible proxy for the burden of NCDIs, because more than 85% of adult deaths in the E&E region are due to NCDIs.
- **Under-5 mortality rate** captures the status of child survival in a country.

2) Infectious disease indicators that signal both urgent and future vulnerabilities:

- **Tuberculosis (TB) incidence** reflects the growth of the most prevalent infectious disease in E&E.
- **HIV incidence** (new cases per year) shows how fast HIV is spreading, which is a more useful indicator than HIV prevalence (cumulative cases), because prevalence is still very low in most of E&E.

3) An "input" indicator that captures public commitment and capacity to improving health and indicates an overall health systems vulnerability:

- **Public health expenditure as a percentage of gross domestic product (GDP)** represents the amount of resources that are 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 expenditure priorities.

Four steps were involved in determining the health vulnerability of countries in the E&E region. First, a "Health Vulnerability Index" (HVI) was created using the six aggregated indicators to assess in which country the current overall health status is the poorest (tables 1 and 2). The HVI ranks the E&E countries from 1 to 28, with 1 having the best and 28 the poorest health.[6] While

[4] Life expectancy, adult mortality rate, under-5 mortality rate, tuberculosis incidence rate, HIV incidence rate, and public health expenditure as percentage of gross domestic product.

[5] In years past, health-adjusted life expectancy (HALE) was used to discount years that people lived suffering from disease or disability. The indicator was changed to life expectancy in the 2007 analysis because HALE was updated infrequently.

[6] A Severity and Magnitude Index was also created based on the size of each country's affected population for each health indicator (annex B). Similar to the HVI, the 28 countries were ranked from 1 to 28, with 1 having the best and 28 the poorest health.

the difference between rankings 21 and 23 may be negligible, specific rankings are useful to quickly assess a country's relative standing and to present this standing clearly and concisely. The rankings, though, are most useful when considered in groups. Second, the trends in data over time for key indicators that are critical in the E&E region were examined. Third, radar graphs that illustrate each country's status for the six vulnerability indicators relative to both the mean for the EU-25 and the mean for the Northern Tier countries were examined. Finally, as a complement to the HVI, qualitative field knowledge was obtained from an online survey to compare subregional and national statistics reported by multilateral organizations with locally available expert knowledge.

Qualitative Component

The online survey aimed to solicit qualitative input from field missions to assist in the interpretation of the results of the health vulnerability assessment in the E&E region by offering explanations concerning worrisome trends and disparate data (see annex C). The questions also solicited feedback on respondents' perceptions of the political commitment of local governments to health and of the effects of health status and health systems on overall development, political progress, economic growth, and social stability. Fourteen responses were received from 12 countries in the region.

Data Sources and Reliability

Data for the indicators were primarily collected from:

- The World Health Organization Statistical Information System (WHOSIS) for data on fertility and mortality
- World Health Organization (WHO) Global Health Atlas, 1995–2005, for data on TB
- EuroHIV, *HIV/AIDS Surveillance in Europe: Mid-Year Report 2006* for data on HIV
- World Bank World Development Indicators (WDIs), 2007, for data on life expectancy and public health expenditures

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. Additional sources were used as cited in the text.

There are limits, however, to the accuracy, validity, and timeliness of reporting for the indicators used in this report. Data quality varies by country. 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 the national vital statistics. Problems of data quality are greatest in the countries of Central Asia and the Caucasus, where official infant and child mortality estimates in particular are considered to be severely underestimated (Rechel et al., 2004).

Caution should also be taken in examining levels and trends of health expenditures. The reported levels of expenditure may be overstated, and there may be a significant lack of information on private spending. Furthermore, estimates of public expenditure as a percentage of GDP may not be comparable between countries, because they depend on comparable and valid estimates of GDP.

It is also important to recognize that there may be disparities between official statistics and information from those in the field. Results from the online survey indicate that data for some countries are suspect and reporting problems plague country data unevenly.[7]

[7] While the data are imperfect for all countries, the data reported for Turkmenistan and Uzbekistan should be treated with extra caution.

HEALTH VULNERABILITY INDEX

Results from the calculation of the HVI based on the six major health indicators show that four Central Asian Republics – Turkmenistan, Tajikistan, Kazakhstan, and Kyrgyzstan – and Russia are the five most vulnerable countries in the E&E region (table 1). The Central Asian Republics also dominate in the vulnerability rankings for all individual indicators except HIV incidence. It is interesting to note that Russia, despite having a higher level of economic performance than other E&E countries, appears fourth on the list of the five most vulnerable countries in the region. On the Severity and Magnitude Index (SMI) (annex B), however, Russia is ranked most vulnerable because of its large population, followed by Uzbekistan, Ukraine, Kazakhstan, and Tajikistan.

Table 2 on the next page presents the complete HVI for all 28 E&E countries. Additional comparisons are available in annex D, which presents regional maps that paint a picture of the health vulnerability of E&E countries overall and their vulnerabilities by specific indicators, and annex E, which presents radar graphs that illustrate each country's status for the six vulnerability indicators relative to both the EU-25 mean and the mean for the E&E Northern Tier countries (Czech Republic, Hungary, Poland, Slovakia, and Slovenia).

TABLE 1. Most Vulnerable Countries in Europe and Eurasia, 2007

Indicator	Overall Health	Life Expectancy	Adult Mortality Rate	Under-5 Mortality Rate	TB Incidence	HIV Incidence	Public Health Expenditure as % of GDP
Most Vulnerable Countries	Turkmenistan	Turkmenistan	Russia	Turkmenistan	Tajikistan	Estonia	Azerbaijan
	Tajikistan	Tajikistan	Kazakhstan	Azerbaijan	Kazakhstan	Russia	Tajikistan
	Kazakhstan	Russia	Ukraine	Kazakhstan	Moldova	Ukraine	Armenia
	Russia	Kazakhstan	Belarus	Tajikistan	Romania	Latvia	Georgia
	Kyrgyzstan	Uzbekistan	Turkmenistan	Uzbekistan	Kyrgyzstan	Moldova	Kyrgyzstan[8]

[8] Although Kazakhstan and Kyrgyzstan both ranked 23 on the HVI public health expenditure as percentage of GDP indicator, analysis of four sub-indicators shows that Kyrgyzstan is overall more vulnerable in health systems than Kazakhstan.

TABLE 2. Vulnerability Index 2007: Country Ranking

	Life expectancy			Adult mortality per 1,000, total			Under-5 mortality per 1,000 live births			Public health expenditure as % of GDP			Estimated TB incidence rate per 100,000 population			New HIV infection rate per 1,000,000 population				
	Year 2005	Source WDI 2007	Adjusted Score	Year 2005	Source WHOSIS 2007	Adjusted Score	Year 2005	Source WHOSIS 2007	Adjusted Score	Year 2004	Source WHOSIS 2007	Adjusted Score	Year 2005	Source WHO Global Health Atlas 2007	Adjusted Score	Year 2005	Source EuroHIV 2007	Adjusted Score		
Country	Value	Rank		Value	Rank		Value	Rank		Value	Rank		Value	Rank		Value	Rank		Avg score	Rank
Albania	75	4	8.35	135	7	8.33	18	19	8.87	3.00	21	4.78	20	4	9.92	9.9	6	11.72	8.66	12
Armenia	73	9	7.12	175	15	6.75	29	21	7.87	1.40	26	1.90	71	18	7.36	24.9	14	11.37	7.06	17
Azerbaijan	72	16	6.51	152	13	7.67	89	27	2.37	0.90	28	1.00	76	19	7.11	25	15	11.37	6.01	21
Belarus	68	20	4.06	246	25	3.97	9	7	9.70	4.60	10	7.66	62	14	7.82	77.0	21	10.15	7.23	16
Bosnia & Herzegovina	74	6	7.73	138	8	8.21	15	14	9.15	4.10	14	6.76	52	13	8.32	3.3	1	11.88	8.68	11
Bulgaria	73	9	7.12	151	12	7.69	15	14	9.15	4.60	10	7.66	39	10	8.97	10.7	7	11.71	8.72	10
Croatia	76	2	8.96	115	3	9.10	7	3	9.88	6.10	5	10.36	41	11	8.87	14.5	11	11.62	9.80	3
Czech Republic	76	2	8.96	113	2	9.18	4	1	10.15	6.50	4	11.08	10	1	10.42	8.8	4	11.75	10.26	2
Estonia	73	9	7.12	197	19	5.90	7	3	9.88	4.00	15	6.58	43	12	8.77	467	27	1.00	6.54	19
Georgia	73	9	7.12	122	5	8.84	45	22	6.40	1.5	25	2.08	83	20	6.76	54.1	19	10.69	6.98	18
Hungary	73	9	7.12	180	17	6.56	8	5	9.79	5.7	6	9.64	22	5	9.82	10.9	8	11.70	9.11	8
Kazakhstan	66	25	2.84	311	27	1.41	73	26	3.84	2.3	23	3.52	144	27	3.71	65	20	10.43	4.29	26
Kyrgyzstan	68	20	4.06	235	23	4.40	67	23	4.39	2.3	23	3.52	121	24	4.86	32.5	17	11.19	5.40	24
Latvia	71	18	5.90	211	20	5.36	10	12	9.60	4.0	15	6.58	63	15	7.77	129.6	24	8.92	7.35	14
Lithuania	71	18	5.90	215	21	5.18	9	7	9.70	4.9	9	8.20	63	15	7.77	35	18	11.14	7.98	13
Macedonia	74	6	7.73	121	4	8.89	17	17	8.96	5.7	6	9.64	29.6	7	9.44	5.9	3	11.82	9.41	6
Moldova	68	20	4.06	218	22	5.07	16	16	9.06	4.2	13	6.94	138.3	26	3.99	126.7	23	8.98	6.35	20
Montenegro	73	9	7.12	132	6	8.43	9	7	9.70	7.3	1	12.52	34	8	9.22	13.8	9	11.63	9.77	4
Poland	75	4	8.35	143	10	8.00	8	5	9.79	4.3	12	7.12	26	6	9.62	16.9	12	11.56	9.07	9
Romania	72	16	6.51	165	14	7.13	19	20	8.78	3.4	19	5.50	134	25	4.21	9.4	5	11.74	7.31	15
Russia	65	26	2.22	322	28	1.00	14	13	9.24	3.7	17	6.04	119	23	4.96	247.1	26	6.16	4.94	25
Serbia	73	9	7.12	145	11	7.95	9	7	9.70	7.3	1	12.52	34	8	9.22	13.8	9	11.63	9.69	5
Slovakia	74	6	7.73	139	9	8.18	9	7	9.70	5.3	8	8.92	17	3	10.07	3.9	2	11.87	9.41	7
Slovenia	78	1	10.18	110	1	9.30	4	1	10.15	6.6	3	11.26	15	2	10.17	18.3	13	11.53	10.43	1
Tajikistan	64	27	1.61	178	16	6.64	71	25	4.02	1.0	27	1.18	198	28	1.00	29	16	11.28	4.29	27
Turkmenistan	63	28	1.00	240	24	4.22	104	28	1.00	3.3	20	5.32	70	17	7.41	n/a	-	-	3.79	28
Ukraine	68	20	4.06	271	26	3.00	17	17	8.96	3.7	17	6.04	99	21	5.96	242.5	25	6.27	5.72	22
Uzbekistan	67	24	3.45	188	18	6.24	68	24	4.30	2.4	22	3.70	113	22	5.26	82.7	22	10.02	5.49	23
Standard Deviation	3.8			57.7			28.6			1.8			47.0			100.7				
Average	71.3		6.07	180.9		6.52	27.5		8.00	4.1		6.72	69.2		7.46	63.5		10.47		
E&E Worst	63.0			321.6			104.0			0.9			198.0			467.0				
EU-25 Average	77.7		10.00	92.3		10.00	5.7		10.00	5.9		10.00	18.4		10.00	83.4		10.00		
United States	78.0			108.0			8			6.9			5.0			202.0				

Notes: No data on the HIV infection rate are available for Turkmenistan.
EU-25 average excludes France, Italy, and Spain for lack of data.
Total adult mortality is not reported by the WHO or the World Bank. For sections of this analysis dealing only with E&E countries, total adult mortality was calculated by weighting adult male and female mortality statistics by the ratio of males to females in the population.
Data for under-5 mortality in Kazakhstan are from the World Bank WDI for 2007.

FINAL OUTCOMES

Rank	Country
1	Slovenia
2	Czech Republic
3	Croatia
4	Montenegro
5	Serbia
6	Macedonia
7	Slovakia
8	Hungary
9	Poland
10	Bulgaria
11	Bosnia & Herzegovina
12	Albania
13	Lithuania
14	Latvia
15	Romania
16	Belarus
17	Armenia
18	Georgia
19	Estonia
20	Moldova
21	Azerbaijan
22	Ukraine
23	Uzbekistan
24	Kyrgyzstan
25	Russia
26	Kazakhstan
27	Tajikistan
28	Turkmenistan

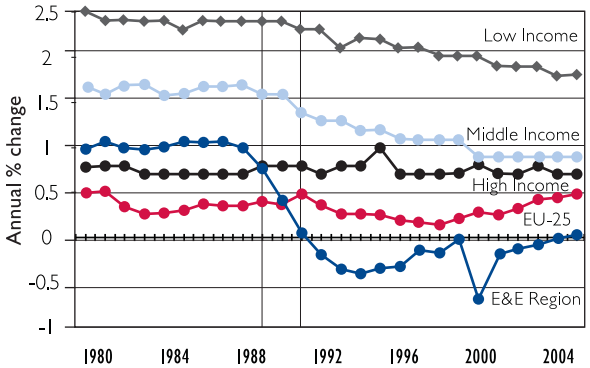
1=least vulnerable, 28=most vulnerable

DEMOGRAPHICS

Population Growth and Fertility

Demography is the study of the size, structure, and distribution of populations in response to birth, death, migration, and aging. For the E&E region, sudden subreplacement 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 of the 1980s and 1990s caused negative population growth and a decline in life expectancy, as seen in figure 1 (World Bank, 1997–2005). The only other countries with similar demographic trends are those ravaged by civil unrest, war, and growing HIV/AIDS epidemics.

FIGURE 1. Population Growth Trends by National Income Levels and for EU-25 and E&E



Source: Heinegg et al., 2006.

E&E REGIONAL OVERVIEW

High rates of adult mortality and subreplacement fertility are, in part, responsible for the alarming contraction in population in 18 of the 28 countries in the region, shown in table 3 (Merson et al., 2004). These trends have likewise altered the distribution of these populations. By 2025, the median age of the population will be more than 10 years greater than it is now in about half of the countries in the E&E region[9] (World Bank, 2007).

SUBREGIONS

Russia, Ukraine, Moldova, and Belarus (RUMB)

Russia is the world's sixth most populous nation, but it also represents the most striking case of population reduction – in terms of sheer size – in the region. Having already fallen from 148 million in 1991 to 143 million in 2005, Russia's population is projected to fall to 111 million by 2050 if current trends persist (World Bank, 2007). Net immigration, mostly consisting of ethnic Russians returning from other countries of the former Soviet Union (FSU), has prevented Russian population losses from being even greater (Rand, 2001). Recent statistics indicate, however, that ethnic Russian immigration is decreasing and will not be a source of population stabilization in the future.

Decreasing populations plague other countries in this subregion. Population size in Ukraine has decreased by 7.0% since 1997, and while the rate of decline has slowed for the first time, low fertility (among the lowest fertility rates in the world at 1.1 lifetime births per woman in 2005) and high adult mortality remain a concern for successful population growth in the country (World Bank, 2007c).

Central Asian Republics (CAR)

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 only non-Muslim majority country in the subregion, the CAR countries have significantly higher rates than other E&E countries for both indicators – 2.7 lifetime births per woman for fertility and an 8.4% increase, on average, in population size since 1997.[10]

[9] The World Bank estimates that the proportion of the population aged 65 and over in Russia was 14% in 2005 and is rapidly growing.

[10] The net percent change in population in Uzbekistan was 10.6% between 1997 and 2005. This is the largest population growth among E&E countries, followed by Turkmenistan (9.9%), Kyrgyzstan (8.9%), and Tajikistan (8.1%). The average rate includes Kazakhstan.

TABLE 3. Population Growth and Fertility in E&E Countries, 1997–2005

Country	Percent Population Change, 1997–2005*	Fertility Rate, 2005**	Total Population (1,000s)*	Country	Percent Population Change, 1997–2005*	Fertility Rate, 2005**	Total Population (1,000s)*
Serbia & Montenegro	-24.0	1.8	8,064	Poland	-1.3	1.2	38,165
Georgia	-15.9	1.4	4,474	Czech Republic	-0.7	1.2	10,234
Ukraine	-7.1	1.1	47,075	Hungary	-0.7	1.3	10,087
Bulgaria	-6.9	1.2	7,740	Slovakia	0.1	1.2	5,387
Armenia	-6.5	1.3	3,016	Albania	0.5	2.2	3,129
Latvia	-6.1	1.3	2,300	Slovenia	0.7	1.2	2,000
Lithuania	-4.6	1.3	3,414	Macedonia	1.9	n/a	2,034
Romania	-4.1	1.3	21,634	Azerbaijan	7.0	1.8	8,388
Estonia	-3.9	1.4	1,346	Bosnia & Herzegovina	7.0	1.3	3,907
Kazakhstan	-3.8	1.9	15,146	Tajikistan	8.1	3.6	6,506
Belarus	-3.4	1.2	9,775	Kyrgyzstan	8.9	2.6	5,143
Russia	-2.8	1.4	143,113	Turkmenistan	9.9	2.6	4,833
Croatia	-2.8	1.3	4,443	Uzbekistan	10.6	2.6	26,167
Moldova	-2.5	1.2	4,205				

Note: The WDI method for calculating Serbia and Montenegro's population statistics changed abruptly in 2002 because Kosovo was no longer included in population figures. WHO rates of population growth for Serbia and Montenegro were used from 2002 onward for consistency. Due to the lack of separate data for each country, Serbia and Montenegro appear as one entry in this table.

* Numbers for percent change and total population extracted from World Bank WDIs for 2005.
** Numbers for total fertility rate extracted from WHOSIS 2005.

Caucasus

Georgia continues to face challenges associated with depopulation and aging. Since 1997, Georgia's population has declined by 15.9% because of "large, undocumented migration" due to high poverty and unemployment (European Policy Center, 2007; PRB/UNFPA, 2007). The proportion of adults aged 65 and over also grew substantially and was projected to reach 18% in 2005 (Rand, 2001). Armenia experienced emigration-associated population losses as well, though not to the extent that Georgia did. However, Azerbaijan, the only Muslim majority country in the subregion, has seen an increase in population size of 7.0% since 1997.

Baltics

The Baltic countries experienced negative population growth (–4.9%) between 1997 and 2005 and had an average fertility rate of 1.3 lifetime births per woman.

Southeastern Europe

Since the breakup of Yugoslavia, political and economic challenges as well as post-conflict plights of refugees and displaced persons have persisted in the subregion, particularly in Serbia and Montenegro and Macedonia. Serbia and Montenegro's 24% decrease in population size from 1997 to 2005 was the largest overall decrease in population in the E&E region, but it was largely due to the exclusion of Kosovo from population figures in 2002 (World Bank, 2007c). In Macedonia, refugees from the 1992 conflict have returned to their homes, bolstering a reported figure of 1.9% population growth since 1997 (Rand, 2001).

Northern Tier

With an average 0.4% population growth since 1997 and a 1.2 fertility rate, the countries of the Northern Tier have experienced demographic trends comparable to Western industrialized countries (such as Italy, which had 0.1% annual growth and a 1.3 fertility rate).

CONCLUSIONS

Overall population size in most E&E countries has declined. Overall, the countries in the E&E region, with the exception of Muslim-majority countries, are declining in population as a result of high adult mortality alongside reduced fertility. In most countries, fertility is below replacement level and for the region as a whole is

among the lowest in the world. Russia displays the most striking case of population decline and high adult male mortality in the region. Dramatic population declines could have destabilizing effects on a country's military (and ability to control its borders), pensions, overall economic growth, and social cohesion.

The E&E countries have a rapidly aging population. Accompanying current trends in mortality is an overall aging of the population. By 2025, the median age of the population will be more than 10 years greater than it is now in about half of the E&E countries. The proportion of elderly and the young to the total population has significant economic implications. This dependent population places a greater financial burden on the society at large (Heinegg et al., 2006).

The role of migration is unclear. Up to 10 million migrants are spread throughout the region, pushed by low living standards and rising poverty levels at home and pulled by economic opportunities in Russia and abroad. The implications of migration on this scale are not taken into account in this report. Due to social dislocation, potential substandard living conditions, and the exclusion of migrating populations from health care systems, there is an increased risk for the spread of infectious disease that is a cause for concern.

USAID

High adult mortality and low fertility can have serious economic consequences affecting both the dependent and working-age populations in the region.

Life Expectancy

Life expectancy, like population growth and fertility, is a demographic measure that relies heavily on adult and under-5 mortality rates to estimate the average number of years an individual is expected to live. In 2005, life expectancy in the developed world reached 79 years for females and 72 years for males. All but two regions in the world – the E&E region and AIDS-impacted sub-Saharan Africa – have experienced an increase in life expectancy since 1990 (figure 2) (USAID, 2005).

E&E REGIONAL OVERVIEW

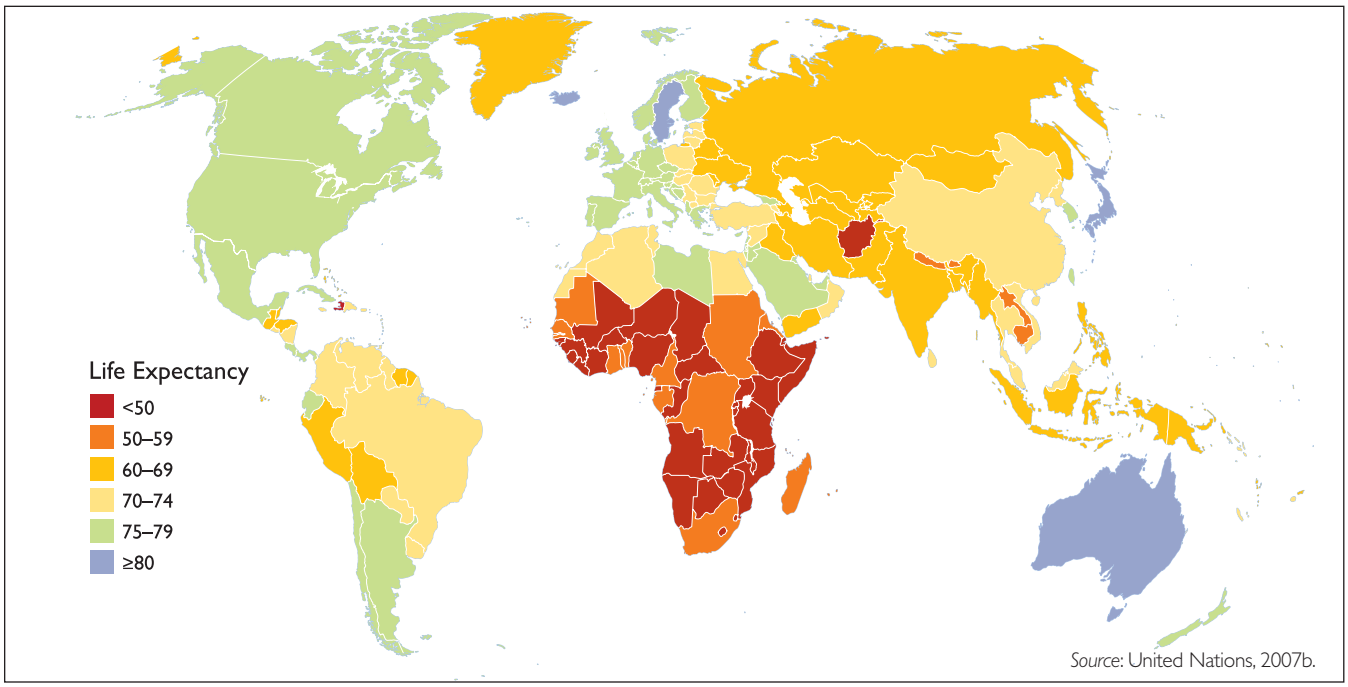
The region's health care infrastructure deteriorated following the collapse of the Soviet Union; adult and under-5 mortality rose; and infectious diseases spread rapidly. In 2005, life expectancy at birth in the E&E region was an average 71.2 years, 6.4 years less than the 77.6 years in the EU-25 countries.

Five Most Vulnerable Countries	
	1. TURKMENISTAN
	2. TAJIKISTAN
	3. RUSSIA
	4. KAZAKHSTAN
	5. UZBEKISTAN

NCDIs are responsible for more than 85% of the deaths in the E&E region, with males disproportionately affected (USAID/Johns Hopkins, 2006). The highest life-expectancy gender gaps in the world are found in Eurasia,[11] where males on average live eight fewer years

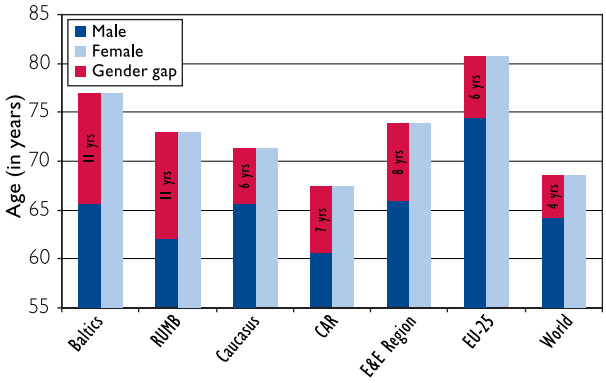
[11] Data for the combined life expectancy presented in this section are obtained from World Bank WDIs 2007. Data for male and female life expectancy to identify the gender gap in life expectancy are obtained from WHOSIS 2007.

FIGURE 2. Life Expectancy, 2005



Source: United Nations, 2007b.

FIGURE 3. Life Expectancy by Gender



Source: WHOSIS, 2007.

than females, as seen in figure 3. Worldwide trends contrast with the E&E regional experience – females worldwide live only two years longer than males in low-income developing countries, four years longer in middle-income developing countries, and six years longer in high-income economies (USAID, 2005).

SUBREGIONS

Russia, Ukraine, Moldova, and Belarus (RUMB)

Combined life expectancy in Russia, Ukraine, Moldova, and Belarus remained relatively static from 2001 to 2005 at 68 years, the second lowest subregional average in E&E. At 65 years, Russia had the lowest life expectancy at birth in 2005 in this subregion; all three other countries were at 68 years. Men in the subregion died on average 11 years earlier then women, three years more than the E&E average. In Russia, that gap was 13 years.[12]

Central Asian Republics (CAR)

With an average of 65.6 years, CAR had the lowest life expectancy in the E&E region in 2005. CAR was the only subregion to see a reduction in life expectancy since 2001 (67.5 to 65.6 years). Of the CAR countries, Turkmenistan had the lowest life expectancy – 63 years, which is comparable with rates in Yemen, Pakistan, and Bolivia. Unlike other E&E subregions, the gender gap in CAR varied considerably among countries, from two years in Tajikistan to 11 years in Kazakhstan.

Caucasus

The Caucasus had an average life expectancy of 72.7 years in 2005, surprisingly high considering that the subregion's average under-5 mortality rates are the highest in E&E. Life expectancy for the Caucasus is comparable with those of Hungary and Turkey, which averaged 72.9 and 72.8 years, respectively.

Baltics

This subregion has not experienced a significant change in overall life expectancy during the last five years, aver-

[12] Data from Russia show male life expectancy is inversely associated with per capita alcohol consumption (14 liters per capita per year) (Treml, 1997).

aging 71.7 years in 2005. Despite this high life expectancy, a large gender gap similar to that in the RUMB subregion (men living 11 fewer years on average than women) is very concerning.

Southeastern Europe and Northern Tier

Southeastern Europe and the Northern Tier have the highest life expectancies in the E&E region, at 73.9 and 75.2 years, respectively. At 78 years, Slovenia had the highest life expectancy in the E&E, greater than the EU-25 average of 77.7 years.

CONCLUSIONS

Life expectancy is low in the E&E region. In general, life expectancy has decreased in much of the E&E region since 1990, and current levels are considerably lower than those of countries in Western Europe. The E&E regional average was 6.4 years lower than that of the EU-25 in 2005, with CAR and Russia having the lowest life expectancies. This premature loss of life represents a loss of prime-age workers, family heads, and active citizens – all principal contributors to the economy and investors in the future (Figuras et al., 2004).

The greatest gains in life expectancy can result from lowering adult mortality. A study by the World Bank (Rechel et al., 2004) showed that between seven and 10 years could be added to life expectancy by reducing non-communicable diseases (NCDs), especially cardiovascular disease and external causes of death, and that Russia would have the greatest gains. Reducing mortality in children under age 5 would increase life expectancy as well, but at a magnitude five to 10 times lower than would reducing adult mortality.

The E&E region has the world's greatest gender gap in life expectancy. In addition to the low levels of overall life expectancy, the E&E region is also marked by the greatest gender gaps in life expectancy in the world, much higher than those found in developing and middle-income countries. This difference could possibly be attributed to the high incidence of NCDIs in the region, with males disproportionately affected compared with females.

Adult Mortality

Adult mortality – the probability of dying between the ages of 15 and 60 – is an important measure in understanding the overall health of adult populations (Merson et al., 2004). Globally, 236 out of every 1,000 15-year-olds will die before reaching age 60.[13] In the E&E region, the average adult mortality rate is lower than the global average. However, for the higher-burdened countries of Eurasia, where more than one quarter of all 15-year-olds die before reaching age 60, adult mortality rates surpass the global average. Only in sub-Saharan Africa is the adult mortality rate higher.

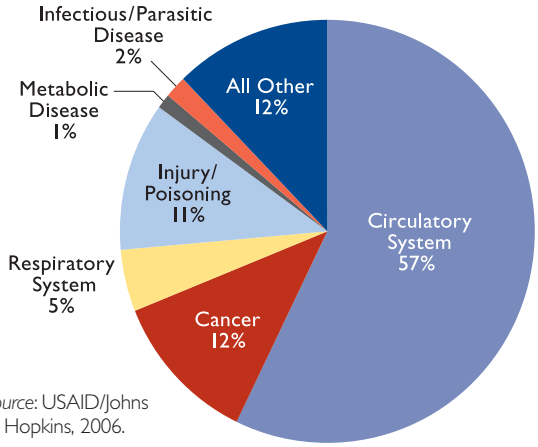
E&E REGIONAL OVERVIEW

Adult mortality in the E&E region uniquely serves as a proxy for NCDIs, which, as previously stated, account for more than 85% of all deaths annually (figure 4) (USAID/Johns Hopkins, 2006; WHO, 2006). Since the early 1990s, Eurasia has seen a marked increase in adult mortality attributed primarily to lifestyle choices,

[13] The adult mortality rate data presented in this chapter were obtained by combining information on adult male and female mortality rates. Since they are not weighted, they may not be identical to the numbers presented in the HVI and SMI tables; they are, however, comparable.

Five Most Vulnerable Countries	
	1. RUSSIA
	2. KAZAKHSTAN
	3. UKRAINE
	4. BELARUS
	5. TURKMENISTAN

FIGURE 4. Primary Causes of Adult Mortality in E&E Region, 2003



Source: USAID/Johns Hopkins, 2006.

TABLE 4. Mortality Gap Between E&E Region and Western Europe: Selected Causes of Death

Cause of Mortality, 2002	E&E Region*	Western Europe**	Mortality Gap
Total All-Cause Deaths (1,000s)	5,644	3,920	1,724
Selected NCDs	Deaths in 1,000s (%)		
Cardiovascular Disease	3,316 (58.8)	1,612 (41.1)	1,704 (17.6)
Diabetes Mellitus	50 (0.9)	92 (2.3)	-42 (-1.5)
Trachea/Bronchus/ Lung Cancers	159 (2.8)	207 (5.3)	-48 (-2.5)
Selected Inf. Diseases			
Tuberculosis	64 (1.1)	5 (0.1)	59 (1.0)
HIV/AIDS	30 (0.5)	6 (0.2)	24 (0.4)
Injuries			
All-Cause Injuries	602 (10.7)	190 (4.8)	412 (5.8)
Poisonings	105 (1.9)	6 (0.2)	99 (1.7)
Violence	69 (1.2)	4 (0.1)	65 (1.1)

Taken from the 2004 World Health Report Statistical Annexes. *http://www.who.int/whr/2004/en/report04_en.pdf*

* E&E region in this table excludes Croatia, Czech Republic, and Slovenia, and includes Turkey.

** 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

Source: Heinegg et al., 2006.

TABLE 5. Cardiovascular Mortality in Working-Age Populations, Russia and Six Other Countries, 2000 (deaths per 100,000)

Country	Male	Female
Russia	576	179
India	211	139
South Africa	187	156
Brazil	180	120
United States	116	63
Portugal	99	62
China	91	62

Source: Adapted from Greenberg et al., 2005.

in particular those related to alcohol, smoking, diet, and exercise-related conditions. Table 4 reveals the mortality gap in NCDIs between the E&E region and Western Europe. Table 5 shows cardiovascular disease mortality among Russian men in 2000, highlighting the substantial difference from the rate among Russian women and the rates in other countries.

Despite the substantial gender gap in mortality, with male deaths significantly exceeding female deaths, the maternal mortality ratio in the E&E region is noteworthy.[14] Although maternal mortality in the region is much lower than in developing countries, it is still higher than in Western Europe and partly contributes to the high rates of adult mortality. An important issue specific to the region arises from the widespread use of abortion as an alternative to contraception. In Russia, for example, around one-quarter of maternal deaths are abortion-related (Suhrcke et al., 2007).[15]

SUBREGIONS

Russia, Ukraine, Moldova, and Belarus (RUMB)

This subregion has had the highest average adult mortality rate since 2000, growing to 267 deaths per 1,000 people in 2005. Russia had the highest adult male mortality in the E&E region. Ukraine has similarly high rates of adult mortality and experienced a large increase (from 250 to 276 deaths per 1,000) between 2000 and 2005, propelled by a significant increase in male mortality (from 365 to 403 deaths per 1,000). Adult mortality in Moldova and Belarus, despite recent decreases, remains high. The principal causes of increased adult mortality, and correspondingly reduced life expectancy, in this subregion are lifestyle-related factors, especially high rates of alcohol consumption (Greenberg et al., 2005). For example, Russian men consume on average almost three times as much alcohol as they did 16 years ago, and alcohol is a contributing factor in nearly one-half of all deaths. In addition, earlier research neglected "manufactured alcohol" not intended for human consumption and the significant contribution it makes to the death rate (Leon et al., 2007).

[14] The maternal mortality ratio is defined as the number of maternal deaths per 100,000 live births during the same time period (CDC, 2007). In most E&E countries, maternal mortality is lower than in developing countries although somewhat higher than in Western Europe.

[15] Despite abortion being legal, some abortions take place outside of medical facilities, where there may be increased risks of morbidity and mortality from complications (CDC/ORC Macro, 2003).

Central Asian Republics (CAR)

All the countries in Central Asia, excluding Kazakhstan, saw overall decreases in adult mortality rates from 2000 to 2005. In 2005, Kazakhstan (316 deaths per 1,000) approached Russian rates of adult mortality for the first time. Despite overall decreases in adult mortality in CAR over the past six years, both Tajikistan and Uzbekistan saw increases from 2004 to 2005, with Tajikistan experiencing the largest increase in adult female mortality in the E&E region (139 to 167 deaths per 1,000) during that time.

Caucasus

Despite having an overall decrease in adult mortality from 2000 to 2005, Georgia saw a rise in adult mortality rates from 2004 to 2005 (111 to 125 deaths per 1,000). Uniquely, Azerbaijan experienced a decrease in adult male mortality (205 to 187 deaths per 1,000) between 2004 and 2005, but saw a rise in adult female mortality (113 to 121 deaths per 1,000) in the same year.

Baltics

Lithuania is the only country in the Baltic subregion where adult mortality increased between 2000 and 2005, from 196 deaths per 1,000 to 218. This increase may be attributed to a significant rise in male mortality in the country – 40 more deaths per 1,000 in 2005 than in 2000.

Southeastern Europe

Like the Northern Tier, Southeastern Europe (138 deaths per 1,000) experienced continuous declines in adult mortality rates from 2000 to 2005 and continues to approach the rates of its EU-25 neighbors.

Northern Tier

Countries in the Northern Tier of E&E all experienced decreases in adult mortality between 2000 and 2005. In 2005, the average adult mortality rate for these five countries was 137 deaths per 1,000, compared with the EU-25 average of 108.

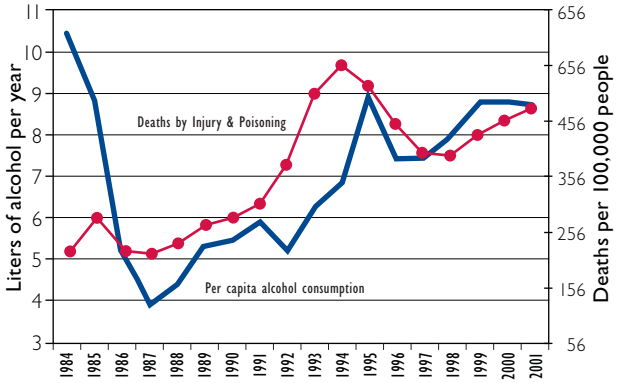
Noncommunicable Disease and Injury

Lifestyle factors associated with poor diet, alcohol consumption, and smoking cause chronic cardiovascular and respiratory diseases that explain some of the striking mortality trends in the region (LSHTM, 2004; Treml, 1997; World Bank, 2007c). Alcohol consumption is a contributing factor in 40% to 60% 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 5 shows a very close correspondence between alcohol consumption in Russia and external causes of death (i.e., from injuries, such as those stemming from automobile accidents, and poisoning, primarily alcohol poisoning). The E&E region also has high rates of violent death from suicide and homicide. The countries in Eurasia have the highest overall injury mortality rates in the world, with the probability of death from injury among adults nearly six times higher than in neighboring Western European countries (WHO, 2000; WHO, 2003).

USAID

With noncommunicable diseases on the rise across the region, the capacity of health systems will continue to be a primary barrier in many countries.

FIGURE 5. External-Cause Deaths by Injury and Poisoning and Total Alcohol Consumption in Russia



Source: Treml, 1997; World Bank, 2004.

CONCLUSIONS

Adult male mortality is exceedingly high in the E&E region. The increase in adult male mortality has resulted in greater gender gaps within overall adult mortality and life expectancy rates (World Bank, 2007b). At the same time, however, most studies in the region show that women report significantly worse health than men (Walters and Suhrcke, 2005).

The RUMB subregion had the highest adult mortality rates in 2005, with rates increasing since 2000. With high mortality rates and record low birth rates, many communities will be unsustainable. The mortality crisis in Russia seems to be concentrated in the least-developed regions and mainly affects poor young and middle-aged urban men with limited education from minority backgrounds (World Bank, 2005).

NCDI incidence is very high in the E&E region. NCDIs account for more than 85% of all deaths in the region. They can be an economic burden to families for indefinite periods of time, increasing the likelihood of continued impoverishment (USAID/ Johns Hopkins, 2006). The expected economic benefit of addressing these issues is of a magnitude that easily outweighs the costs of health promotion and disease prevention programs (World Bank, 2005).

Abortion is a significant cause of maternal mortality in the region. Complications from childbirth and the use of abortion as a method of contraception have led to increasing rates of maternal mortality in the E&E region. Vital statistics in Eastern Europe and Central Asia indicate that between 15 percent and 50 percent of maternal deaths are related to abortion (CDC/ORC Macro, 2003).

Under-5 Mortality

Under-5 mortality is defined as the probability (expressed as a rate per 1,000 live births) of a child dying before reaching the age of 5.[16] Each year, almost 10.5 million children worldwide die before their fifth birthday. Although under-5 mortality is declining globally, the pace of progress has been uneven across developing regions, including Eurasia (United Nations, 2007).

Five Most Vulnerable Countries	
	1. TURKMENISTAN
	2. AZERBAIJAN
	3. KAZAKHSTAN
	4. TAJIKISTAN
	5. UZBEKISTAN

E&E REGIONAL OVERVIEW

Under-5 mortality rates are relatively low in the E&E region compared with those in developing countries, but are still high when compared with Western Europe. Moreover, a significant number of infant deaths are uncounted in the FSU countries because, in several countries, of poor registration of vital statistics and because infant mortality rates tend to be based on a Soviet-era definition of live birth that differs from the definition now recommended by WHO.[17] Fortunately, progress in standardizing the definition is being made. In Eurasia, the majority of deaths before 5 years of age occur during the neonatal and infant periods (figure 6) (USAID, 2006b).

SUBREGIONS

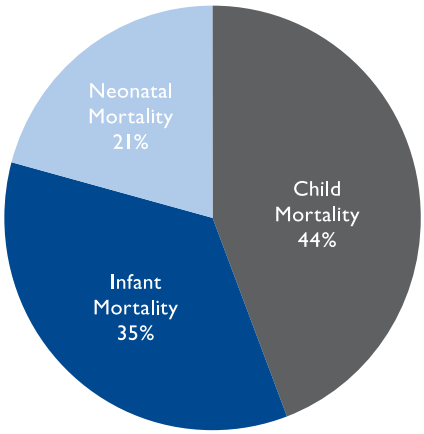
Russia, Ukraine, Moldova, and Belarus (RUMB)

Russia, Ukraine, Moldova, and Belarus have relatively low under-5 mortality rates comparable with those of Southeastern Europe (both 14 per 1,000 in 2005). Moldova saw the most significant decline, from 37 to

[16] The under-5 mortality rate 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 et al., 2004).

[17] Infant mortality rates provided in 1995 to the United Nations Statistical Division by Russia, Ukraine, Armenia, Georgia, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan, Belarus, and Moldova did not include infants who died within seven days following live birth and were at less than 28 weeks' gestation, below a weight of 1,000 grams, or smaller than a length of 35 centimeters. This compares with international practice, in which infants who die after birth but are less than 22 weeks' gestational age or weigh less than 500 grams are considered stillbirths rather than perinatal deaths and are excluded from being considered a live birth (USAID, 2006b)

FIGURE 6. Age-Specific Under-5 Mortality Rates in E&E Region, 2005 (Neonatal Mortality, 2004)



Source: WHOSIS, 2007.

16 deaths per 1,000 live births from 2000 to 2005. This change may be due in part to the launch of the "Making Pregnancy Safer Initiative" in 2001, a response to the crisis in delivery care and mortality indicators (ORC Macro, 2006).

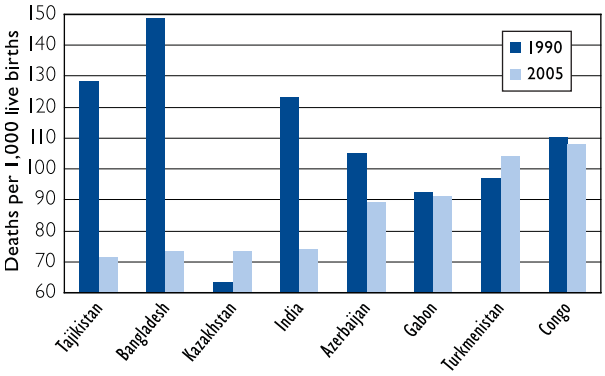
Central Asian Republics (CAR)

The highest rates of under-5 mortality in the E&E region are observed in CAR. The average subregional under-5 mortality rate of 77 deaths per 1,000 live births is more than 12.5 times higher than the 2005 EU-25 average of 6 deaths. Since 1990, Turkmenistan and Kazakhstan are the only countries in E&E that have experienced significant increases in under-5 mortality, reaching, respectively, 104 and 73 deaths per 1,000 live births in 2005. Among the developing countries shown in figure 7, only these two had increased under-5 mortality over the last 15 years. Tajikistan experienced a decline in under-5 mortality between 1990 and 2005, from 128 to 71 deaths per 1,000 live births, with much of the drop taking place in recent years. Uzbekistan and Kyrgyzstan remained relatively unchanged.

Caucasus

The Caucasus subregion had the second highest under-5 mortality rate in E&E. Although it is much lower than the rate observed in Central Asia, the combined subregional average of 54 deaths per 1,000 is nine times higher than the EU-25 average. Azerbaijan's under-5 mortality rate in 2005 was the highest in the Caucasus subregion at 89.

FIGURE 7. Under-5 Mortality Rates, Country Comparisons, 1990 and 2005



Source: WHOSIS, 2007.

Baltics

Under-5 mortality rates in Estonia, Latvia, and Lithuania have remained relatively unchanged since 2000, averaging just under nine deaths per 1,000 live births.

Southeastern Europe

Croatia had the lowest under-5 mortality rate in the Southeastern Europe subregion in 2005, with seven deaths per 1,000 live births, a rate comparable with that of the United Kingdom and other industrialized Western countries.

Northern Tier

Countries in the Northern Tier had the lowest under-5 mortality rates in the E&E region in 2005. Czech Republic and Slovenia had the lowest rates of all E&E countries, with four deaths per 1,000 live births in each country.

USAID

A nurse examines a young child in Kazakhstan. Infant and child mortality remain a significant concern for parts of the E&E region. In Kazakhstan and the other CAR countries, the highly successful ZdravPlus primary health care pilot project is helping to reduce deaths among young children.

CONCLUSIONS

Under-5 mortality rates are highest in CAR and Caucasus. The average subregional under-5 mortality rates of the CAR and Caucasus are considerably higher than the 2005 EU-25 average. Child health in these countries remains mired in very basic problems that bring high mortality. Recent economic booms in Azerbaijan and Kazakhstan have apparently not transferred much benefit to child health programs.

High child poverty is a reason for high under-5 mortality. One in four children in the E&E region is growing up in poverty. In all countries in the region, children are the age group most at risk of poverty, and gains on the income front are not being translated into children's well-being (Alexander and Hoelscher, 2006). Tajikistan, the poorest country in Central Asia, has experienced strong economic growth, but four out of five children there live below the poverty line. Public spending (4% of GDP) on key social services such as health care and education is low.

INFECTIOUS DISEASE

Tuberculosis

Tuberculosis (TB) remains a threat to public health, with a global burden of more than 8.8 million active cases and 1.5 million TB-related deaths per year (WHO, 2007). Although worldwide incidence rates appear to have stabilized, the number of active TB cases continues to rise. Figure 8 presents the estimated TB incidence rate across all countries in 2005 (WHO, 2007b). In the E&E region, high treatment default rates caused by parallel treatment systems and late access to the health system are principal causes of treatment failure, which, at 6.6%, is the highest in the world.[18]

E&E REGIONAL OVERVIEW

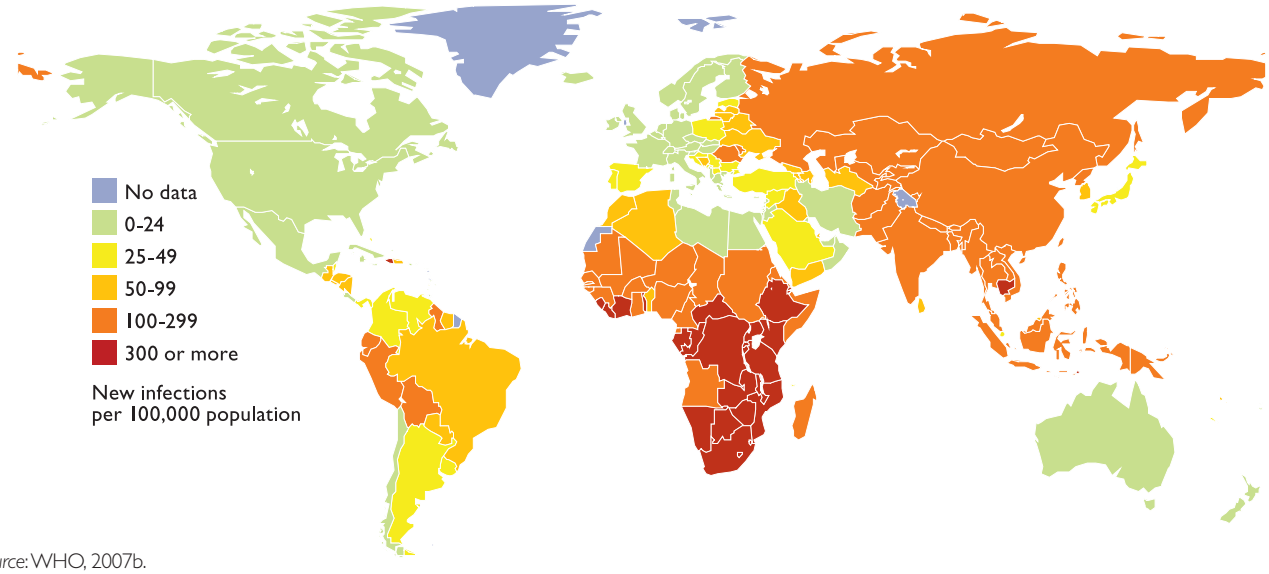
As the health care system of the Soviet Union deteriorated, the countries of Eastern Europe and Eurasia could no longer financially support the previous TB infrastructure, and TB increased at an alarming rate (USAID, 2006c). In 2005, the E&E region had approximately 5.5 times more new TB cases than the EU-25 countries. Higher rates in the E&E region are largely attributable to multidrug-resistant tuberculosis (MDR-TB), highly affected prisoner populations, and growing TB-HIV co-infection.

Five Most Vulnerable Countries	
	1. TAJIKISTAN
	2. KAZAKHSTAN
	3. MOLDOVA
	4. ROMANIA
	5. KYRGYZSTAN

Treatment failure leads to an increase in drug-resistant TB and, according to the latest published survey of the International Union Against Tuberculosis and Lung

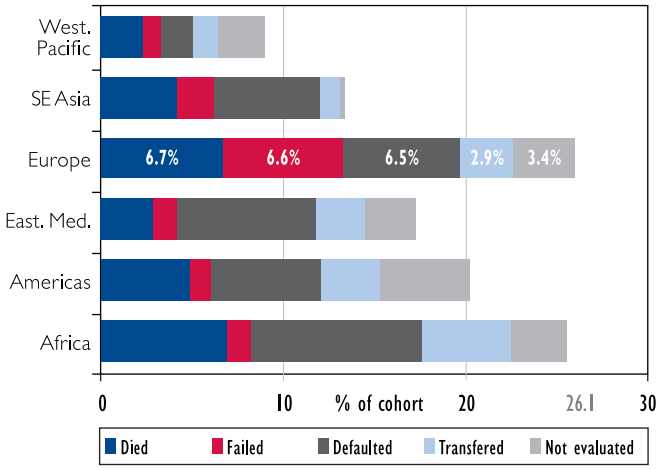
18 With increasing international pressure, many countries have made large strides toward reducing default and failure under the DOTS program, but several countries, including Croatia (25%), Ukraine (29%), Albania (33%), Turkmenistan (37%), Tajikistan (61%), and Russia (83%), still fall dramatically short of the goal of 100% DOTS coverage (figure 12).

FIGURE 8. Estimated TB Incidence Rates, 2005



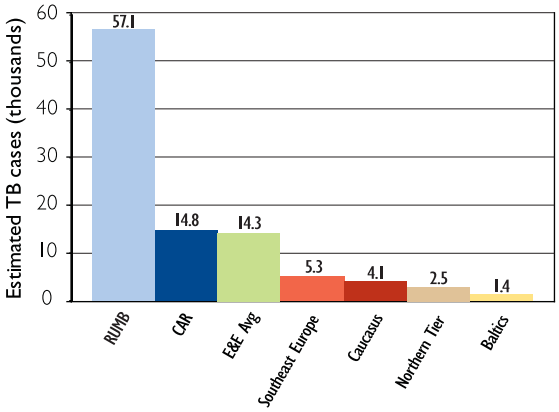
Source: WHO, 2007b.

FIGURE 9. WHO Regional Comparison of Outcomes for TB Patients Not Successfully Treated with DOTS, 2004



Source: WHO, 1995–2005.

FIGURE 10. Average New TB Cases, All Forms (Subregional), 2005



Source: WHO, 1995–2005.

Disease (IUATLD), 13 of the 25 countries with the highest estimated number of MDR-TB cases are in the E&E region (WHO/IUATLD, 2007). Treatment failure rates across WHO regions are presented in figure 9.

Prisons are often high-risk environments for TB transmission because of severe overcrowding, poor nutrition, poor ventilation, and limited access to often insufficient health care. Reports from various prison settings in the region have documented a very high annual rate of reported TB cases, up to 20 times higher than in the civilian sector.[19] Moreover, TB strains transmitted in prisons are more likely to be drug-resistant or associated with HIV co-infection (WHO EURO, 2007).

The incidence of HIV/AIDS in Eastern Europe and Central Asia has shown exponential growth 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% of all new TB cases. A decade later, more than 3% of all TB cases reported HIV co-infection – a more than 9.5 fold increase (WHO 2007b). Recognizing TB-HIV co-infection is an important part of understanding and controlling the epidemic in the region.

SUBREGIONS

Russia, Ukraine, Moldova, and Belarus (RUMB)

In WHO's 2007 *Global Tuberculosis Control* report, the RUMB subregion had the highest number of estimated new TB cases. Russia – the only E&E country on the list – ranked 12th among the 22 highest-burden countries in the world (WHO, 2007). In 2005, Russia had an estimated 170,422 new TB cases (all forms), 11.5 times the TB burden of all the CAR countries, the next highest subregion. Figure 10 shows the contrasting burden of TB cases in RUMB against the rest of the E&E subregions.

Likewise, Ukraine has a rapidly escalating TB problem exacerbated by one of the fastest-growing HIV/AIDS epidemics in the world and by growing MDR-TB. WHO estimates that Ukraine has the eighth-highest number of MDR-TB cases globally. Prisoners in the Ukraine are especially vulnerable. In a study done by the Ukraine Department of State, active TB was found in 2,588 per 100,000 prisoners, a rate more than 20 times higher than in the general population (Kalashnyk, 2006).

TB in Moldova is an increasing risk, with an estimated new TB incidence rate of 138 per 100,000 people in 2005, approximately 15 times higher than the incidence rates of Western European countries and one of the highest among the FSU countries. Moldova also has the highest estimated TB incidence among HIV-positive people in the E&E region (5.9 per 100,000).

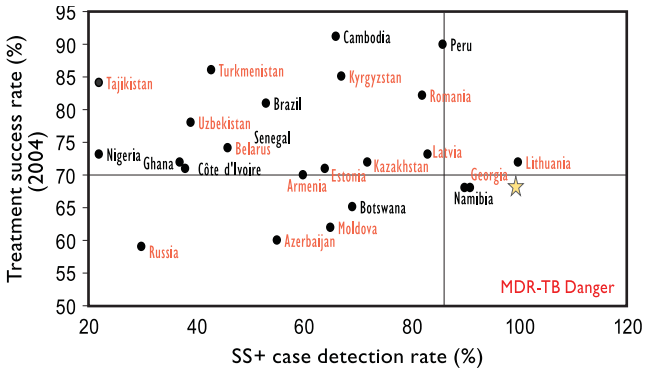
Central Asian Republics (CAR)

The CAR subregion had the highest overall estimated TB incidence rate in the E&E region (129.2 per 100,000) – a rate nearly 2.5 times the E&E mean and 10.5 times the EU-25 mean. Kazakhstan had the highest proportion of MDR-TB (more than 15% of newly diagnosed cases and more than 23% of all TB cases) among countries surveyed (WHO, 2004).[20] All CAR countries

[19] Others have also pointed out homelessness as a significant factor contributing to MDR-TB (PIH, 2007).

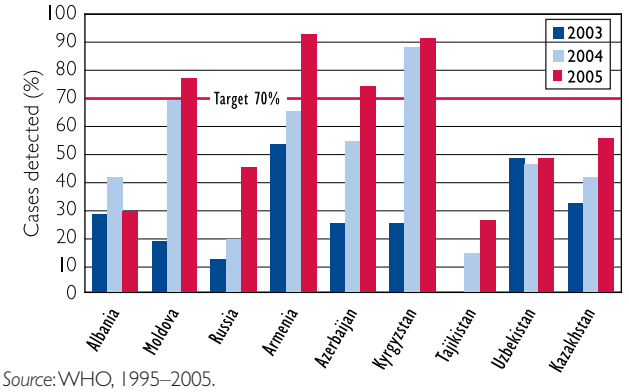
[20] CAR countries rank 10, 11, 19, and 21 on a list of the 25 priority countries for MDR-TB.

FIGURE 11. Progress Toward WHO Treatment and Detection (70/85) Targets, Country Comparisons, 2005



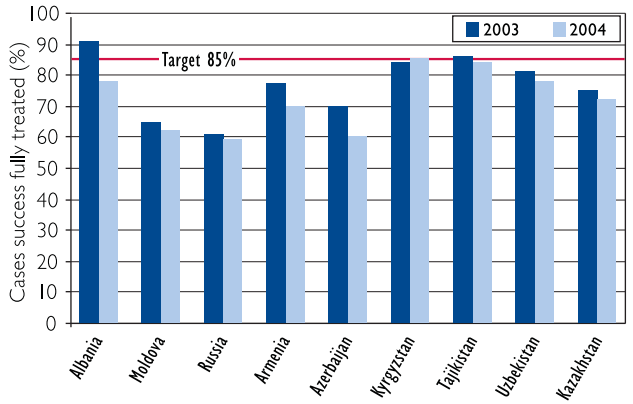
Source: WHO, 1995–2005.

FIGURE 12. DOTS TB Detection Rate for Selected E&E Countries, 2003–2005



Source: WHO, 1995–2005.

FIGURE 13. DOTS TB Treatment Success Rate for Selected E&E Countries, 2003–2004



Source: WHO, 1995–2005.

except Turkmenistan were on the WHO/IUATLD list of the global 25 top-priority MDR-TB countries.

CAR also had the second most TB-HIV co-infection cases in the E&E region, behind RUMB. The majority (93%) of co-infected cases occurred in Kazakhstan and Uzbekistan, where HIV is more prevalent.

Caucasus

The average estimated TB incidence rates in the countries of the Caucasus subregion have been steadily increasing since data became available. Since 1995, the number of estimated TB cases increased by 65% in Azerbaijan, by 43% in Armenia, and by 36% in Georgia.

Despite its relatively low number of estimated TB cases, Georgia may be in unique danger of an MDR-TB epidemic because of its high rates of failure in treatment (figure 11). Approximately 20% of all people newly diagnosed with TB and 30% of all those previously treated who presented with TB in 2005 had defaulted or failed to be re-evaluated. Azerbaijan and Georgia were both on the WHO/IUATLD list of the top 25 MDR-TB countries, at the 17th and 20th positions, respectively.

Baltics

The Baltics have some of the highest incidence rates of MDR-TB in the world and have been targeted in the *Global MDR-TB & XDR-TB Response Plan, 2007–2008* as priority countries, with Estonia having the second-highest proportion of MDR-TB cases globally (20.1%) (Stop TB, 2007).

Southeastern Europe

In 2005, Romania was the fourth most vulnerable country in the E&E region and had the highest estimated TB incidence and mortality in Southeastern Europe by far, with 134 cases per 100,000 population. The rate is declining annually, but TB remains a serious public health threat in the country.

Northern Tier

TB incidence in the Northern Tier countries has declined every year since 1995. From 1995 to 2005, the Northern Tier had the region's largest decrease in estimated TB cases (14,948). During that period, the E&E region experienced an increase of 97,392 cases, while the EU-25 decreased by 39,344.

TB Treatment in Eurasia

Increasing TB incidence (figure 12), coupled with decreasing treatment success in many of the countries in the region (figure 13), is especially alarming, as these trends push countries closer to the MDR-TB danger zone seen in figure 11. These trends signal an increase in the risk of an MDR-TB epidemic, to which countries in the CAR and Caucasus subregions appear particularly vulnerable. Some countries, however, have shown progress in moving toward successful treatment. Belarus, for example, recently initiated TB follow-up and outcome analysis and guaranteed TB treatment for released prisoners (WHO, 2007c).

USAID

A pilot DOTS program was initiated in Turkmenistan to help address the increasing threat of TB and MDR-TB in Central Asia.

CONCLUSIONS

MDR-TB is a very significant vulnerability in E&E, both as a drain on regional resources and as a threat to global health. MDR-TB is a consequence of inadequately managed and poorly coordinated treatment regimens and lack of investment in laboratories. It is 20 to 1,400 times more expensive to treat than single-strain TB, takes four times as long to treat, and is much more difficult to diagnose. If MDR-TB goes untreated, the infection is 90% fatal. CAR is disproportionately affected, with MDR-TB occurring in up to 20% of all TB cases.

Stigmatized populations are disproportionately affected by TB. Prisons in Ukraine and Russia have reported TB incidence rates more than 20 times higher than those found in the civilian sector. Similarly, the E&E region has experienced a rapidly growing HIV epidemic, placing HIV-positive individuals at an increasing risk for TB infection.

HIV/AIDS

Globally, 39.5 million people are infected with HIV, and an estimated 4.3 million new infections occured in 2006 (UNAIDS, 2006). In the E&E region, the high efficiency of HIV transmission through injecting drug use, drug-related sexual behaviors, and the highest prevalence of heroin use in the world (four times the global average) place the estimated 2.5 million drug users and their sexual partners at extremely high risk for HIV (UNODC, 2007). Injecting drug use-related transmission, therefore, causes the greatest concern for one of the fastest-growing HIV epidemics in the world (EU, 2004).

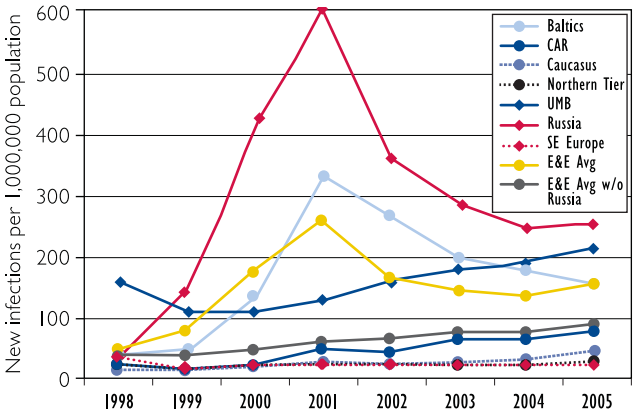
Five Most Vulnerable Countries	
	1. ESTONIA
	2. RUSSIA
	3. UKRAINE
	4. LATVIA
	5. ROMANIA

E&E Regional Overview

In the 28 countries of the E&E region, 1.5 million people are living with HIV, a 20-fold increase in less than a decade (figure 14). Almost one third of newly diagnosed HIV infections in this region are in people aged between 15 and 24 years. In 2005, infection via injecting drug use accounted for almost two-thirds (62%) of the reported HIV cases for which information on the mode of transmission was available (figure 15).[21] Infection through injecting drug use is especially troubling

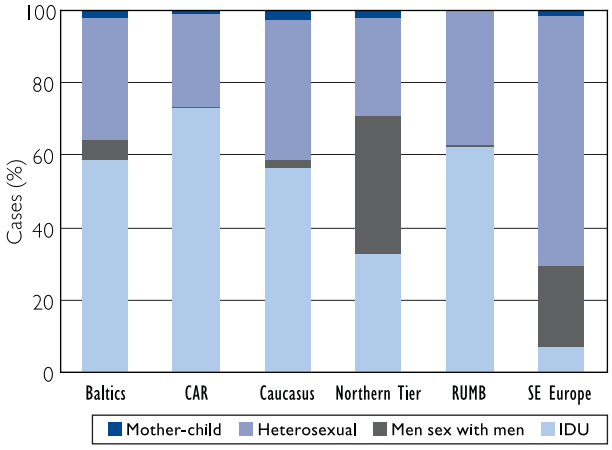
[21] An increasing proportion of HIV infections (36% of reported cases in 2005) is estimated to occur via unprotected sexual intercourse, primarily among the sexual partners of HIV-infected IDUs. As a result, women bear a growing part of the HIV burden. In Uzbekistan, for example, there were 8.6 times more infections in women in 2005 than in 2001 (EuroHIV, 2007).

FIGURE 14. HIV Incidence Rates in E&E Region (Subregional), 1998–2005



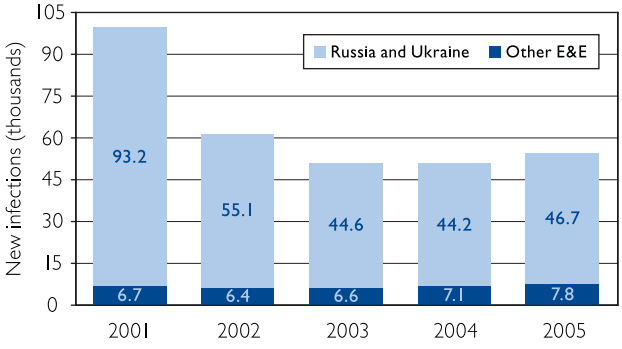
Source: EuroHIV, 2007.

FIGURE 15. Reported HIV Transmission Pathways in the E&E Region (Subregional), 2005



Source: EuroHIV, 2007.

FIGURE 16. Reported New HIV Infections in E&E Region, 2001–2005



Source: EuroHIV, 2007.

because of its very high efficiency as a means of transmission, the highly marginalized nature of the population, and the lack of access to effective treatment.

Overall, treatment coverage with antiretroviral drugs (ARVs) remains inadequate in E&E, with only 13% of people in need of ARVs receiving them at the end of 2005. Injecting drug users (IDUs), who represent more than 60% of HIV cases in the region, account for only 24% of the people receiving ARVs (UNAIDS, 2006).

SUBREGIONS

Russia, Ukraine, Moldova, and Belarus (RUMB)

Russia and Ukraine together account for approximately 85% of all people reported living with HIV in this region (figure 16). The number of newly reported HIV cases in Russia alone rose rapidly in the late 1990s, peaked in 2001, and then declined sharply. Partial explanations for the sharp decline after 2001 could be that:

1. Fewer HIV tests were carried out in some populations at high risk of HIV infection. IDUs and prisoners, for example, received 51% and 30% fewer tests, respectively, in 2003 than in 2001 (UNAIDS/ WHO, 2005).

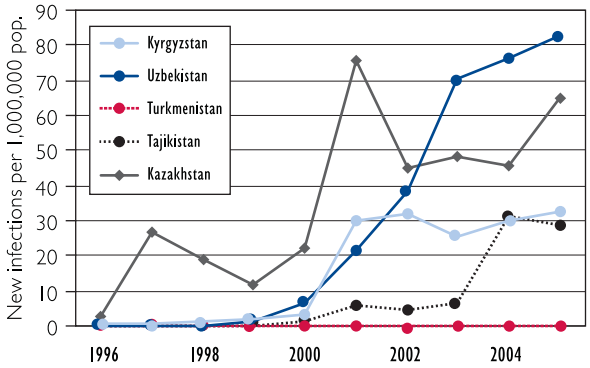
2. HIV infections among IDUs may have reached saturation levels in 2001, at least in those parts of the country where HIV had spread quickly.[22] The number of new reported HIV cases among IDUs decreased almost fivefold in Russia between 2001 and 2005.

3. New drug legislation and the creation of a new counternarcotics agency due to an increase in the volume of opium and heroin entering Russia from Afghanistan may have contributed to stigmatization of IDUs and resultant underreporting (UNAIDS/WHO, 2006; U.S. Embassy, 2003).

Ukraine's HIV epidemic is rapidly increasing. Annual HIV diagnoses have more than doubled since 2000, bringing adult prevalence to 1.4% (UNAIDS, 2006). Although new sexually transmitted HIV infections are on the rise (40.7% of all reported cases in 2005, up from 14.0% in 1999), injecting drug use remains the major risk factor for HIV infection in Ukraine.

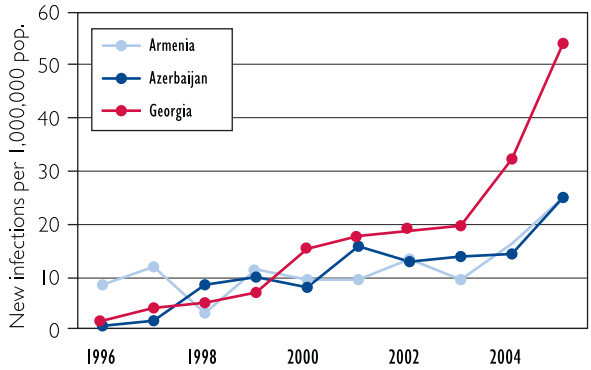
[22] Kaliningrad and Nizhniy Novgorod *oblasts* and Krasnodarskiy *krai* (Rhodes et al., 2006).

FIGURE 17. HIV Incidence Rates in CAR Subregion, 1996–2005



Source: EuroHIV, 2007.

FIGURE 18. HIV Incidence Rates in Caucasus Subregion, 1996–2005



Source: EuroHIV, 2007.

Moldova experienced a 50% increase in the rate of new HIV infections from 2004 to 2005 (85 to 127 per million); that rate has more than tripled since 2000. Belarus, on the other hand, saw a stabilization in HIV infection increases since 1999. Of those newly infected, an increasing proportion of cases are transmitted via unprotected sexual contact, which accounted for 27.2% of new infections in 2001, 35.5% in 2003, and 57.0% in 2005.

Central Asian Republics (CAR)

All CAR countries (discounting Turkmenistan, which has no reporting system) have experienced increasing rates of HIV incidence from 2000 to 2005 as seen in figure 17. Kazakhstan and Uzbekistan bear the largest HIV burden in the CAR region (65.0 and 82.7 new cases per million, respectively).

Caucasus

With a relatively small number of HIV diagnoses and low baseline level, Azerbaijan experienced the region's largest increase (74.8%) in the rate of new HIV infections from 2004 to 2005 (14.3 to 25.0 per million). Armenia and Georgia also had large increases of 54.7% and 68.5%, respectively (figure 18).

Baltics

In the Baltics, there was a steady decrease in the rate of new HIV diagnoses from 2002 to 2005 (231 to 130 per million in Latvia, 114 to 35 per million in Lithuania, and 667 to 467 per million in Estonia). Nevertheless, the HIV incidence rate in Estonia is the highest in WHO's European Region, and the estimated adult prevalence of 1.3% in 2005 was the second highest in the E&E region.

Southeastern Europe and Northern Tier

The epidemics in the Southeastern Europe and Northern Tier countries remain small in comparison with the rest of Eastern Europe and Central Asia. Only four of 12 countries reported more than 100 new HIV diagnoses in 2005: Poland (645), Romania (203), Serbia and Montenegro (111), and Hungary (110). Poland is the only country in Central Europe with an HIV epidemic largely due to injecting drug use.

Nosocomial HIV Infection

In 1989, Romania experienced a major nosocomial (hospital-based) HIV epidemic in which more than 10,000 institutionalized children contracted HIV through blood transfusions and infected needles (UNAIDS/WHO, 2006). Many of those infected in 1989 recently entered the age of sexual debut, increasing the likelihood of new sexual HIV transmission in the country.

Since the summer of 2006, 118 children who received hospital-based blood transfusions in Shymkent, Kazakhstan, have tested positive for HIV, 10 of whom have died from AIDS-related illnesses. As of June 27, 2007, 17 health workers from this hospital had been sentenced to prison after being convicted of criminal negligence for the HIV outbreak (Reuters, 2007).

CONCLUSIONS

Injecting drug use is the primary means of HIV transmission in the E&E region. High youth unemployment and a boom in drug trafficking has fueled injecting drug use in this region. In 2005, 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, and stigmatization.

USAID

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

The HIV/AIDS epidemic is primarily a source of vulnerability in Estonia, Russia, and Ukraine. While the epidemic is a concern everywhere, one could argue that it does not yet pose a very significant vulnerability for other E&E countries. Only Estonia, Russia, and Ukraine have incidence rates higher than the United States, and only those three countries, plus Latvia and Moldova, have rates higher than the EU-25.

HIV is largely a youthful epidemic in the E&E region. Almost one-third of newly diagnosed HIV infections in this region are in people aged 15 to 24 years. In Russia, more than 80% of people living with HIV are between 15 and 30 years old.

Ukraine's rate of HIV infection is growing fast. HIV/AIDS is a relatively new phenomenon for Ukraine, with rapid spread of the virus only since 1994. Consequently, although the overall prevalence is still relatively low, the rate of increase in infection is quite high.

HEALTH EXPENDITURES

Health system financing is a key determinant of population health and successful social and economic transition. In many developing countries, the level of government health spending is still insufficient to ensure equitable access to essential health services. In the E&E region, out-of-pocket payment often is 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 (Healy and McKay, 1997). Investments in the health system have been low among countries in the E&E region, with investments in several comparable with levels in such countries as Afghanistan, Bangladesh, Chad, and Cameroon. High levels of poverty, especially among children, in parts of the region and the combination of low public spending with high out-of-pocket costs make the populations of these areas highly vulnerable to poor health outcomes.

Three indicators are used to assess different facets of health system financing:

- **Government health expenditure (% 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 health sector has not been spared the effects of the post-communist transition and has moved from free (albeit insubstantial) health care under the Soviet system to inadequate national health care financing. E&E countries differ significantly in the amount they can afford to invest in health care, with richer countries spending more both on public health as a percentage of GDP and per capita (Shakarishvili, 2006). Figure 19 illustrates these differences, as well as the substantial difference in health spending between Western Europe and most of the E&E region. Although each E&E country has engaged in health care finance reform to a varying degree, challenges remain, especially for the Caucasus and CAR countries. Some respondents to the qualitative survey conducted for this report stated that local governments demonstrated only a moderate commitment to health priorities.

Five Most Vulnerable Countries	1. AZERBAIJAN 2. TAJIKISTAN 3. ARMENIA 4. GEORIGA 5. KYRGYZSTAN[23]

In 2004, the EU-25 countries contributed 5.9% of GDP to health, whereas the E&E region contributed only 4.1% of a much smaller GDP. Although that gap may not appear large, the disparity between health spending and disease burden in the EU compared with E&E is sizeable, and inequities in health care costs and quality are pronounced (Shakarishvili, 2006).

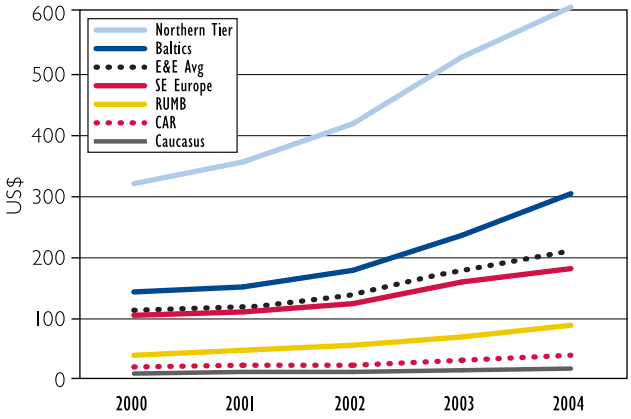
While per capita income in the E&E region is one-third that of the EU-25, per capita government expenditure

[23] Kazakhstan and Kyrgyzstan both had 2.3% government expenditure on health (% of GDP). Kyrgyzstan is represented here as being more vulnerable, however, because its performance on per capita and out-of-pocket payment indicators was significantly poorer.

on health in the E&E countries is, on average, just one-eighth that of the EU-25, where per capita expenditure was estimated at $1,692.70 in 2004. Over the 2000 to 2004 time period, the Northern Tier was substantially, consistently, and disproportionately ahead of other E&E subregions in terms of government per capita health expenditure; this difference affects the E&E regional average and masks the overall burden placed on the individual (figure 20).

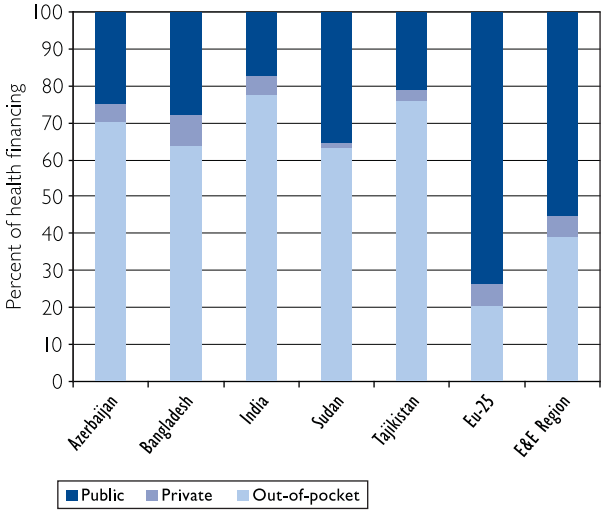
In the majority of E&E countries, citizens pay a high share of total health expenditures privately through both formal and informal out-of-pocket payments. In 18 of the 27 countries in the region, individuals pay 25% or more of health care costs out-of-pocket, and in eight of the 27 they pay more than 50%, comparable with some less developed countries, including India, Bangladesh, and Sudan, as seen in figure 21. In 2004, individuals in the EU-25 paid on average 20.6% of healthcare expenditures out-of-pocket (figure 21).

FIGURE 20. Per Capita Government Expenditure on Health (Subregional), 2000–2004



Source: WHOSIS, 2007.

FIGURE 21. Primary Sources of Health Financing, High-Burden Countries



Source: WHOSIS, 2007.

SUBREGIONS

Russia, Ukraine, Moldova, and Belarus (RUMB)

In 2004, the RUMB governments spent an average of 4% of GDP on health. Although this percentage does not appear high, it reflects a steady increase since 1999. Similarly, the RUMB subregion has shown the largest increase (139%) in per capita public spending on health since 2000.

Large variations in out-of-pocket payments were seen in this subregion. In 2004, the people of Belarus were responsible for 18.3% of their health care costs, less than the EU-25 average of 20.6%. Moldovans, on the other hand, pay 41.5% of their health care costs out of pocket.

Central Asian Republics (CAR)

CAR spent an average of 2.3% of its GDP on health expenditures, with the government of Tajikistan demonstrating the lowest fiscal support for its health agendas (1% of GDP) in 2004, ranking 11th lowest out of 192 WHO reporting countries worldwide.

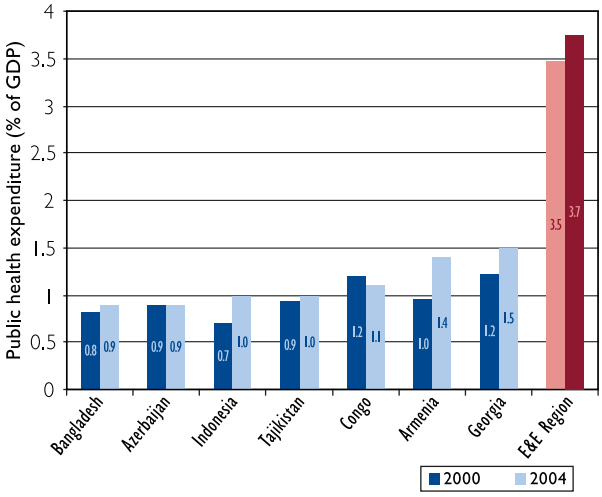
Per capita government health expenditure averaged nearly $35 in 2004, which is 2% of the EU-25 average, and two countries spent $10 or less per person: Kyrgyzstan ($9, comparable with Rwanda and Sudan) and Tajikistan ($3, comparable with Afghanistan and Bangladesh). People in CAR countries on average cover more than 50% of their health care costs out of pocket; in Tajikistan, the population is responsible for 76.3% of health care costs, the highest out-of-pocket payment in the E&E region (figure 21).

Caucasus

The Caucasus subregion is the poorest performer in health financing. The level of public health expenditure observed in this subregion raises serious doubts as to whether basic health systems can be maintained (Suhrcke et al., 2007).

Countries in the Caucasus subregion have the lowest level of public spending for health in the E&E region,

FIGURE 22: Low Public Health Expenditures, Country Comparisons, 2000–2004



Source: WHOSIS, 2007.

with Azerbaijan spending 0.9% of GDP in 2004 (the 10th lowest of 192 WHO reporting countries), Armenia spending 1.4%, and Georgia spending 1.5% (figure 22). These countries are similarly among the poorest performers in per capita government health expenditure, spending an average of $14.07 per person and leaving the majority of health care costs to the household. In Georgia (63.3%), Armenia (65.8%), and Azerbaijan (70.2%), individuals are paying on average about two-thirds of their health care costs.

Baltics

On average, the governments of the Baltics spent 4.3% of GDP on health care in 2004; however, that figure has declined since 1998 due largely to a reduction in spending by Estonia (from 4.8% in 1998 to 4.0% in 2004). The subregion has seen steady increases since 2000 in per capita health expenditure – second highest in the E&E region in 2004 at $303.20.

While Estonia and Lithuania had out-of-pocket payment rates comparable to that of the EU-25 (20.6%), Latvia (42.7%) was far behind.

Southeastern Europe and Northern Tier

Southeastern Europe (4.9%) and the Northern Tier (5.7%) countries spend the largest portion of GDP on health, making them closest in GDP spending to the EU-25 countries (5.9% in 2004). The countries with the highest public health expenditure as a percentage of GDP in 2004 were Serbia and Montenegro (7.3%), Slovenia (6.6%), Czech Republic (6.5%), and Croatia (6.1%), all higher than the EU-25 average.

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

CONCLUSIONS

Expenditures on health in several countries in the region are highly inadequate. The subregion averages mask stark variations in individual country performance, some of which are comparable with the levels of sub-Saharan African countries. High out-of-pocket expenditures cannot make up for low public expenditure. Social health insurance, which is a primary means for providing protection to households against large catastrophic health shocks, is not widely available, especially to the poor populations in many E&E countries.

While health expenditures in the region are increasing, their levels are still worrisome, as they are not sufficient to provide essential services. Estimates of the minimum per capita health spending required to ensure essential health services vary, ranging up to $100 to $150 per person per year. Government per capita health expenditures in the RUMB, Caucasus, and CAR countries fall far below these benchmarks, underscoring the need to improve their health care financing performance.

USAID

The opening of a new family medical center in Tajikistan is hopefully a step toward more progressive health services.

Most countries 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 should continue to play a critical role in supporting these initiatives.

Corruption is a critical impediment to successful health systems in the E&E region. Governments have an important role in ensuring the provision of quality health services and preventing the spread of disease. The health sector is particularly vulnerable to corruption for several reasons, including the diversity of commodities and expenses and the inelastic demand for services. In the E&E region, government failure to provide commodities and services is linked to corruption (Lewis, 2000; Vian, 2002). Investors' perceptions of corruption and patients' perceptions of poor quality discourage, respectively, private investment and demand for health care (Lewis, 2006).

CONCLUSIONS

It is now clear that achieving major impact against growing health challenges in the E&E region will not be quick or easy.

The Central Asian Republics and Russia are the most vulnerable countries in the E&E region in terms of their health conditions. Results from the calculation of the HVI based on the six major health indicators show that the CAR nations of Turkmenistan, Tajikistan, Kazakhstan, and Kyrgyzstan, along with Russia, are the five most vulnerable countries in the E&E region. It is interesting to note that Russia, despite having a higher level of economic performance than other countries in the region, appears on the most vulnerable list. The least vulnerable countries are all from the Northern Tier and Southeastern Europe subregions. Starting with the least vulnerable, they are Slovenia, the Czech Republic, Croatia, Montenegro, and Serbia. Based on this assessment of health vulnerability, it appears that USAID generally has health programs in the right countries. Results from the calculation of the SMI also generally support these findings.

Some general conclusions based on the findings are presented below.

- **Of the six main indicators, adult mortality and life expectancy stand out as great threats to overall economic, social, and political progress of the region.** This is especially true when the magnitude of the Russian population is taken into account. For the whole region, the average rate of adult death before the age of 60 is 2.2 times and 2.5 times greater than the average rates in, respectively, the EU-25 and United States. Life expectancy in the region was 71 years in 2005, which is more than six years shorter than the average life expectancy in neighboring European countries. The vast majority of this premature loss of life – representing loss of prime-age workers, family heads, and active citizens – is caused by NCDs, such as cardiovascular diseases, and external causes of death, such as injuries, violence, and poisoning. The high consumption of alcohol, tobacco, and drugs are major contributing factors to E&E's higher mortality rates.

- **Child mortality is still an alarming problem in the E&E region, especially in CAR and Azerbaijan.** Other countries in the E&E region remain a long way from reaching EU-25 levels, but their rates generally match what is expected of countries in the middle-income bracket. The five CAR countries and Azerbaijan, however, have widespread child poverty and high child mortality rates. Recent economic booms in Azerbaijan and Kazakhstan have apparently not yielded much benefit for this basic developmental constraint. If more accurate estimates of child mortality were available, the picture would likely be even gloomier, especially in CAR and the Caucasus (Suhrcke et al., 2007).

- **Men's health continues to be a major problem in E&E but is largely overlooked by donor assistance.** Deaths among adult males contribute the most to adult mortality and consequently to the lower life expectancy in E&E countries. The E&E region is unique in that a very high proportion of these deaths and poor health conditions among adult men is explained by the high incidence of NCDs, especially cardiovascular diseases, and injuries. However, there is currently little effort made to strengthen public health services and emphasize health promotion and disease prevention.

- **Shrinking and aging populations could become a threat to stability.** Large and populous Russia is currently experiencing negative population growth of -2.8%, driven mostly by high adult mortality coupled with low fertility rates. Other countries in the region, such as Ukraine, Georgia, Serbia, and Montenegro,

face even higher population declines of between 7% and 24%, mostly due to emigration. Such dramatic declines could have destabilizing effects on a country's military (and ability to control its borders), pensions, overall economic growth, and social cohesion. In many of the region's countries, fertility rates as low as 1.1 lifetime births per women (well below replacement level) will lead to rapidly aging populations and smaller labor forces to support them.

- **HIV/AIDS is spreading at a fast pace in the E&E region.** The E&E region is experiencing one of the world's fastest-growing HIV/AIDS epidemics. According to UNAIDS, 270,000 people in the region became infected with HIV in 2006, bringing the number of people infected to 1.7 million. The spread of HIV is particularly high in FSU countries and is associated with rising levels of injecting drug use, primarily among men, and rising sexual transmission of HIV among women. The impact of HIV/AIDS on life expectancy in the region is, however, still relatively small compared with countries in Southern Africa.

- **The incidence of TB is steadily increasing in many countries in the E&E region.** The key reason for this increase is the rapidly growing incidence of MDR-TB as a result of treatment failure, especially among special populations such as prisoners. The highest overall estimated TB incidence rate is in the CAR subregion, while the spread of TB in Russia, which is responsible for at least half of all the TB-related deaths in the region, is also of increasing concern. 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.

- **Expenditures on health in several countries are highly inadequate.** In a majority of the countries in the region, public expenditures on health have increased over the years. However, they are still low, leading to a low supply of medicines, low quality of services, and low salaries for health workers. The large burden of high out-of-pocket and informal payments affects the poor the most and can lead the more vulnerable groups in societies into a cycle of poverty.

- **Russia's population is sick, with alcohol a leading cause of morbidity and mortality.** While Turkmenistan is most vulnerable on public health and humanitarian grounds, Russia is arguably the country where demographic and health factors create the greatest or most worrisome impediments to progress in the E&E region. Alcohol consumption by adult men of working age has increased threefold since the early 1990s and is a factor in nearly half of the deaths in this group.

- **Kazakhstan's vulnerability requires further consideration.** For five years, Kazakhstan has routinely fallen among the five most vulnerable countries on the E&E HVI (it ranks third most vulnerable this year). Among the CAR countries, however, it is widely perceived to be a leader in terms of economic growth and overall stability, and colleagues in the field have rightly pointed out that its health statistics may be more accurate than those of its neighbors (which lowers its ranking in the HVI relative to its neighbors). Still, with an adult mortality rate of 311 per 1,000 (meaning nearly one in three 15-year-olds will die before age 60) and an under-5 mortality rate that is high by any standard (73 per 1,000 live births, compared with 5.7 in the EU-25), Kazakhstan clearly has something of a worrisome "double burden," suffering from the basic child mortality problems of poorer countries plus the adult and lifestyle health issues of richer ones.

- **Turkmenistan is a special case due to a severe lack of reliability in its data.** Turkmenistan is ranked as the most vulnerable country in the region in terms of its health conditions, although severe underreporting of data on health conditions is suspected. For example, it is widely known by health professionals in the field that the country has a booming injecting drug use problem and very probably many cases of HIV infection, yet there is no reporting of HIV incidence data.

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ANNEXES

ANNEX A. Health Vulnerability Index Indicator Selection

Indicator	Rationale
Life expectancy *Source: WDI*	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.
Adult mortality per 1,000 *Source: WHOSIS*	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&E countries because NCDIs are responsible for more than 90% of deaths in this age range in the E&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.
Under-5 mortality per 1,000 live births *Source: WHOSIS*	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.
Public health expenditure as a % of GDP *Source: WDI*	The lack of public commitment to investing in health poses a grave health risk in many E&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.
Tuberculosis incidence per 100,000 population *Source: WHO, Global Health Atlas (Global TB Database)*	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&E, and the presence of multidrug-resistant TB poses an increased threat.
HIV incidence (new infection rate per 1,000,000 population) *Source: WHO; EuroHIV*	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.

ANNEX B. Severity and Magnitude Index

The Severity and Magnitude Index (SMI) is based on the size of each country's affected population for each health indicator. Severity of the health status is based on a country's value for an indicator relative (above or below) a certain target value. The value above or below the threshold is considered to be an excess or gap. For under-5 mortality, adult mortality, and life expectancy indicators, the EU-25 mean was selected as the threshold value to gauge the severity exceeding acceptable or target levels. For TB and HIV incidence indicators, no threshold was used because any disease prevalence is assumed to be undesirable; in this case, countries with any prevalence received a score. For public health expenditure indicator, the SMI seeks to capture a country's commitment to health, measured by the gap between a country's potential spending (if on par with the EU-25), and the country's actual spending. Since each indicator has a different method of measurement, the resulting weighted values are converted to a log score in order to keep all values uniform. The countries are then ranked based on their total score. A higher score in the SMI means that the country is more vulnerable. Unlike the Health Vulnerability Index rankings, which found Tajikistan and Kazakhstan the most vulnerable in terms of overall health, the SMI found Russia more vulnerable because of its large population, followed by Uzbekistan, Ukraine, Kazakhstan, and Tajikistan.

Severity and Magnitude Index 2007: Country Ranking

	Total Pop. (millions)	GDP ($mil)	Public Exp. on Health (%GDP)	Public. Exp. Log Score	Life Exp.	Life Exp. (<77.7)	LE Log Score	New HIV Infections (per 1 mil)	# of people HIV positive per 100,000	HIV Log Score	TB Incidence (per 100,000 population—all cases)	#TB Cases (incidence rate per 100,000)	TB Log Score	U5MR	U5MR (>5.7)	U5MR Log Score	AMR	AMR (>92.3)	AMR Log Score	Severity and Magnitude Index	Rank
Albania	3.6	8380	3.00	82.67	75	1.74	19.46	9.9	0.36	3.69	20	0.72	6.79	18	8.72	31.78	135	1.02	9.92	25.7	10
Armenia	3	4903	1.40	90.41	73	2.42	23.45	24.9	0.75	8.08	71	2.13	18.95	29	11.37	36.02	175	1.74	15.67	32.1	14
Azerbaijan	8.1	12561	0.90	75.43	72	1.03	14.09	25	2.03	17.60	76	6.16	35.75	89	12.38	37.40	152	3.26	24.08	34.1	16
Belarus	9.7	29566	4.60	61.47	68	11.24	46.27	77.0	7.47	35.45	62	6.01	35.34	9	7.59	29.61	246	1.07	10.41	36.4	18
Bosnia & Herzegovina	4.5	9949	4.10	80.20	74	0.95	13.41	3.3	0.15	0.80	52	2.34	20.27	15	2.89	15.69	138	1.45	13.60	24.0	8
Bulgaria	7.3	26648	4.60	63.34	73	4.23	31.07	10.7	0.78	8.41	39	2.85	23.14	15	10.10	34.12	151	2.94	22.59	30.4	13
Croatia	4.5	38506	6.10	57.14	76	0.88	12.69	14.5	0.65	7.11	41	1.85	17.01	7	2.57	14.21	115	0.68	6.45	19.1	4
Czech Republic	10.2	124365	6.50	35.43	76	1.97	20.92	8.8	0.90	9.51	10	1.02	10.06	4	3.09	16.58	113	1.53	14.15	17.8	3
Estonia	1.3	13101	4.00	75.59	67	1.38	16.94	467	6.07	32.32	43	0.56	4.80	7	0.64	0.57	197	0.94	9.14	23.2	7
Georgia	4.6	6395	1.50	86.50	73	3.02	26.36	54.1	2.49	20.07	83	3.82	27.71	45	22.22	47.07	122	0.91	8.88	36.1	17
Hungary	9.9	109239	5.70	37.61	73	6.05	36.40	10.9	1.08	11.09	22	2.18	19.26	8	7.43	29.29	180	6.04	33.63	27.9	12
Kazakhstan	15.3	57124	2.30	48.66	66	30.12	62.98	65	9.95	39.89	144	22.03	59.49	73	144.86	79.34	311	23.20	57.09	57.9	25
Kyrgyzstan	5.3	2441	2.30	99.63	68	12.48	48.01	32.5	1.72	15.77	121	6.41	36.47	67	66.43	65.80	235	4.71	29.64	49.2	22
Latvia	2.2	15826	4.00	72.36	71	1.72	19.38	129.6	2.85	21.78	63	1.39	13.44	10	1.89	10.47	211	1.89	16.73	25.7	9
Lithuania	3.6	25625	4.90	64.14	71	2.59	24.30	35	1.26	12.54	63	2.27	19.83	9	2.53	14.00	215	3.07	23.20	26.3	11
Macedonia	2	5766	5.70	89.11	74	0.95	13.41	5.9	0.12	0.34	30	0.60	5.32	17	3.29	17.41	141	0.68	6.41	22.0	6
Moldova	4.3	2917	7.30	98.56	68	6.24	36.88	126.7	5.45	30.72	138	5.93	35.11	16	7.72	29.87	222	4.01	27.17	43.1	20
Montenegro	0.7	26215	4.30	63.54	73	0.42	7.76	13.8	0.10	0.00	33	0.23	0.00	9	0.59	0.00	132	0.20	0.00	11.9	2
Poland	38.5	303229	4.30	17.80	75	13.90	49.79	16.9	6.51	33.36	26	10.01	44.50	8	29.72	51.99	143	13.93	47.91	40.9	19
Romania	22.2	98565	3.40	38.80	72	14.67	50.70	9.4	2.09	17.95	134	29.75	65.36	19	36.86	55.66	165	11.34	44.30	45.5	21
Russia	141.4	763720	3.70	0.00	65	245.17	100.00	247.1	349.40	100.00	119	168.27	100.00	14	201.45	85.10	322	230.49	100.00	80.8	28
Serbia	10.1	26215	7.30	64.49	73	6.05	36.40	13.9	1.40	13.61	33	3.33	25.56	10	9.43	33.03	145	3.55	25.35	33.1	15
Slovakia	5.4	46412	5.30	53.45	74	2.86	25.60	3.9	0.21	1.71	17	0.92	9.01	9	5.06	23.49	139	1.81	16.15	21.6	5
Slovenia	2	34354	6.60	59.38	78	-0.08	0.00	18.3	0.37	3.81	15	0.30	1.11	4	0.69	1.03	110	0.25	0.76	11.0	1
Tajikistan	7.1	2312	1.00	100.00	64	35.26	65.72	29	2.06	17.79	198	14.06	50.86	71	140.86	78.85	178	3.68	25.89	56.5	24
Turkmenistan	5.1	8067	3.30	83.35	63	18.92	54.99	-	-	-	70	3.57	26.64	104	103.43	73.48	240	4.56	29.16	53.5	23
Ukraine	46.3	82876	3.70	42.15	68	49.94	71.80	242.5	112.28	80.42	99	45.84	73.91	17	65.72	65.61	271	57.40	73.83	68.0	26
Uzbekistan	27.8	13951	2.40	74.06	67	96.40	83.40	82.7	22.99	53.50	113	31.41	66.43	68	472.01	100.00	188	16.66	51.11	71.4	27
		EU-25 Average	6.27		EU-25 Average	77.7								EU-25 Average	5.7		EU-25 Average	5.7			

Note: Sources of data are: Life expectancy, World Bank WDI for 2007; public health expenditure, U5MR, and AMR, WHOSIS 2007; TB incidence rate, WHO Global Health Atlas 2005; HIV new infection rate, EuroHIV 2007.
No data on the HIV infection rate are available for Turkmenistan.
EU-25 average excludes France, Italy, and Spain for lack of data.
Total adult mortality is not reported by the WHO or the World Bank. For sections of this analysis dealing only with E&E countries, total adult mortality was calculated by weighting adult male and female mortality statistics by the ratio of males to females in the population.

ANNEX C. Qualitative Survey

The online survey was administered to collect qualitative data from staff in the USAID missions in the E&E region. Fourteen responses were received from 12 countries (Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Georgia, Kazakhstan, Kyrgyzstan, Romania, Turkmenistan, Ukraine, and Uzbekistan). Respondents to the online survey were asked several questions regarding their perception of the results from the Health Vulnerability Analysis. Respondents were asked if they perceived the health indicator data to be accurate based on their experience in country. Most respondents stated that the data were accurate. However, there was some variation by indicator. For example, almost half of the respondents were unable to tell if the adult mortality rate was accurate, and almost one-fifth of the respondents found the data on new HIV infections to be inaccurate. Respondents were also asked to comment on whether the health indicator data and trends were as they would have expected, and most responded that they were. However, 20% of respondents found the under-5 mortality rate to be worse than expected, while another 20% found the under-5 mortality indicator to be higher than expected. More than one-third of respondents found the number of new HIV infections to be better than expected.

The *Health Vulnerability Analysis* field questionnaire also solicited feedback on respondents' perceptions of the political commitment of local governments to health and of the effects of health status and health systems on overall development, political progress, economic growth, and social stability. Respondents stated that local governments demonstrated a moderate commitment to health priorities. With regard to the effects of health status on development progress, the majority of respondents agreed that health status impeded the overall development and economic growth of the country. Behaviors were most frequently cited as a key determinant of health status. With regard to the effects of the health system on development progress, the majority of respondents agreed that the health system impeded the economic growth of the country and cited health financing most frequently as a key aspect of the health system that was of concern.

Overall, respondents found the data to be as expected, but a few concerns were raised. Several respondents noted that although Kazakhstan has not embraced reform, it has greater economic opportunities and would therefore be considered less vulnerable than some of its neighbors. In addition, there was some speculation on the quality of data for Uzbekistan and Turkmenistan, and one respondent suggested that a comparative survey on the data accuracy and reliability in the region be prepared.

ANNEX D. Regional Vulnerability and Indicator Maps

Data and sources for the following maps are the same as for the Health Vulnerablity Index shown in table 2 on page 8.

Vulnerability Ranking, 2007

Severity and Magnitude Ranking, 2007

Population Growth Rate, 2005

Life Expectancy, 2005

Adult Mortality Rate, 2005

Under-5 Mortality Rate, 2005

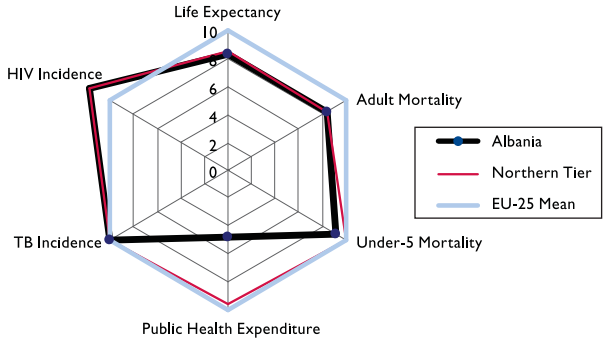
TB Incidence Rate, 2005

HIV Incidence Rate, 2005

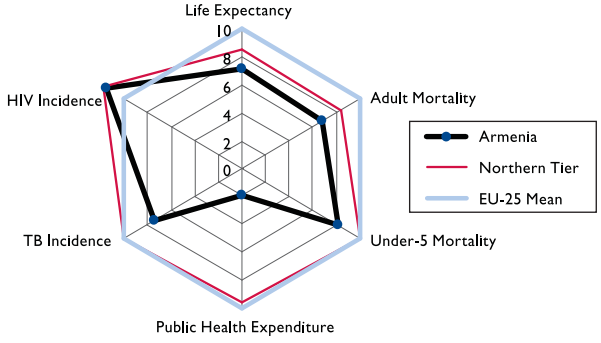
Government Expenditure on Health, 2005

ANNEX E. Country Radar Graphs for E&E and EU-25

Albania



Armenia



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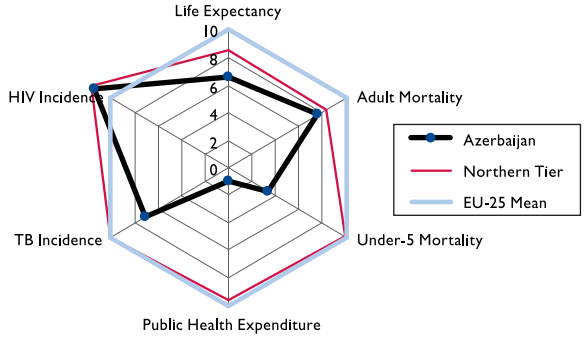

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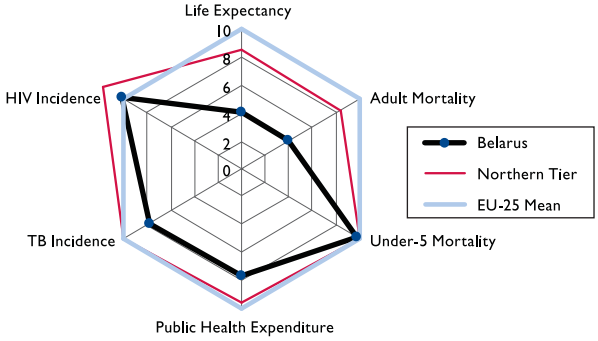

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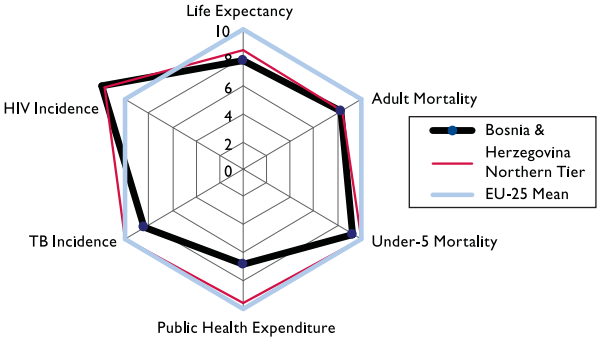

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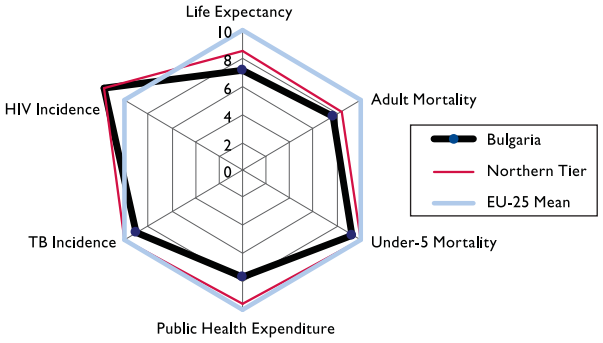

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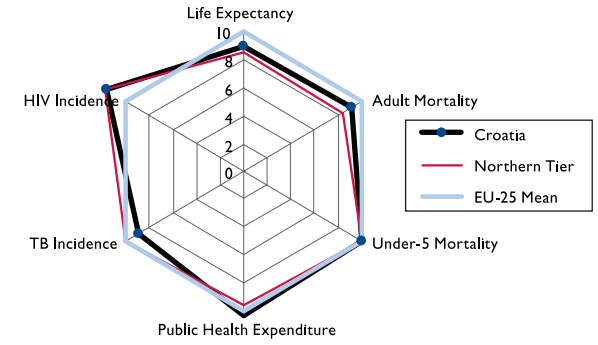

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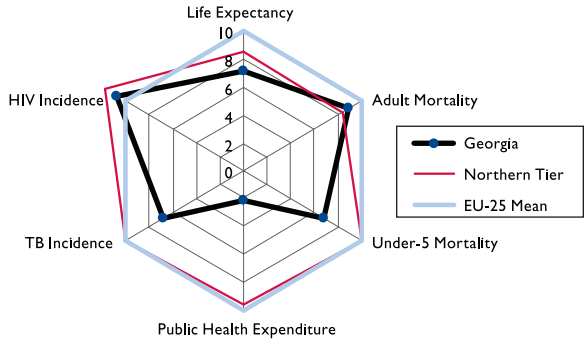

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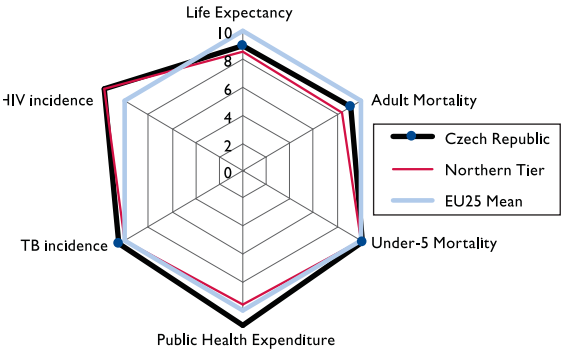

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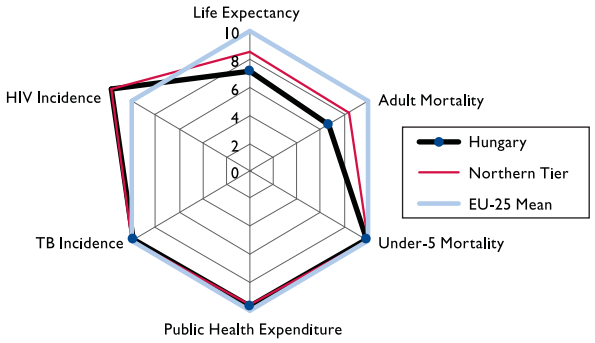

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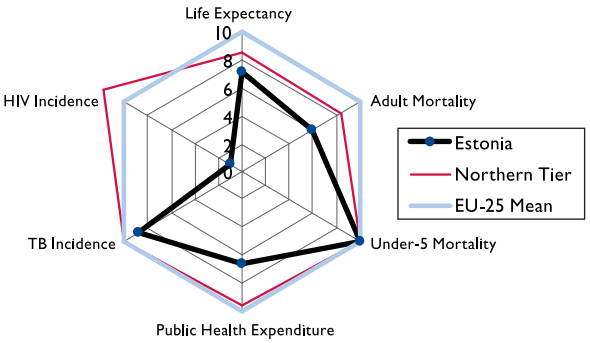

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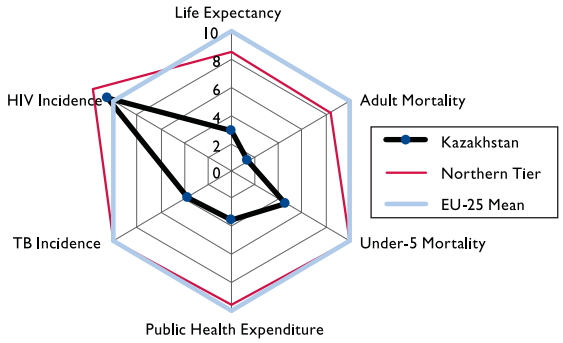

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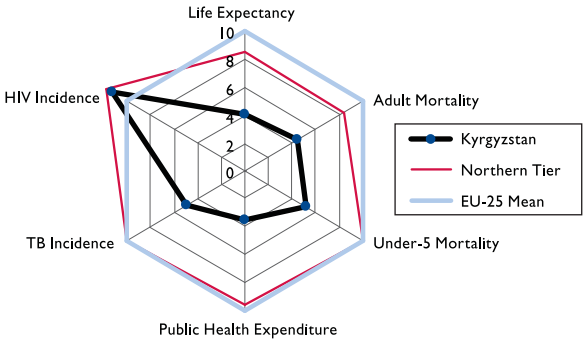

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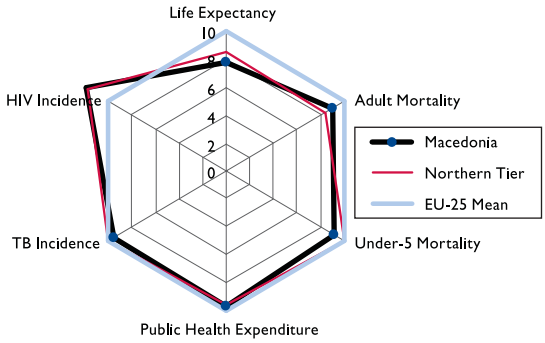

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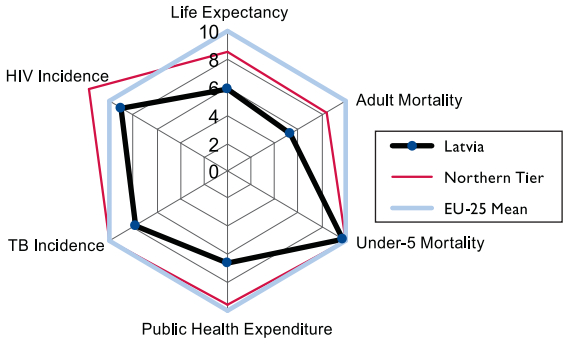

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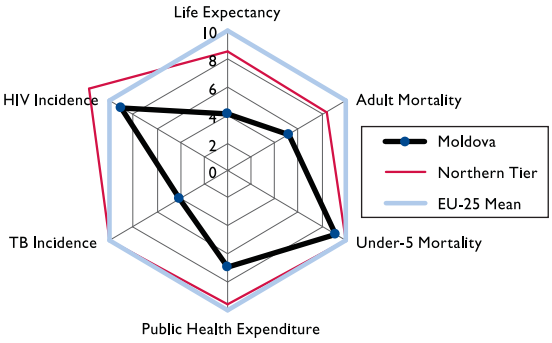

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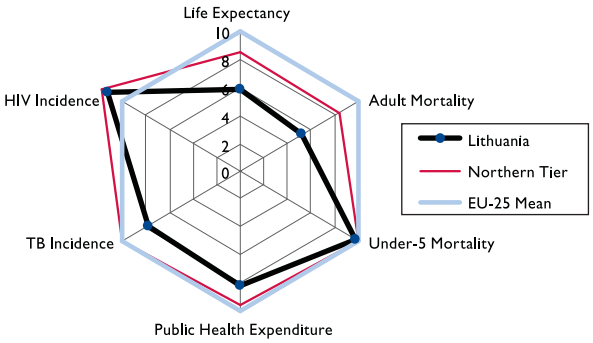

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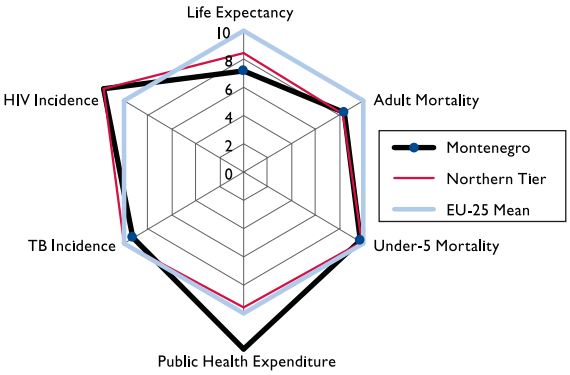

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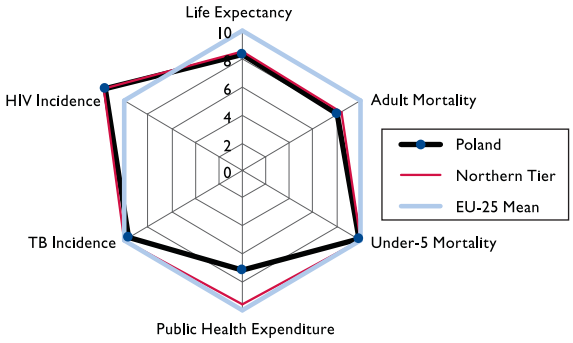

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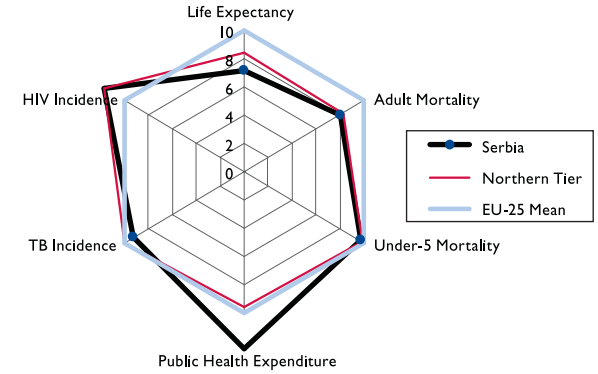

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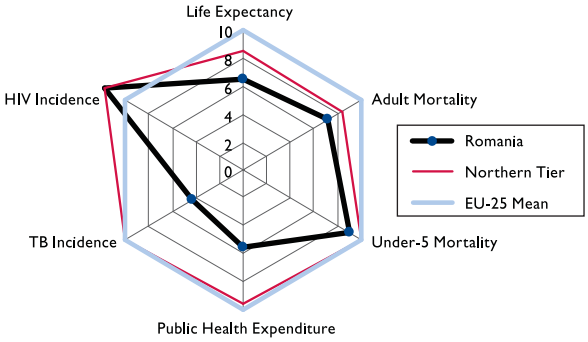

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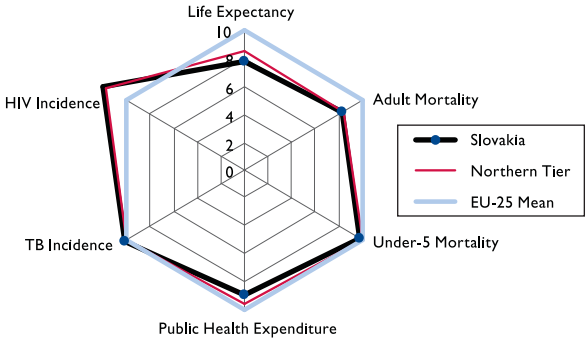

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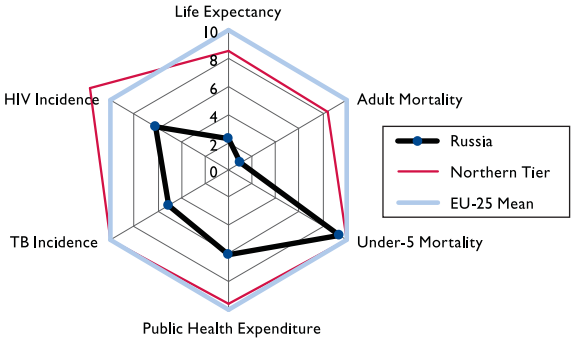

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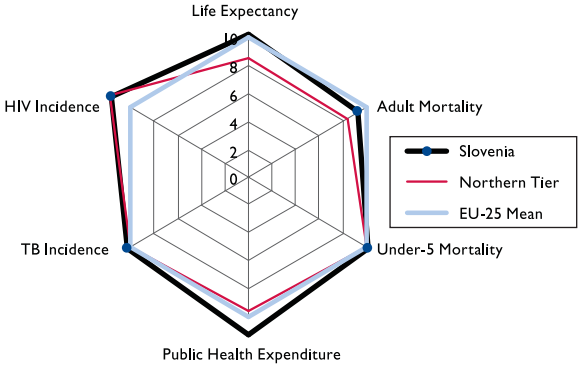

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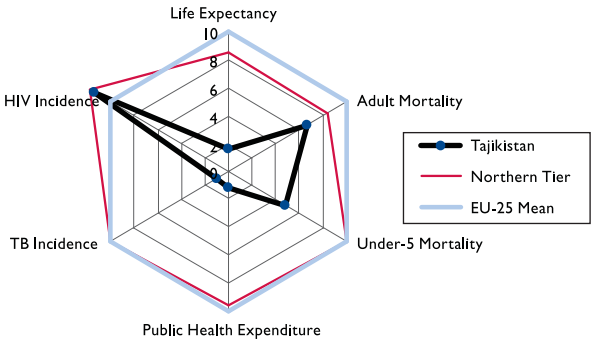

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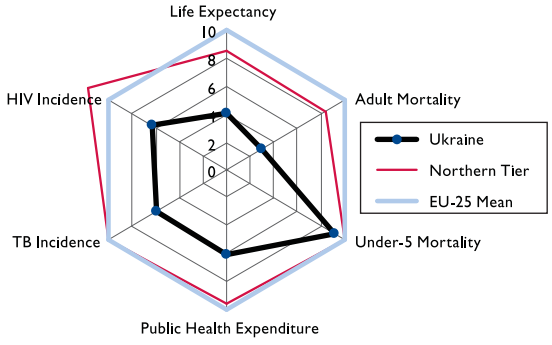

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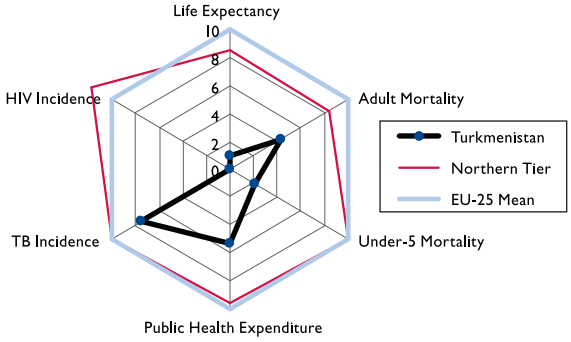

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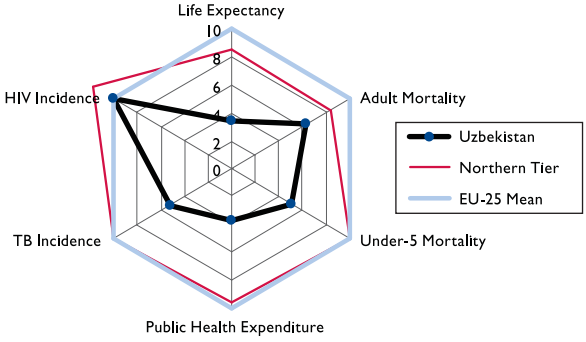

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