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Europe and Eurasia Health Vulnerability Analysis

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This year's report was a team effort. Lauren Smith was the primary data analyst and author, and Sarah Guagliardo created many of the maps and graphs. Nathan Blanchet supervised the team and developed the conclusions and recommendations with input from E&E Bureau colleagues and USAID health colleagues from the field.

ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
CAR	Central Asian Republics
E&E	Europe and Eurasia
GDP	Gross Domestic Product
HALE	Healthy Life Expectancy
HIV	Human Immunodeficiency Virus
MCPR	Modern Contraceptive Prevalence Rate
NCD	Non-communicable disease
NCDI	Non-communicable diseases and injuries
TB	Tuberculosis
USAID	United States Agency for International Development
USG	United States Government
WDI	World Bank's World Development Indicators
WHO	World Health Organization

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I. EXECUTIVE SUMMARY

The 2005 Europe and Eurasia Health Vulnerability Analysis identifies those E&E countries whose health status is the poorest and whose transition to democracy and free-market economies may be most vulnerable due to 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 for the office of USAID's Assistant Administrator for E&E. This is the third in an annual exercise to provide USG policy makers and USAID health staff in E&E an overview of health status and vulnerability in the region.

This analysis shows the general health picture across 27 countries, and is not meant for detailed needs assessments at the individual country level. As it is based on readily accessible data regularly provided by international organizations, it is most useful in comparing sub-regions within E&E and for raising awareness of major health issues relevant to the region.

The foundation of this analysis is a Vulnerability Index, which ranks the E&E countries' health status using aggregated data for six indicators. Annex 1 defines these six indicators and explains the rationale for choosing them. The paper also includes an analysis of health trends in E&E during recent years, and comparisons of each country to the Northern Tier in several health indicators to see how well each is progressing relative to the "ideal" for the region.

Additionally, we present a Health Program Components Table to illustrate how countries perform with respect to indicators more closely related to USAID programming.

The primary findings of the analysis are:

- Current USAID health programs are operating in the most vulnerable sub-regions (see Chart, p.4, and Map, p.5).
 - The Northern Tier countries (excluding the Baltics) and Southeastern Europe are least vulnerable in terms of health (12 countries).
 - The Baltics are more vulnerable than the Northern Tier and Southeastern Europe (3 countries).
 - Russia, Ukraine, Moldova, Belarus, and the Caucasus are much more vulnerable (7 countries).
 - Central Asia is the most vulnerable sub-region (5 countries).

- There has been a divergence in life expectancy levels in E&E since 1991. In general, the lower the level of life expectancy that a country had in 1991, the smaller the gain (or larger the decline) it experienced, compared to its 2003 level.
 - Life expectancy declined in Central Asia and Russia, Ukraine, Moldova and Belarus between 1991 and 2003. Declines persisted in more recent years, between 1997 and 2003, for all of the above countries except Moldova and Ukraine (where it increased modestly).
 - The E&E region has a larger gender gap in life expectancy than any other region in the world. Russian males live an average of 14 years less than do Russian females. Belarus, Estonia, Lithuania, Kazakhstan, Ukraine and Latvia also have gender gaps greater than 10 years.

- Population declines have occurred in two-thirds of the region's countries since 1991. Even where population growth has generally been positive since 1991, those growth rates are decreasing, from an average of 1.04% in 1991 to 0.65% in 2003.
 - Total fertility rates fell short of the replacement rate of 2.1 in 21 of the 27 E&E countries.
 - There are concerns about the potential economic impact of substantial declines in population that are projected in Ukraine, Bulgaria, Georgia, Belarus, Latvia,

Lithuania, Romania, and Russia. The projected percentage decreases by 2050 for these countries range from 43% for Ukraine to 22% for Russia.

- Increases in adult mortality have occurred in three E&E countries with some of the highest current adult mortality rates: Russia, Kazakhstan, and Ukraine.
 - Currently, in the Baltics, RUMB, and parts of CAR (Kazakhstan, Turkmenistan and Kyrgyzstan), male adult mortality rates are very high, exceeding the average for South-East Asia Region.
 - As with life expectancy, E&E leads the world's regions in its gender gap for adult mortality.
 - In Russia, nearly half of all 15-year old boys will die before the age of 60 if current mortality rates persist.

- In parts of E&E, extremely low rates of total health expenditure per capita reflect very poor public capacity and commitment to investing in health as well as low private capacity to supplement public health expenditure.
 - Tajikistan reports one of the lowest rates of total health expenditure in the world at just \$6 per capita per year (the seventh lowest level in the world¹).
 - Kyrgyzstan, Uzbekistan, Georgia, Azerbaijan and Moldova also have rates below the Sub-Saharan Africa average of \$32 per capita per year.
 - The E&E regional average, \$181 is only a fraction of the EU-25 average, \$1463.

For a summary snapshot of the analysis, readers should see Annex 2, p. 27, which aggregates the countries' rankings across the six indicators.

¹ Only six countries have lower total health expenditure per capita than Tajikistan. They are: Burundi, the Democratic Republic of Congo, Ethiopia, Liberia, Madagascar and North Korea.

I. 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. More than a decade later, throughout the E&E region, health conditions are either little different or in several countries worse than they were in the early 1990s.

The gap between USAID's assumptions in 1991 and regional realities in 2005 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 how to use its resources so as to invest in the most pragmatic, cost-effective ways to improve health.

This paper 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. As an annual exercise, the Health Vulnerability Analysis serves several important functions:

- To provide a snapshot of regional "hotspots" where health status is poorest;
- To track health trends;
- To examine special areas of concern, which might not be evident from the data or by casual observation;
- To compare countries individually with the "ideal" performance for the region (this hints at the appropriate level of progress for which USAID should strive);²
- To spark innovative thinking about evolving future health needs; and
- To 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, more than a threat in its own right; it is a threat to economic and democratic progress.

Expanding on the 2003 and 2004 vulnerability analyses, this year's analysis ranks the 27 E&E countries from least to most vulnerable first in terms of overall health status and lists countries in terms of specific health sector weaknesses. It also compares each country's health status to that of the Northern Tier group which recently joined the EU, and examines health trends from 1991 to present.

Overall, the 2005 analysis finds the most vulnerable countries in terms of health to be Tajikistan, Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Azerbaijan, Uzbekistan, Ukraine, and Estonia.

This paper also serves as a convenient reference for health indicator values in the E&E region.

² We use the Northern Tier countries that recently joined the European Union for this benchmark.

II. METHODOLOGY OVERVIEW

Indicators

In the 2005 Health Vulnerability Analysis, we aggregate data for six indicators,³ which are meant to capture health conditions in four specific areas: non-communicable disease and injury, infectious disease, child health, and public commitment and capacity to improving health. Indicators from each of these categories, plus one indicator that captures all categories—healthy life expectancy—combine to assess the overall health status of a given country. A chart in Annex 1 lists each indicator by category and provides the definition and rationale for using the indicator.

Sources

Data for the indicators were collected from three sources: WHO, the World Bank (World Development Indicators), and EuroHIV. 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.

There may be disparities between the official statistics and information that people working in the field may acquire. For consistency, however, the analysis presented here is based solely on data reported annually by the sources above. Data for some countries are suspect and reporting problems plague country data unevenly.⁴

Each section below includes more details on methodology.

III. ANALYSIS

Four steps were taken to assess health vulnerability. First, we created a vulnerability index using six indicators to assess where present overall health status is the poorest. The index ranks the E&E countries from 1 to 27, with 1 having the best health and 27, the poorest. Second, we examined trends over time for key indicators that are critical in the E&E region. Third, we created radar graphs that illustrate each country's status for the six vulnerability indicators relative to both the E&E mean and the mean for the Northern Tier countries. Finally, as a complement to the vulnerability index, we created a table that ranks the countries in a fashion identical to the vulnerability index, using criteria more directly related to USAID's health-related "Program Components."

III. A. Vulnerability Index

Methodology

For the aggregate vulnerability ranking, we averaged the countries' performance on six indicators, relative to the mean performance in the E&E region.⁵ In order to accurately compare the indicators, the data for each indicator were normalized using the 27 E&E countries' mean and standard deviation for the given indicator. Each country's standard deviation from the mean was used to rank the country for each indicator. We constructed the standard deviations so that a positive number represents the extent to which a country is better off than the mean in that indicator and a negative number signifies that a country is worse off (e.g. a country with fewer

³ Healthy Life Expectancy, Adult Mortality Rate, HIV Incidence Rate, Tuberculosis Incidence Rate (reported cases), Under-five Mortality Rate, and Public Health Expenditure as % of GDP.

⁴ While all country data are imperfect, the data reported for Turkmenistan and Uzbekistan should be treated with extra caution.

⁵ This differs from the approach used in the 2004 analysis, which used a straight order ranking. We departed from this method to more fully capture the difference in variation between countries. For example, sometimes the difference between two consecutive rankings is very large for a given indicator and sometimes it is very small. The standard deviation based ranking accounts for this variation when the results across indicators are averaged.

HIV infections and higher healthy life expectancy would in both cases receive a positive standard deviation score). Then, these standard deviations were averaged across the six indicators to give each country's final ranking relative to the average performance of the other E&E countries.

We do not claim that the six indicators are of equal importance. However, they were weighted equally for simplicity and for lack of a rigorous method to construct appropriate weights. In order to portray a comprehensive picture of health in each country, we have included three types of indicators:

- 1) Indicators that depict the present status of health, or *chronic* vulnerabilities:
 - **Healthy life expectancy (HALE) at birth** captures not only how long people can expect to live, but it discounts years that people are expected to live suffering from disease or disability. It is therefore a summary measure of the average length and quality of life that a population enjoys.⁶
 - **Adult mortality rate** is a sensible proxy for the burden of non-communicable diseases and injuries (NCDIs) since over 90% of adult deaths in the E&E region are due to NCDIs.
 - **Under-five mortality rate** captures the status of child survival in a country.
- 2) Indicators that signal both *urgent* and future vulnerabilities in a population:
 - **Tuberculosis (TB) incidence** reflects the growth of the most prevalent infectious disease in the E&E region.
 - **HIV incidence** shows how fast HIV is spreading (new cases per year), which is a more useful indicator than HIV prevalence (cumulative cases) since prevalence is still very low in most of E&E. Nonetheless, due to 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 likely the greatest urgent health threats to the E&E region.
- 3) An "input" indicator that captures public commitment and capacity to improving health and indicates a *chronic* 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 prioritized by the public sector, relative to a country's total income.

The result is a final rank from 1 (best) to 27 (worst) suggesting the overall vulnerability of each country relative to the other countries in the E&E region. This ranking is a useful way to understand the *relative* health status of E&E countries, and to track changes in relative status. The difference between ranks 23 and 24, or even 20 and 27 may be negligible. Specific ranks are useful to quickly assess a country's relative standing, and to present this standing clearly and concisely; therefore, they are used throughout this paper. The ranks, though, are most useful when considered in groups. For instance, there might be little difference between ranks 23 and 24, but the difference between 10 and 24 *is* significant.

Results

The following are highlighted results from the analysis. For detailed information about rankings, comparisons, and groupings, see Annexes 1-2. To provide a frame of reference, statistics for the U.S. as well as the mean for the EU were included for each indicator (see bottom row of Annex 2 to compare US indicator values with E&E values).

⁶ For more detailed information about how HALE is calculated, see Annex 5.

- The disparity in HALE between E&E and the EU-25 is almost twice as large as the disparity in life expectancy. Therefore, in E&E, the impact of morbidity and disability on quality of life is much greater than in the EU-25.
- The nine most vulnerable countries overall, starting with the most vulnerable, are: **Tajikistan, Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Azerbaijan, Uzbekistan, Ukraine and Estonia**. These countries' average performance on the six vulnerability indicators was more than 0.5 standard deviations worse than the E&E mean. This group includes the entire CAR region, Russia, Ukraine, one country from the Caucasus (Azerbaijan), and one country from the Baltics (Estonia).
- The two countries found to be most vulnerable in the region were **Tajikistan and Kazakhstan**, which both scored more than one full standard deviation worse than the E&E mean.
- The final ranking of E&E countries indicates that the Northern Tier countries (without the Baltics) are least vulnerable and the Central Asian Republics (CAR) are most vulnerable.
- An analysis of the final ranking based on sub-regions yields the following distribution:

	Least Vulnerable → → →			Most Vulnerable		
Sub-region	Northern Tier, without Baltics ⁷	Southeastern Europe ⁸	Baltic countries ⁹	Caucasus ¹⁰	RUMB ¹¹	Central Asian Republics ¹²
Rankings	1, 2, 4, 6, 7	3, 5, 8, 9, 10, 11, 14	12, 16, 19	15, 17, 22	13, 18, 20, 24	21, 23, 25, 26, 27
Average # of standard deviations above/below E&E mean	0.91	0.52	-0.13	-0.32	-0.46	-1.00

⁷ Czech Republic, Hungary, Poland, Slovakia, Slovenia, Slovakia

⁸ Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Romania, Serbia and Montenegro

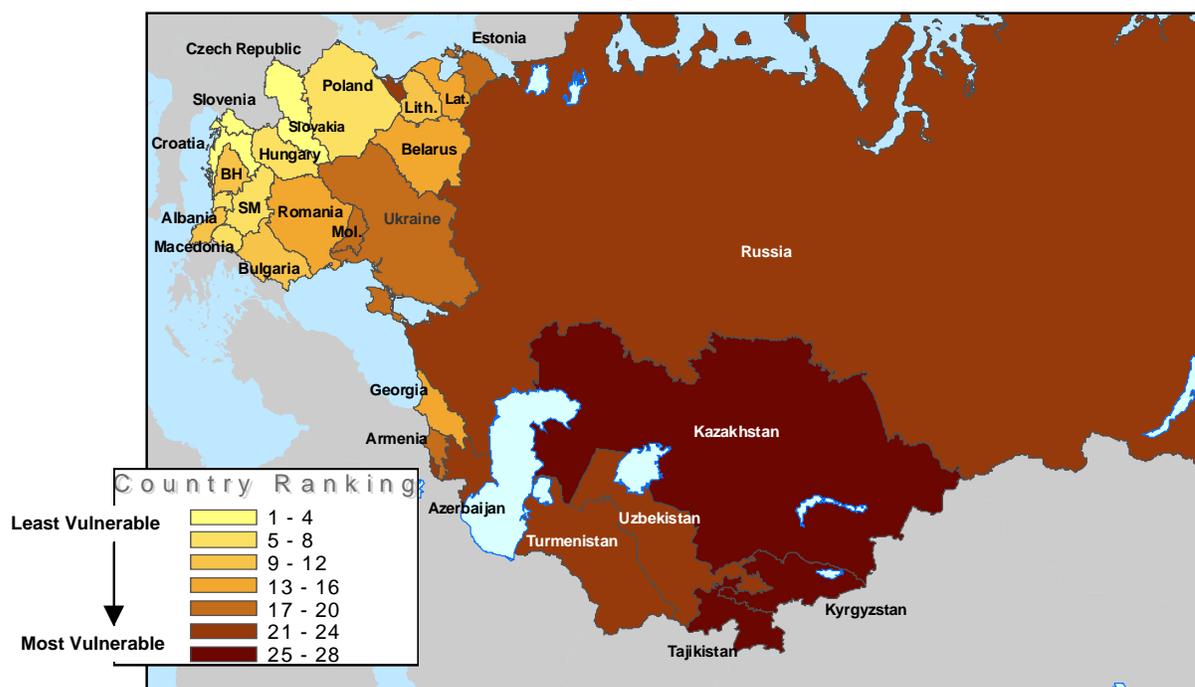
⁹ Estonia, Latvia, Lithuania

¹⁰ Armenia, Azerbaijan, Georgia

¹¹ Russia, Ukraine, Moldova, Belarus

¹² Kazakhstan, Kyrgyzstan, Uzbekistan, Turkmenistan, Tajikistan

The geographical distribution of the rankings, 1 to 27 is shown in the map below.



We also examined which were the most vulnerable countries in each of the six indicators. The table below only lists the countries that performed especially poorly, meaning they underperformed by more than one standard deviation from the E&E mean on a given indicator. Other countries may also be vulnerable for the indicator in question.

Indicator	Healthy Life Expectancy (HALE)	Adult Mortality Rate	Under-five Mortality Rate	Public Expenditure as % of GDP	TB incidence (new cases reported)	HIV incidence (new infection rate)
Most Vulnerable Countries (worse off by more than one standard deviation from the E&E mean)	Turkmenistan	Russia	Tajikistan	Azerbaijan	Tajikistan	Estonia
	Tajikistan	Kazakhstan	Turkmenistan	Tajikistan	Romania	Russia
	Kyrgyzstan	Turkmenistan	Azerbaijan	Georgia	Kazakhstan	Ukraine
	Kazakhstan	Ukraine	Kazakhstan	Armenia	Moldova	
	Azerbaijan	Kyrgyzstan	Uzbekistan	Kazakhstan	Kyrgyzstan	
		Belarus	Kyrgyzstan			

III. B. Health Trends

Methodology

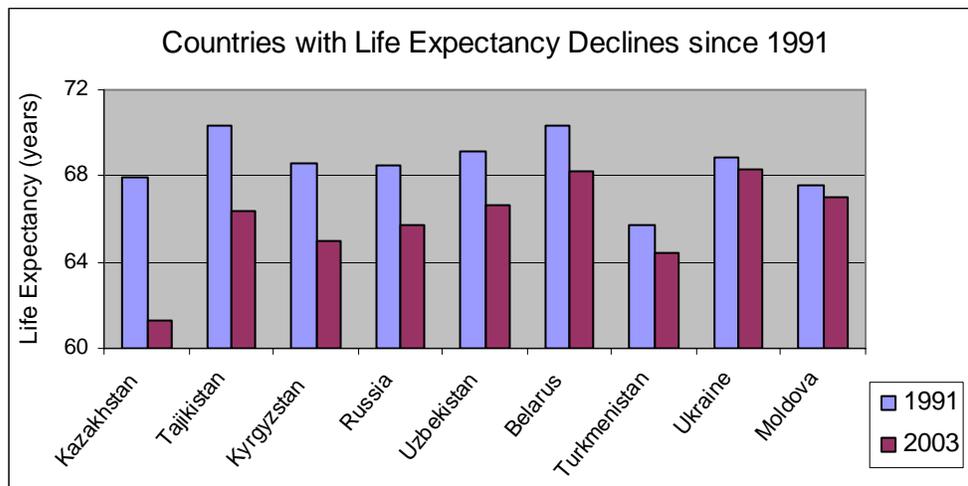
Thus far, the analysis has focused on current levels of health status, to the extent that they can be captured by the latest data available. In this section, we examine whether several health indicators have improved or worsened during recent years, which may be as or more important than their absolute level. Where the data permit, changes are observed between 1991 and the most recent year available. Otherwise, trends start with the earliest year for which data are available.

If the Vulnerability Analysis is performed using consistent methodology for several years in a row, future trends in sub-regional averages for each indicator and trends in final rank will also be helpful.

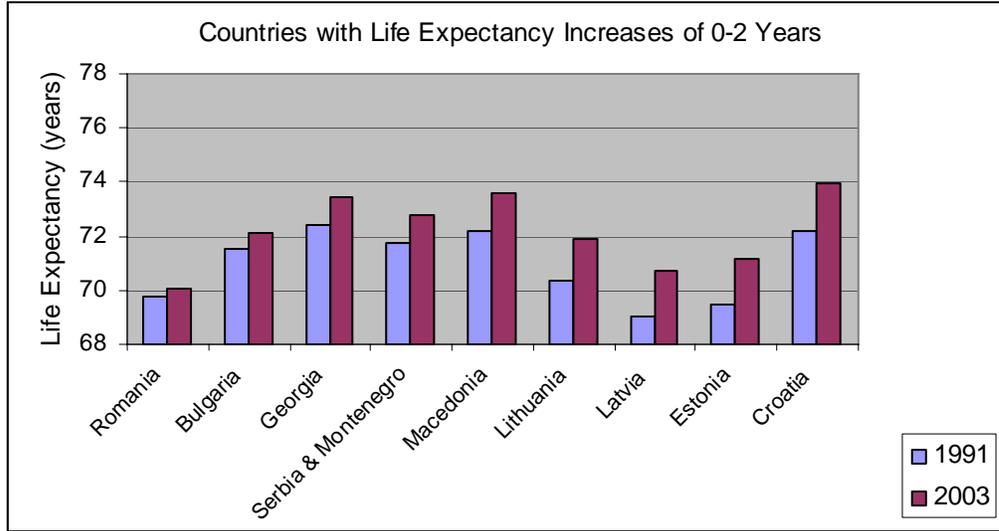
Life Expectancy

While HALE was preferable for use in our Vulnerability Index, it is a relatively new indicator and has only been reported for the past few years. Life expectancy, therefore, is a more practical indicator for examining trends. In the future, it would be useful to track HALE over time, when more observations are available.

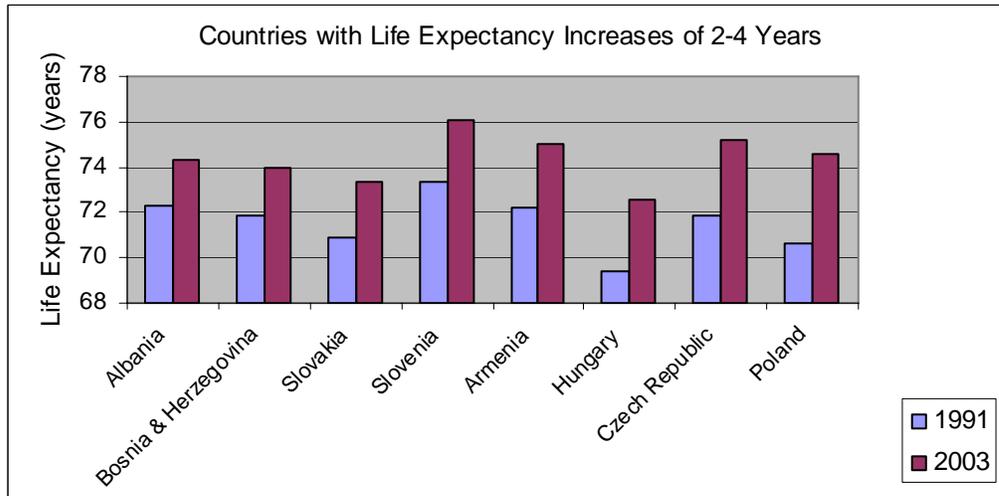
In E&E, nine countries (exactly one-third of the region's countries) experienced declines in life expectancy from the level in 1991 to the last year reported, 2003. These countries were Russia, Ukraine, Moldova and Belarus (RUMB) and CAR. The average decline for these countries during this time period was 2.7 years. Azerbaijan decreased from a life expectancy of 70.3 in 1991 to 65.2 in 2000, but no more recent data are available.



Nine countries experienced modest increases in life expectancy, ranging from 0.3 to two years. The rates in these countries are shown in the chart below.



The countries with the largest gains in life expectancy are shown below. Poland enjoyed the largest increase, which was four years.



Perhaps the most startling aspect of the trends in life expectancy is the divergence that has occurred. The standard deviation of the region's life expectancy figures more than doubled during the time period from 1.8 for the 1991 values to 4.0 for the 2003 values.¹³

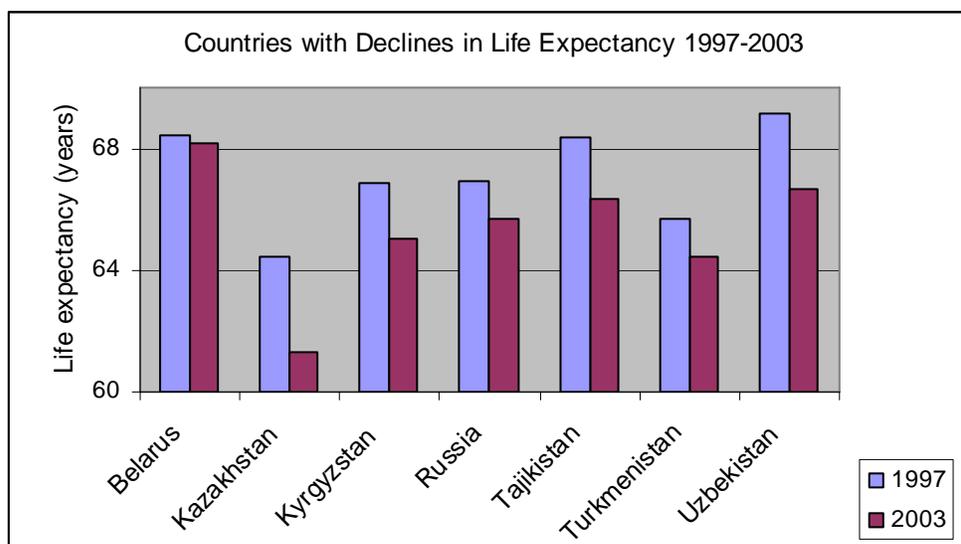
Essentially, the countries with lower starting points in 1991 did not improve faster to catch up with their neighbors. Rather, they fared worse on average, seeing declines or only small gains in life expectancy. There is a statistically significant¹⁴ and positive correlation between the countries' life expectancy in 1991 and improvement in that indicator. The on the following page roughly demonstrates this trend. Note that the lower the 1991 average is for a group of countries, the lower the increase (or the greater the decline) in life expectancy.

¹³ This calculation is based on the averages of the 1990 and 1992 values for Georgia and Bosnia & Herzegovina as a substitute for 1991 values. Since the latest value for Azerbaijan is from 2000, that country was excluded from 2003 calculations and also from the table on page 8.

¹⁴ This relationship is statistically significant at the 99% level.

Type of change in life expectancy	Mean life expectancy in 1991	Mean life expectancy in 2003	Average change during time period
E&E countries with declines	68.6	65.9	-2.7
E&E countries with modest increases	71.0	72.2	+1.2
E&E countries with large increases	71.5	74.4	+2.8

While it is well established that life expectancy decreased since 1991 in much of the E&E region, **it is important to note that in the past few years the declines have, by and large, continued.** Only in two of the countries (Ukraine and Moldova) did the downward trend reverse between 1997 and 2003. Ukraine's life expectancy increased by one year during that period and Moldova's by half a year. For the countries shown below, declines in life expectancy persisted from 1997 to 2003.



It is important to note that these life expectancy figures are composite rates and that life expectancy is considerably higher for females in this region. While it is typical for females to outlive males in most parts of the world, men are dramatically more vulnerable in some parts of E&E. Globally, females live only two more years than men in low-income developing countries, four more years in middle-income countries and six more years in high-income economies.¹⁵ In stark contrast, the average for E&E countries is a gap of 8.3 years, with the seven of countries reporting gaps greater than 10 years. The table on the following page reports the gender gaps in life expectancies, starting with Russia, which has an astounding gap of 14 years.

¹⁵ [From Ron Sprout's Demography and Health in Eastern Europe and Eurasia, June 2005]

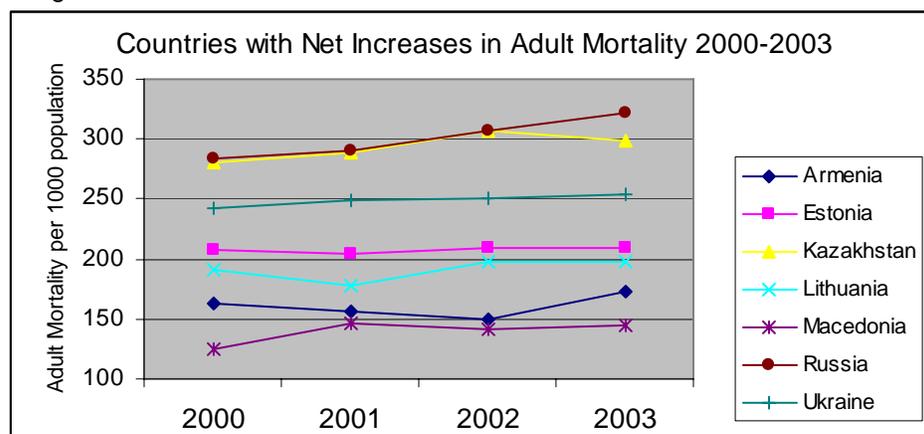
Gender Gaps in Life Expectancies for Select E&E Countries

Country	Gender gap in life expectancy (2003)	Country	Gender gap in life expectancy (2003)
Russia	14	Slovenia	8
Belarus	12	Armenia	7
Estonia	12	Bosnia & Herzegovina	7
Lithuania	12	Bulgaria	7
Kazakhstan	11	Croatia	7
Ukraine	11	Czech Republic	7
Latvia	10	Romania	7
Hungary	9	Albania	6
Kyrgyzstan	9	Azerbaijan	6
Turkmenistan	9	Macedonia	6
Georgia	8	Uzbekistan	6
Moldova	8	Serbia & Montenegro	5
Poland	8	Tajikistan	4
Slovakia	8		

Russia's large gap can probably be attributed to high rates of death from non-communicable diseases and injuries that disproportionately affect males. A recent study found that the standardized mortality rates for males in Russia's prisons were actually lower than for the overall Russian male population.¹⁶ This result was driven by much higher rates of death attributable to external causes and to cardiovascular disease in the general population. There is growing evidence that episodic drinking leads to many sudden cardiac deaths in Russia. This is an exposure from which prisoners are relatively protected, as are women who consume considerably less alcohol.

Adult Mortality Rate

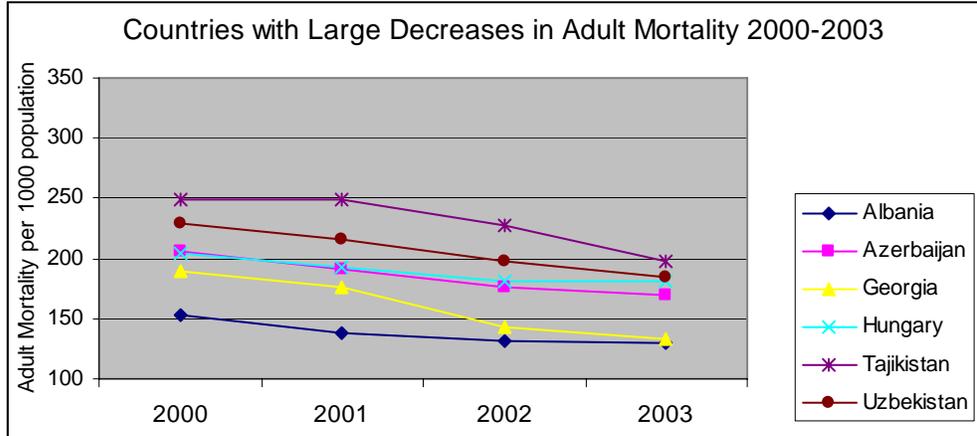
The WHO data for adult mortality are only available from 2000 to 2003. While the usefulness of a four-year trend is limited, some patterns do emerge. In Russia, the adult mortality has increased every year since 2000 and it remains the highest in the region. Russia's rates are charted below, along with those of the other 6 E&E countries that suffered net increases.



Most of the E&E region experienced slight decreases in adult mortality rates. Six countries, however, enjoyed considerable decreases in adult mortality rates, at more than 20 deaths per

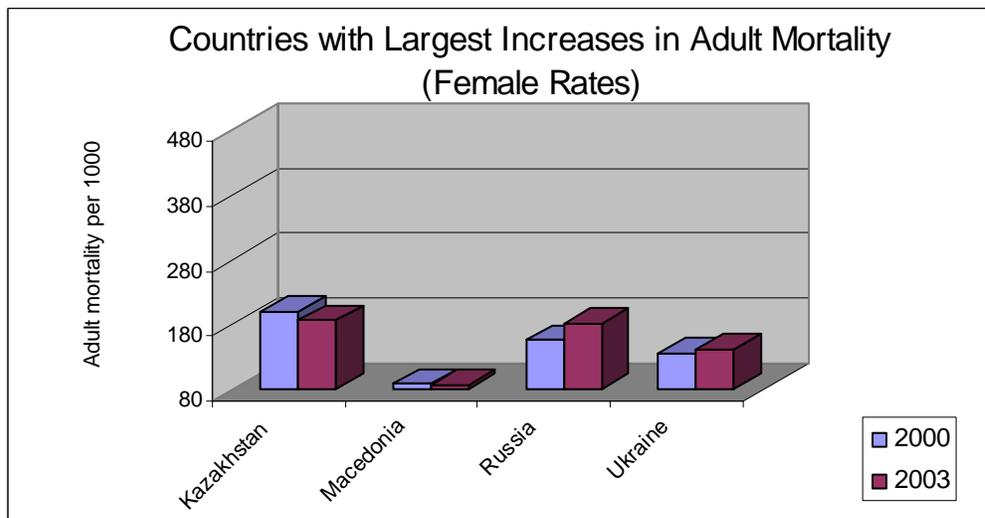
¹⁶ Bobrik, et al. Prison Health in Russia. *Journal of Public Health Policy*. 2005; 16:30-59.

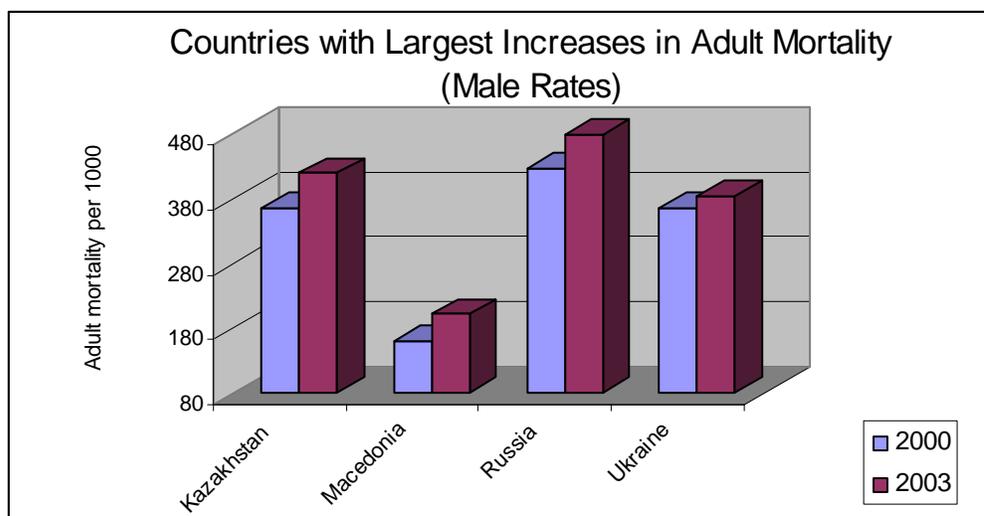
1000 population. These six: Albania, Azerbaijan, Georgia, Hungary, Tajikistan and Uzbekistan are shown below.



The composite adult mortality rates that are shown above combine both female and male rates. In fact, trends differ considerably between males and females, with female rates generally improving (decreasing) faster. On average, female adult mortality rates by country decreased by 7.4% over this time period while male rates decreased only 3.7%, or half as much.

In the E&E region, only 3 countries (Armenia, Ukraine and Russia) experienced net increases in adult mortality for females, while 10 countries experienced net increases in adult mortality for males. The following two charts show the changes in female adult mortality and in male adult mortality in the four E&E countries where adult mortality increased the most.





The two charts above suggest that where adult mortality has risen substantially, it has been driven primarily by increases in male mortality rates. As illustrated by the tables below, males in E&E face higher adult mortality rates relative to the other regions of the world, than do females in E&E.

Male Adult Mortality Rates

EU-25	155
Western Pacific Region	164
Region of the Americas	179
Eastern Mediterranean Region	257
E&E Region	261
South-East Asia Region	275
African Region	522

Female Adult Mortality Rates

EU-25	70
Western Pacific Region	100
Region of the Americas	102
E&E Region	116
Eastern Mediterranean Region	187
South-East Asia Region	212
African Region	466

As it is for life expectancy, the average gender gap in E&E for adult mortality is larger than that of any other region.

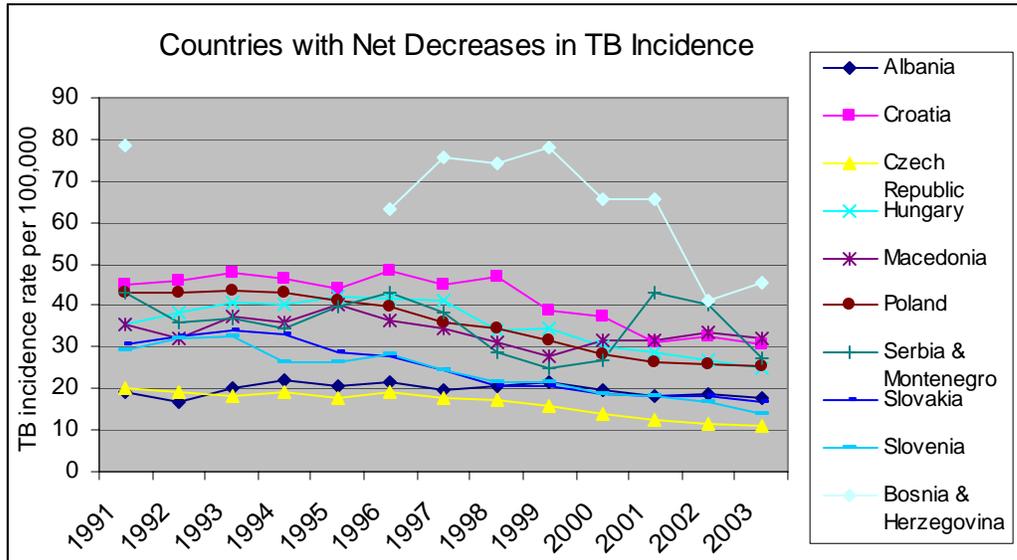
Gender Gap in Adult Mortality Rates

E&E Region	145
EU-25	85
Region of the Americas	77
Eastern Mediterranean Region	70
Western Pacific Region	64
South-East Asia Region	63
African Region	56

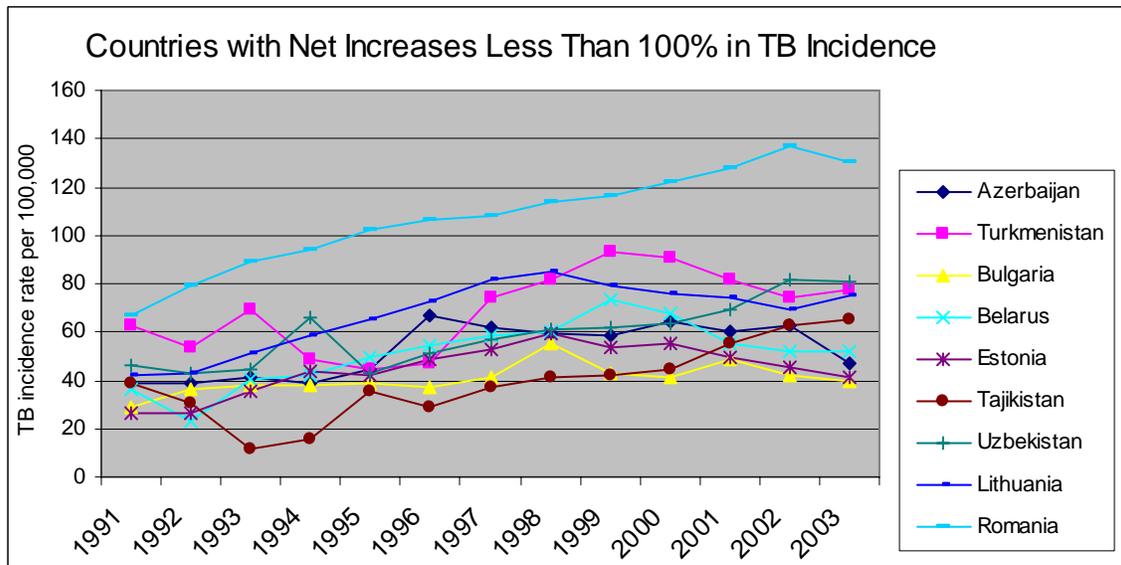
TB incidence rate

In the E&E region, 63% of the countries experienced net increases in TB incidence between 1991 and 2003. The Northern Tier countries (excluding the Baltics) along with Southeastern Europe countries were the only sub-regions that generally experienced decreases in TB incidence, with the exception of Bulgaria and Romania. The countries whose incidence rates decreased did so

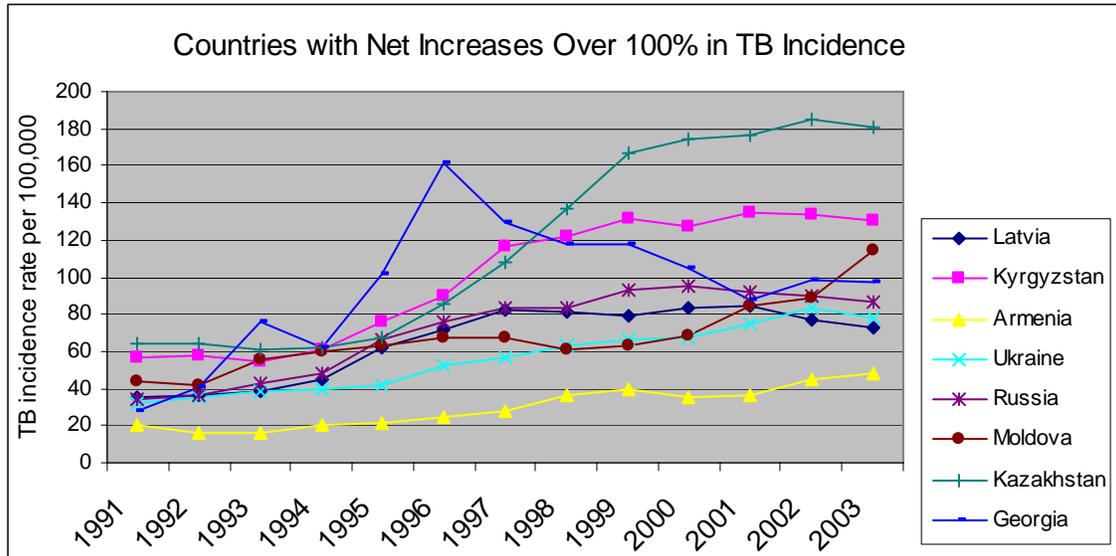
by an average of 35% of the country's 1991 rate. The trends for these countries are displayed below.



All other sub-regions, plus Romania and Bulgaria, saw increases in TB incidence. On average, these countries had increases that more than doubled their 1991 rates. The following chart shows the countries with net increases that were less than 100% of their 1991.



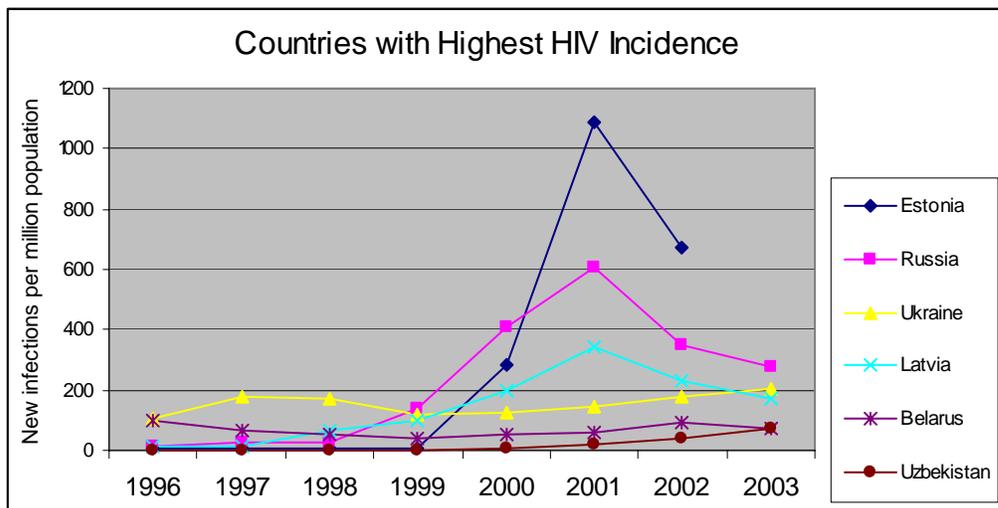
Below, the countries with the most dramatic increases (more than 100%) in TB incidence rates are shown.



Interestingly, no statistically significant correlation was found between the starting rates in 1991 and the degree to which TB incidence has increased or decreased since then. The average TB incidence rate in 1991 for the countries with rates that declined was only three points lower (at 38 versus 41 new infections per 100,000 people) than it was for countries with rates that have increased. As previously mentioned, however, there is a rough geographical correlation with the direction of TB incidence trends. Southeastern Europe and the Northern Tier (excluding the Baltics) have generally fared better in slowing the spread of TB.

HIV Incidence Rate

As previously mentioned, the rate of the spread of HIV is as important to consider as the current prevalence. Also of interest is how the rate of spread changes over time. The six countries where the incidence rates are currently the highest are Estonia, Russia, Ukraine, Latvia, Belarus and Uzbekistan. Time trends for these countries are shown in the chart below.



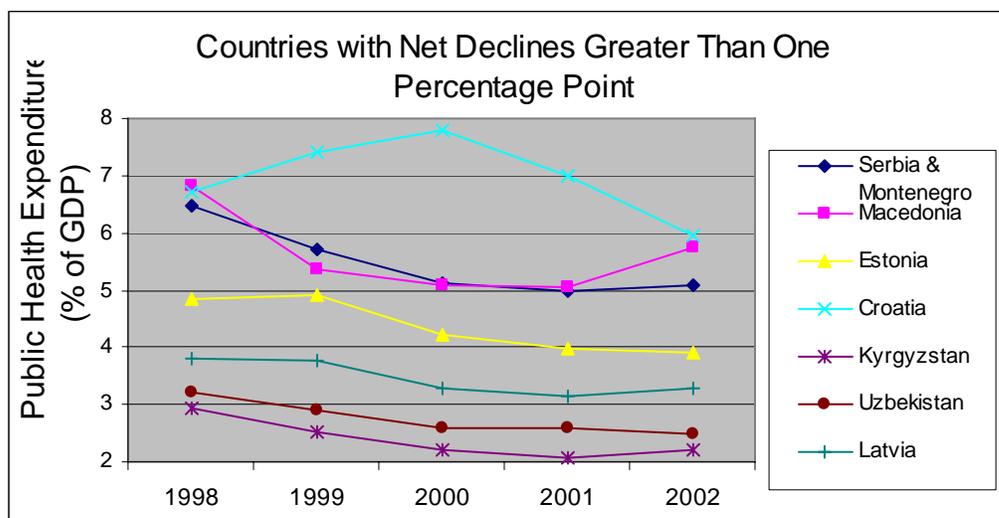
After rising steadily from 1996 to 2001, the incidence rates appear to have decreased from 2001 to 2003 for Estonia, Russia and Latvia (although no 2003 rate is available for Estonia). This does not necessarily reflect an actual decline in HIV incidence. One potential explanation is that fewer HIV screening tests were conducted in the last two years. In this scenario, health authorities would have detected fewer of the new the infections and the actual rate of new infections may or may not have declined. In the case of Russia, for example, 491,000 people were tested for HIV in 2001, compared to only 279,000 in 2003. Whether or not testing was targeted to the highest risk groups and whether targeting varied across years could also bias reported rates over time.

Rates in Ukraine, Belarus and Uzbekistan did not suffer the same steady increases early on as did the other countries nor have they shown any significant decreases in the recent years.

Public Health Expenditure as a Percentage of GDP

Public health expenditure as a percentage of GDP includes government spending on health as well as public spending from donor agencies, non-governmental organizations (NGOs) and social health insurance funds. Since many factors impact this indicator, fluctuations have multiple potential causes. Therefore, trends are difficult to interpret. For instance, a decrease in this indicator could result from a fall in health expenditure from one or more of many public sources or it could result from an increase in GDP.

Nevertheless, this indicator is a decent proxy for government



Total Health Expenditure Per Capita¹⁷

On average, countries in the E&E region experienced increases in total health expenditure per capita by 24.5% between 1998 and 2002. However, the current average of \$180 per year is still a mere fraction of the E.U. mean of \$1464 and appears even more limited next to the U.S. figure of \$5274.

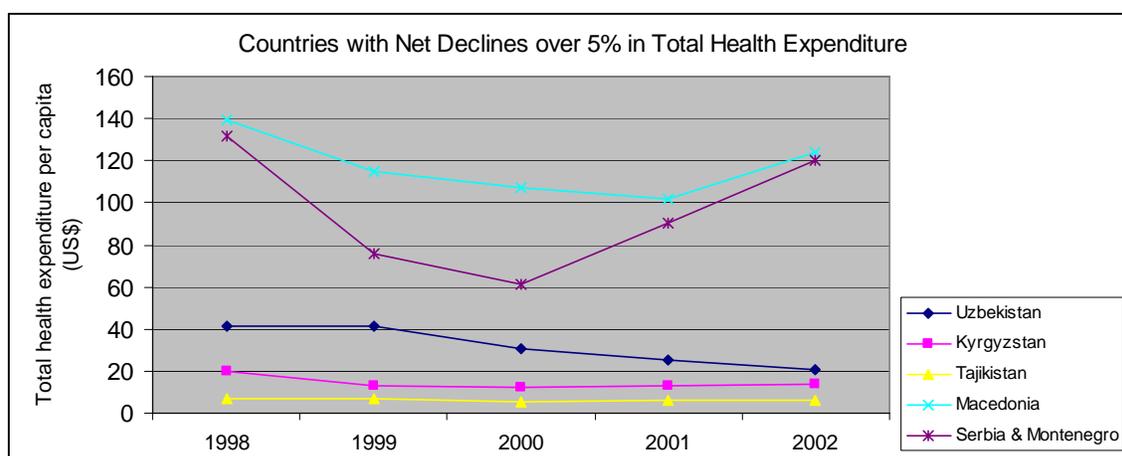
More alarming are levels in the 3 countries with the largest percentage decreases in health expenditure since 1998. These happen to also be the 3 countries with the lowest current levels of

¹⁷ For the Health Program Components Table, we used the total health expenditure per capita rate reported by the WHO, which is reported to be the most accurate source of national health accounts data. In the trends section, we relied on the World Bank World Development Indicators 2005 because those data have been reported for a greater number of years. Therefore, slight disparities occur between the two sections.

spending and they are all from the CAR sub-region. Tajikistan has the lowest total health expenditure at just \$6 per capita (the seventh lowest level in the world¹⁸), a 14% decrease from 1998. Kyrgyzstan is next at \$14 per capita, after a 30% decrease. Uzbekistan suffered the largest decrease, 49%, to \$21 of health spending per capita. Six E&E countries have lower total health expenditure than the average for Sub-Saharan Africa, which is \$32 per capita. Their values are shown in the table below.

Country	Total per capita expenditure on health at average exchange rate (US\$) 2002
Tajikistan	6
Kyrgyzstan	14
Uzbekistan	21
Georgia	25
Azerbaijan	27
Moldova	27

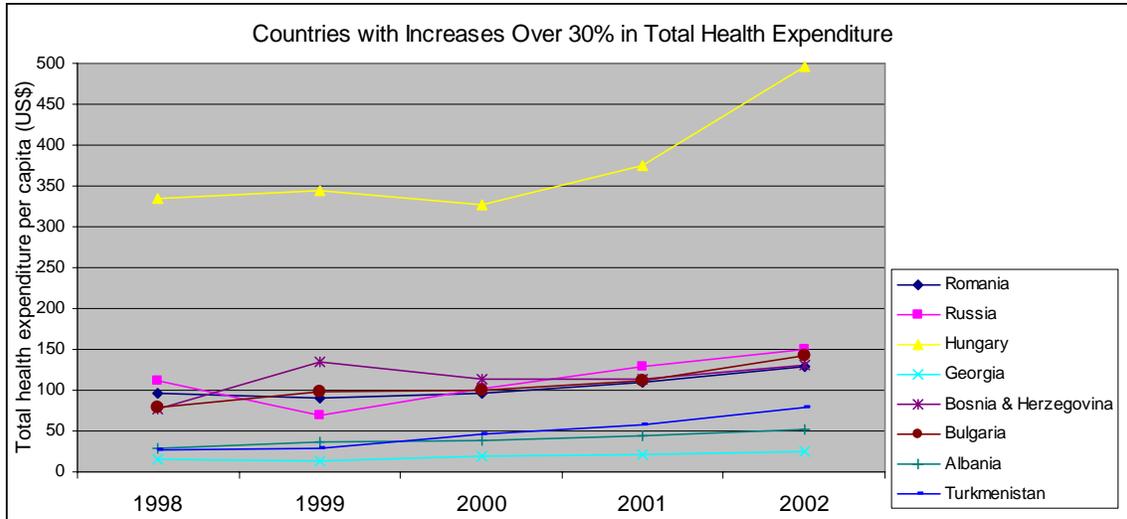
The countries in which total health expenditure decreased by more than 5% are graphed below.



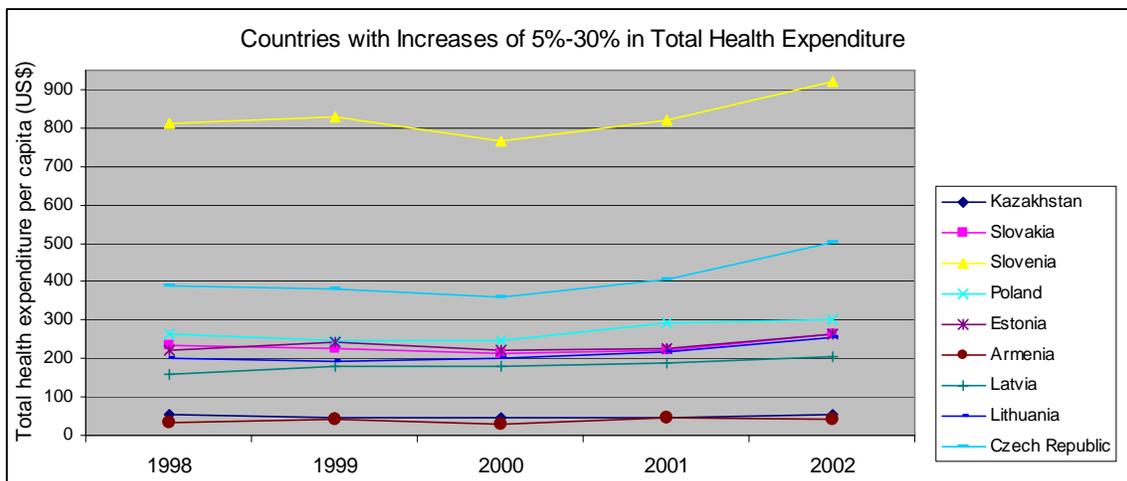
In contrast with the rest of CAR, Turkmenistan reports the largest percentage increase in total health expenditure, at 193%.¹⁹ The eight countries with relatively large increases (over 30%) are charted below.

¹⁸ Only six countries have lower total health expenditure per capita than Tajikistan. They are: Burundi, Democratic Republic of the Congo, Ethiopia, Liberia, Madagascar and North Korea.

¹⁹ As mentioned previously, Turkmenistan is one of the countries where outsider access is most limited. Therefore, we treat data from Turkmenistan especially cautiously.



Nine countries had more modest increases in health expenditure, from 5% to 30% of their 1998 value.



Five E&E countries had no discernible trend in health expenditure, with net changes that were less than 5 percent between 1998 and 2002. They were Croatia, Ukraine, Moldova, Belarus and Azerbaijan.

Population Growth

Twenty of the 27 E&E countries experienced a net decrease in population between 1991 and 2003. For all but three of these countries the decline was consistent in more recent years (from 1997 to 2003). In Slovenia, Albania, and Bosnia & Herzegovina, populations are still below what they were in 1991, but the downward trend has reversed and populations have grown since 1997.

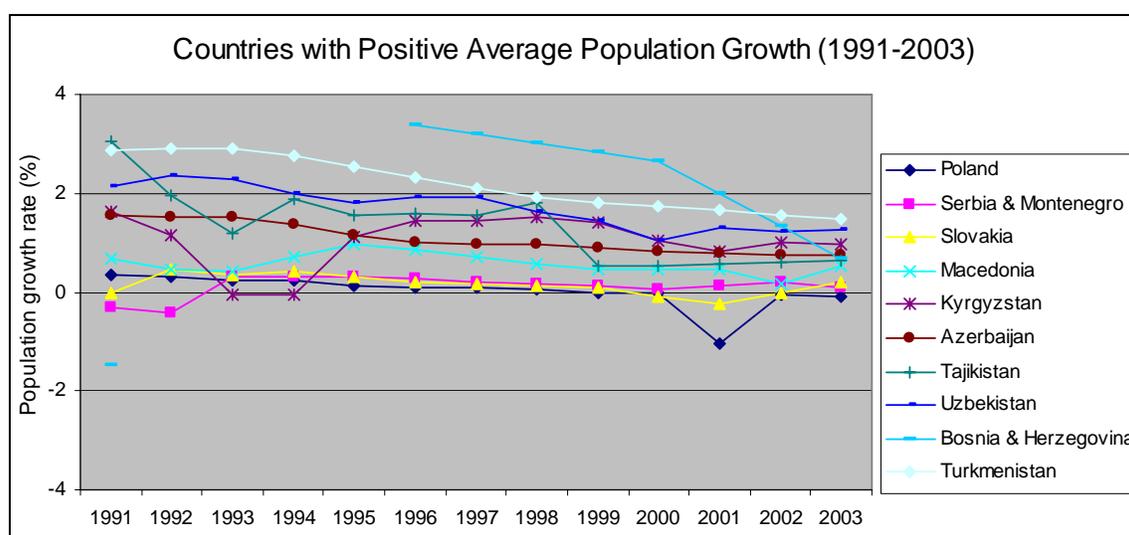
The table below shows the percentage change in populations from 1997 to 2003, starting with the largest decrease.

Country	Percent change in population between 1997 and 2003	Country	Percent change in population between 1997 and 2003
Bulgaria	-5.9	Czech Republic	-1.0
Kazakhstan	-5.5	Hungary	-0.3
Latvia	-5.3	Slovakia	+0.1
Armenia	-5.3	Serbia & Montenegro*	+0.4
Ukraine	-4.6	Slovenia	+0.5
Georgia	-3.6	Albania	+1.7
Romania	-3.6	Macedonia	+2.6
Lithuania	-3.5	Tajikistan	+4.8
Estonia	-3.4	Azerbaijan	+5.0
Croatia	-2.7	Kyrgyzstan	+6.9
Russia	-2.6	Uzbekistan	+8.1
Belarus	-2.3	Turkmenistan	+10.6
Moldova	-1.7	Bosnia & Herzegovina	+13.3
Poland	-1.2		

*The percent change for Serbia & Montenegro is from 1997 to 2001.

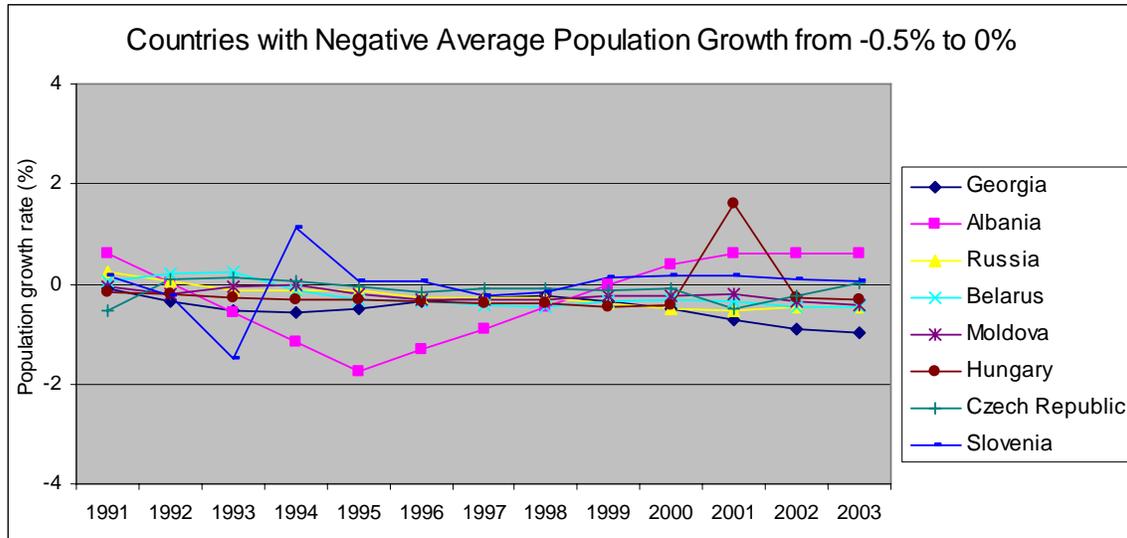
Population Growth Rates

Ten E&E countries had positive average population growth rates from 1991 to 2003. However, these rates generally decreased on average over the time period. For these countries, the average population growth rate was 1.04 in 1991, compared with 0.65 in 2003. The decreasing trend is visible in the graph below.



*Note that Serbia & Montenegro's rates for 2002 to 2003 are from the WHO. All other population growth rates are from the World Bank WDI.

Most of the region, on the other hand, experienced population declines, which can be attributed to low fertility rates, high adult mortality, and, in some cases, net emigration. Eight countries in the region experienced an average negative growth ranging from -0.5% to zero growth (shown below).

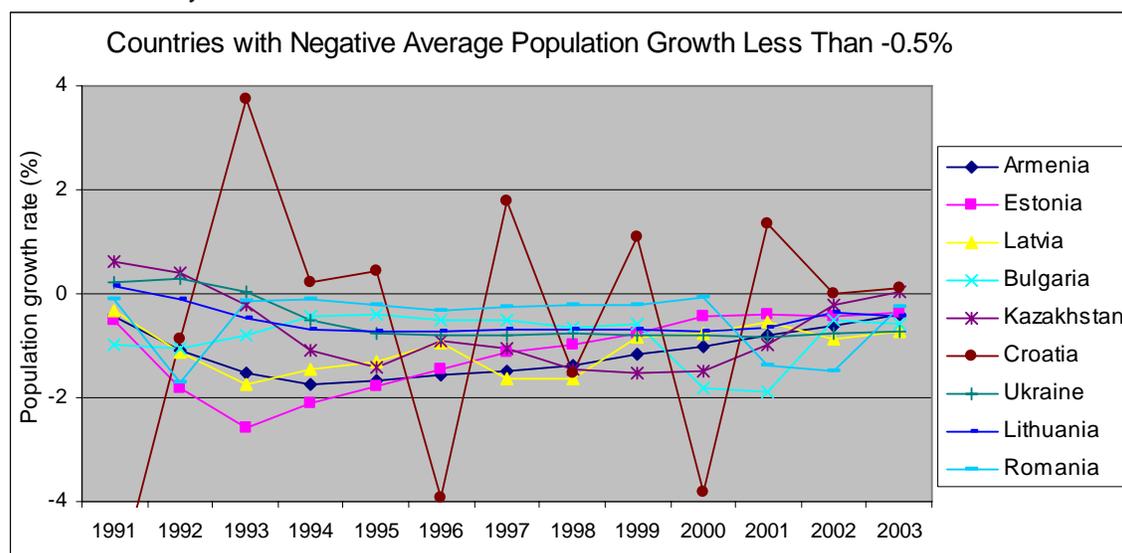


The countries in the graph above generally had total fertility rates²⁰ that fell short of the replacement rate (the total fertility rate required in a country to keep its population steady) of 2.1, with Albania being the only exception. The table below shows these rates.

Total fertility rate in E&E countries with population decreases from 0% to 0.5%	
Georgia	1.1
Czech Republic	1.2
Slovenia	1.2
Belarus	1.3
Russia	1.3
Hungary	1.3
Moldova	1.4
Albania	2.2

²⁰ Total fertility rate is the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

Nine E&E countries had more significant net decreases during the time period, with drops greater than 0.5%. They are shown in the chart below.



**It is currently unclear why Croatia reports such erratic rates, but flaws in this data are likely.*

All nine of these countries also have total fertility rates far lower than the replacement rate. The average for this group is 1.3 births per woman and individual country rates are displayed below.

Total fertility rate in E&E countries with population decreases greater than 0.5%	
Armenia	1.2
Ukraine	1.2
Bulgaria	1.2
Lithuania	1.3
Romania	1.3
Latvia	1.3
Estonia	1.4
Croatia	1.4
Kazakhstan	1.8

III. C. Individual Country Webs

Methodology

The individual country webs offer a quick glimpse of a country's status relative to the level of health that USAID might strive to help the country achieve. We use the Northern Tier's mean health performance on the six vulnerability indicators as merely suggestive of such a benchmark.

The Northern Tier countries²¹ are a suitable standard for comparison since they share much of the same history and geographical features as the rest of the region, and have demonstrated relative success in their transitions by recently entering the E.U. While this sub-region still faces serious health challenges, it has performed "ideally" considering the impediments.

²¹ Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia and Slovenia.

Results

For each country in E&E, we have designed a “radar graph” illustrating how well it performs relative to the entire region on the six vulnerability indicators: HALE, adult mortality rate, under five mortality rate, public expenditure on health as a percent of GDP, TB incidence rate and HIV incidence rate. Graphs for the EU-25 and the United States are also shown to give an additional standard for comparison.

Each graph has a bold line at zero, representing the mean performance on the given indicator for the E&E region. A light pink line circles the graph intersecting each indicator axis at the number of standard deviations by which a country outperforms (or fares worse than) the E&E mean. When a country performs better than the E&E mean, its line intersects that indicator axis outside the bold zero line. When a country performs worse than the E&E mean, its line intersects the axis inside the bold zero line, closer to the center of the graph. Another dark blue line circles the graph showing how well the Northern Tier countries performed, on average, for each indicator. See Annex 6 for graphs for E&E, followed by graphs for the EU-25 and the United States.

In sum, a smaller “web” is worse for all indicators, a bigger “web” is better.

III. D. Health Program Components Table

Methodology

The indicators used in the Vulnerability Index were selected to assess where health status is the poorest. Many are top-level health measures, capturing the health impacts of a myriad of factors. For this section, we developed a table that displays how well countries perform in specific areas more directly related to USAID program objectives.

In 2004, USAID created 39 standard “Program Components” that summarize the Agency’s development work around the world. The seven health-related Program Components form the basis for the Health Program Components Table. For each Program Component, we consider a related indicator, repeating the use of several indicators from the Vulnerability Index. We employed statistical methods identical to those used for the Vulnerability Index to rank countries according to these specific health-related Program Components and also to give an aggregate ranking. Listed below are the seven health-related Program Components and the indicator we chose relating to each of them. See the glossary for indicator definitions.

PROGRAM COMPONENT	RELATED INDICATOR
<i>1. Prevent and control infectious diseases of major importance</i>	TB incidence rate (new cases reported) per 100,000 population
<i>2. Reduce transmission and impact of HIV/AIDS</i>	HIV incidence rate per 1,000,000 population
<i>3. Improve maternal health and nutrition</i>	Lifetime risk of maternal death
<i>4. Improve child survival, health and nutrition</i>	Infant mortality rate
<i>5. Reduce non-communicable diseases and injuries</i>	Adult mortality rate
<i>6. Support family planning programs</i>	Modern contraceptive prevalence rate (MCPR) among married women 15-49
<i>7. Enhance health systems capacity</i>	Total health expenditure per capita (US\$) ²²

²² There is a paucity of indicators that represent health systems capacity. We recognize that total health expenditure per capita is limited in its ability to capture Health Systems Program Component.

Results

The final Health Program Components Table mirrors the results of the Vulnerability Index. The countries' rankings generally do not differ by more than four places between the two ranking methods. One notable exception is Uzbekistan which ranks six places higher in the Health Program Components Table. This jump in rank is due primarily to its relatively high MCPR, which is equal to that of the Czech Republic and is the highest MCPR reported for the region.

The ten countries that performed most poorly on the Health Program Components, starting with the poorest performer, are: Tajikistan, Russia, Azerbaijan, Kyrgyzstan, Kazakhstan, Estonia, Ukraine, Moldova, Turkmenistan and Romania.

See Annex 3 for the full results and to view the table.

IV. SUMMARY FINDINGS

1. The most vulnerable countries in the E&E region are Tajikistan, Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Azerbaijan, Uzbekistan, Ukraine, Estonia, and Moldova.

Each of these ten countries' aggregate performance on the six vulnerability indicators was 0.4 or more standard deviations worse than the E&E mean. The two countries found to be most vulnerable in the region were Tajikistan and Kazakhstan, which both scored more than one full standard deviation worse than the E&E mean.

There is a link between geographic location and vulnerability—as determined by our index. The most vulnerable nine countries include the entire CAR region, parts of RUMB (specifically, Russia and Ukraine), one country from the Caucasus (Azerbaijan), and one country from the Baltics (Estonia). The least vulnerable countries, on the other hand, are all from the Northern Tier (excluding the Baltics) and Southeastern Europe. Starting with the least vulnerable, they are Slovenia, Czech Republic, Croatia, Slovakia, Macedonia, Poland, Hungary, Serbia & Montenegro, Bulgaria and Bosnia & Herzegovina. These all perform 0.5 or more standard deviations better than the E&E mean. The mid-range performing countries (scoring less than 0.5 standard deviations below or above the E&E mean) are scattered in Southeastern Europe, the Northern Tier, the Baltics, and RUMB.

2. Region-wide, there has been divergence in life expectancy. In general, the lower the level of life expectancy that a country had in 1991, the smaller the gain (or larger the decline) it experienced. Declines in life expectancy have persisted in recent years in CAR, Russia and Belarus. In addition, males are considerably disadvantaged in E&E in terms of life expectancy, relative to other regions of the world.

All of the countries in CAR and RUMB experienced net decreases in life expectancy from 1991 to 2003. Of these countries, only Ukraine and Moldova experienced an upturn in the more recent period, from 1997 and 2003. For the rest of the countries with decreasing life expectancy, declines are generally steady and there is no evidence that the trends are reversing.

Globally, females live only two more years than men in low-income developing countries, four more years in middle-income countries and six more years in high-income economies.²³ In stark contrast, the average for E&E countries is a gender gap of 8.3 years, with the seven E&E countries reporting gaps greater than ten years. These seven include the Baltics, Russia, Belarus, Ukraine and Kazakhstan.

3. Increases in adult mortality have occurred in three countries with some of the highest adult mortality rates: Russia, Kazakhstan, and Ukraine. Elsewhere, rates remain high, especially for males. Currently, in the Baltics, RUMB, and parts of CAR (Kazakhstan, Turkmenistan and

²³ [From Ron Sprout's Demography and Health in Eastern Europe and Eurasia, June 2005.]

Kyrgyzstan), male adult mortality rates are very high, exceeding the average for South-East Asia Region.

Russia, Kazakhstan, and the Ukraine have the first, second, and fourth highest adult mortality rates in the E&E region, respectively. All three countries saw rises in adult mortality from 2000 to 2003.

No E&E countries have rates surpassing the average for the AIDS-ravaged continent of Africa (522 per 1000 population). However, ten countries have male adult mortality rates that exceed the WHO's South-East Asia Region average (275 per 1000). They are: Russia, Kazakhstan, Ukraine, Belarus, Turkmenistan, Kyrgyzstan, Estonia, Latvia, Moldova, and Lithuania. On the other hand, no country in E&E has a female adult mortality rate exceeding that of South-East Asia, at 212 deaths per 1000.

4. Population declines have occurred in two-thirds of the region's countries since 1991. Even among E&E countries with positive population growth between 1991 and 2003, the average growth rates decreased.

Seventeen of the E&E countries experienced net decreases in total population between 1991 and 2003. These population declines can probably be attributed to low fertility rates, high adult mortality, and, in some cases, net emigration.

The countries with populations that have decreased by more than 0.5% of their 1991 size are Armenia, Estonia, Latvia, Bulgaria, Kazakhstan, Croatia, Ukraine, Lithuania and Romania. All of these countries have total fertility rates well below the replacement rate (the total fertility rate required to maintain the population level) of 2.1 and the average for these countries is 1.3 births per woman. Even where population growth has generally been positive since 1991, those growth rates are decreasing, from an average of 1.04% to 0.65%.

While age dependency ratios²⁴ have generally fallen in E&E, they may increase as population structures age if the elderly populations grow faster than the adult populations. There are concerns about the potential economic impact of substantial declines in population that are projected in Ukraine, Bulgaria, Georgia, Belarus, Latvia, Lithuania, Romania, and Russia. The projected percentage decreases by 2050 for these countries range from 43% for Ukraine to 22% for Russia.

5. In parts of E&E, extremely low rates of total health expenditure per capita reflect very poor public capacity and commitment to investing in health as well as low private capacity to supplement public health expenditure.

Tajikistan reports one of the lowest rates of total health expenditure in the world at just \$6 per capita per year. Kyrgyzstan, Uzbekistan, Georgia, Azerbaijan and Moldova also have rates below the Sub-Saharan Africa average of \$32 per capita per year.

The E&E regional average, \$181 is only a fraction of EU-25 average, \$1463.

²⁴ The age dependency ratio is the ratio of dependents to the working-age population, where dependents are those below the age of 15 and above the age of 64 and the working-age population consists of those ages 15-64. Since 1991, age dependency ratios have fallen in all of the E&E region, with the exception of Croatia and Serbia & Montenegro.

V. CONCLUSIONS

1. Based on vulnerability, USAID generally has health programs in the right countries.
2. Vulnerability among a set of Eurasian countries has generally been consistent through various analyses from 2001 to 2005.
3. The most vulnerable countries of the region have continued to weaken on many health fronts in recent years—a deterioration that goes beyond the original 1991 shock.
4. Given consistent vulnerability and continued deterioration, we conclude that the paradigm of “transition” is unrealistic for most of Eurasia.
5. Men’s health matters.
6. Adult health matters.

VI. RECOMMENDATIONS

1. *Ways to improve the Vulnerability Analysis and its use:*
 - Add *qualitative* field knowledge to future analyses, possibly through a short questionnaire/survey.
 - Consider more systematic use of vulnerability as ONE input to budget decisions, possibly by incorporating it into the E&E Bureau’s Monitoring Country Performance reports by Ron Sprout.
 - Explore possibility of running similar analyses within countries—especially as pertains to mapping vulnerability by oblast/region.
2. *Ways to act upon the Vulnerability Analysis’ findings and conclusions:*
 - In Eurasia especially, ensure USG optic is long-term and development-oriented, rather than short-term, “transition”-oriented.
 - Explore feasible ways to reduce adult mortality, including but not limited to men.
 - Continue to emphasize HIV and TB (and MDR-TB) in the short term.
3. *Areas for further research and/or debate:*
 - What are the impacts and potential responses to NCDs, violence, and injuries in E&E?
 - How have various factors contributed to population declines and what is the potential impact of those declines on health vulnerability and economic growth?
 - How well aligned should USAID programs be to sources of vulnerability? Are there more important factors to consider in programming, such as USAID’s comparative advantage, other donors’ efforts, and host-country government commitment, or lack thereof?

VII. ANNEXES

Annex 1. Vulnerability Index Indicators

CATEGORY	INDICATOR	RATIONALE
General	Healthy Life Expectancy (HALE)	Life expectancy is a well-established indicator of national health status and was used in the 2003 and 2004 analyses. However, life expectancy measures do not account for the relative quality of life that people enjoy during the years they are alive. Recently, there has been a movement towards disability- or health-adjusted measures of life expectancy. HALE is the WHO's standard health-adjusted life expectancy indicator and has been regularly reported since 2000. It accounts for longevity as well as quality of life by discounting years spent with disease or disability.
Non-communicable disease and injury	Adult mortality per 1,000	Adult mortality measures the probability of dying between the ages of 15 and 59. An adult mortality rate of 186 (the E&E average), for example, means that for every 1,000 15 year olds, 186 of them will die before their 60 th birthday. This is an appropriate proxy indicator for non-communicable disease (NCD) and injury in E&E countries because NCD and injury are responsible for over 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.
Infectious disease	HIV incidence (new infection rate per 1,000,000 population)	The 2004 analysis used HIV prevalence among adults, as it is the international standard for monitoring HIV/AIDS. However, in the E&E region, HIV prevalence is still very low with several countries at less than 0.1% even though HIV infection rates are growing rapidly. Consequently, the 2005 analysis uses the HIV new infection rate, or incidence, per 1,000,000 population. The incidence rate is preferable because it offers more cross-country variation and is also indicative of the speed with which the virus is spreading—a more meaningful indicator in areas where prevalence remains uniformly low.
	Tuberculosis incidence per 100,000	In the 2004 analysis, the WHO's estimated TB incidence rate was used. For the 2005 analysis, we use the WHO indicator for new cases reported, which is a more precise measure of TB incidence.
Child health	Under-five mortality per 1,000 live births	The under-five mortality rate (U5MR) 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. U5MR 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 commitment and capacity	Public health expenditure as a % of GDP	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.

Annex 2. Vulnerability Index Results

VULNERABILITY INDEX 2005: COUNTRY RANKING

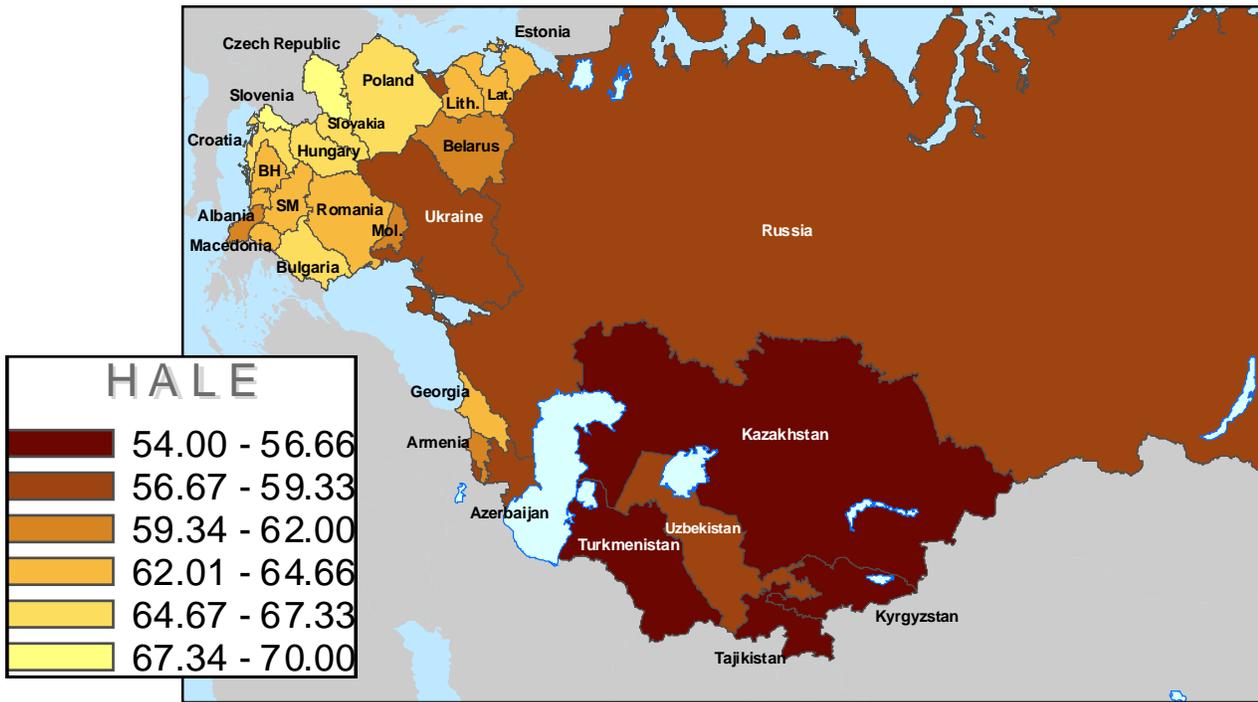
Vulnerability Analysis	Healthy life expectancy at birth, total			Adult mortality per 1000, total			Under 5 mortality per 1000 live births			Public health expenditure as % of GDP			TB incidence rate per 100,000 population			New HIV infection rate per million population								
	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean						
	2002	WHO		2003	WHO		2003	WHO (World Health Stats)		2002	WDI		2003	WHR		2003	EuroHIV					FINAL OUTCOMES		
Country	Value	Rank		Value	Rank		Value	Rank		Value	Rank		Value	Rank		Value	Rank		Avg std dev diff	Rank		Rank	Country	
Albania	61.4	16	-0.14	130	4	1.00	21	18	0.32	2.36	21	-0.84	23	3	1.10	6.6	7	0.43	0.31	11		1	<i>Slovenia</i>	
Armenia	61	17	-0.24	172	14	0.24	33	20	-0.05	1.33	24	-1.47	70	15	0.04	9.5	12	0.41	-0.18	17		2	<i>Czech Republic</i>	
Azerbaijan	57.2	23	-1.18	169	12	0.30	91	25	-1.85	0.82	27	-1.78	76	18	-0.10	13.9	15	0.38	-0.71	22		3	<i>Croatia</i>	
Belarus	60.7	18	-0.31	243	22	-1.03	10	9	0.67	4.73	8	0.61	53	12	0.42	72.1	23	-0.05	0.05	13		4	<i>Slovakia</i>	
Bosnia & Herzegovina	64.3	9	0.58	139	7	0.84	17	15	0.45	4.58	9	0.52	55	13	0.38	2.9	4	0.46	0.54	10		5	<i>Macedonia</i>	
Bulgaria	64.6	7	0.66	152	11	0.61	15	13	0.51	4.45	10	0.43	43	9	0.65	8	10	0.42	0.55	9		6	<i>Poland</i>	
Croatia	66.6	3	1.15	120	3	1.19	7	3	0.76	5.94	3	1.35	43	9	0.65	10.2	13	0.41	0.92	3		7	<i>Hungary</i>	
Czech Republic	68.4	2	1.60	119	2	1.20	5	1	0.82	6.40	1	1.62	12	1	1.35	6	5	0.44	1.17	2		8	<i>Serbia & Montenegro</i>	
Estonia	64.1	10	0.53	209	20	-0.43	8	4	0.73	3.89	15	0.09	50	11	0.49	671.9	27	-4.44	-0.50	19		9	<i>Bulgaria</i>	
Georgia	64.4	8	0.61	133	5	0.95	45	21	-0.42	1.03	25	-1.65	83	19	-0.26	19.5	17	0.34	-0.07	15		10	<i>Bosnia & Herzegovina</i>	
Hungary	64.9	6	0.73	181	15	0.09	9	7	0.70	5.48	5	1.06	29	5	0.97	6.4	6	0.43	0.66	7		11	<i>Albania</i>	
Kazakhstan	55.9	24	-1.50	299	26	-2.05	73	24	-1.29	1.86	23	-1.14	145	25	-1.67	48.4	20	0.13	-1.26	26		12	<i>Lithuania</i>	
Kyrgyzstan	55.3	25	-1.65	248	23	-1.12	68	22	-1.14	2.20	22	-0.94	124	23	-1.19	25.3	18	0.30	-0.96	25		13	<i>Belarus</i>	
Latvia	62.8	15	0.21	205	19	-0.36	13	11	0.57	3.27	18	-0.29	75	17	-0.08	174.7	24	-0.80	-0.12	16		14	<i>Romania</i>	
Lithuania	63.3	13	0.33	198	18	-0.23	9	7	0.70	4.32	12	0.36	70	15	0.04	31.9	19	0.25	0.24	12		15	<i>Georgia</i>	
Macedonia	63.4	12	0.36	144	10	0.75	12	10	0.60	5.76	4	1.23	31	6	0.92	0.5	2	0.48	0.72	5		16	<i>Latvia</i>	
Moldova	59.8	19	-0.53	224	21	-0.69	32	19	-0.02	4.07	14	0.21	139	24	-1.53	60.5	21	0.04	-0.42	18		17	<i>Armenia</i>	
Poland	65.8	5	0.95	140	8	0.83	8	4	0.73	4.42	11	0.41	31	6	0.92	15.8	16	0.37	0.70	6		18	<i>Moldova</i>	
Romania	63.1	14	0.28	171	13	0.25	20	16	0.35	4.15	13	0.25	149	26	-1.76	10.9	14	0.40	-0.04	14		19	<i>Estonia</i>	
Russia	58.6	22	-0.83	321	27	-2.45	16	14	0.48	3.46	16	-0.17	112	21	-0.92	275.5	26	-1.54	-0.90	24		20	<i>Ukraine</i>	
Serbia & Montenegro	63.8	11	0.46	142	9	0.78	14	12	0.54	5.09	7	0.82	35	8	0.83	9.1	11	0.41	0.64	8		21	<i>Uzbekistan</i>	
Slovakia	66.2	4	1.05	139	6	0.85	8	4	0.73	5.27	6	0.94	24	4	1.08	2.4	3	0.46	0.85	4		22	<i>Azerbaijan</i>	
Slovenia	69.5	1	1.87	116	1	1.26	5	1	0.82	6.22	2	1.51	18	2	1.22	7.1	9	0.43	1.18	1		23	<i>Turkmenistan</i>	
Tajikistan	54.7	26	-1.80	197	17	-0.21	118	27	-2.69	0.91	26	-1.72	168	27	-2.19	6.7	8	0.43	-1.36	27		24	<i>Russia</i>	
Turkmenistan	54.4	27	-1.87	261	25	-1.35	102	26	-2.20	3.04	19	-0.42	67	14	0.10	0	1	0.48	-0.88	23		25	<i>Kyrgyzstan</i>	
Ukraine	59.2	21	-0.68	255	24	-1.25	20	16	0.35	3.34	17	-0.24	92	20	-0.46	206.3	25	-1.03	-0.55	20		26	<i>Kazakhstan</i>	
Uzbekistan	59.4	20	-0.63	184	16	0.03	69	23	-1.17	2.50	20	-0.75	115	22	-0.99	70.4	22	-0.03	-0.59	21		27	<i>Tajikistan</i>	
Standard Deviation	4.0			55.4			32.1			1.6			44.0			136.5								1=least vulnerable, 27=most vulnerable
Mean	62.0			185.5			31.4			3.7			71.6			65.6								
United States	69.3			109.9			8.0			6.6			5.0			197.0								
EU-25 Mean**	69.2			111.1			6.2			5.7			73.8			89.1								

*Estonia's and Turkmenistan's HIV infection rates are for 2002. The U.S. rate is for 2003, reported by CDC. The E.U. rate excludes France, Malta and Spain.

**EU-25 mean is for the European Union-25, excluding Malta for lack of data.

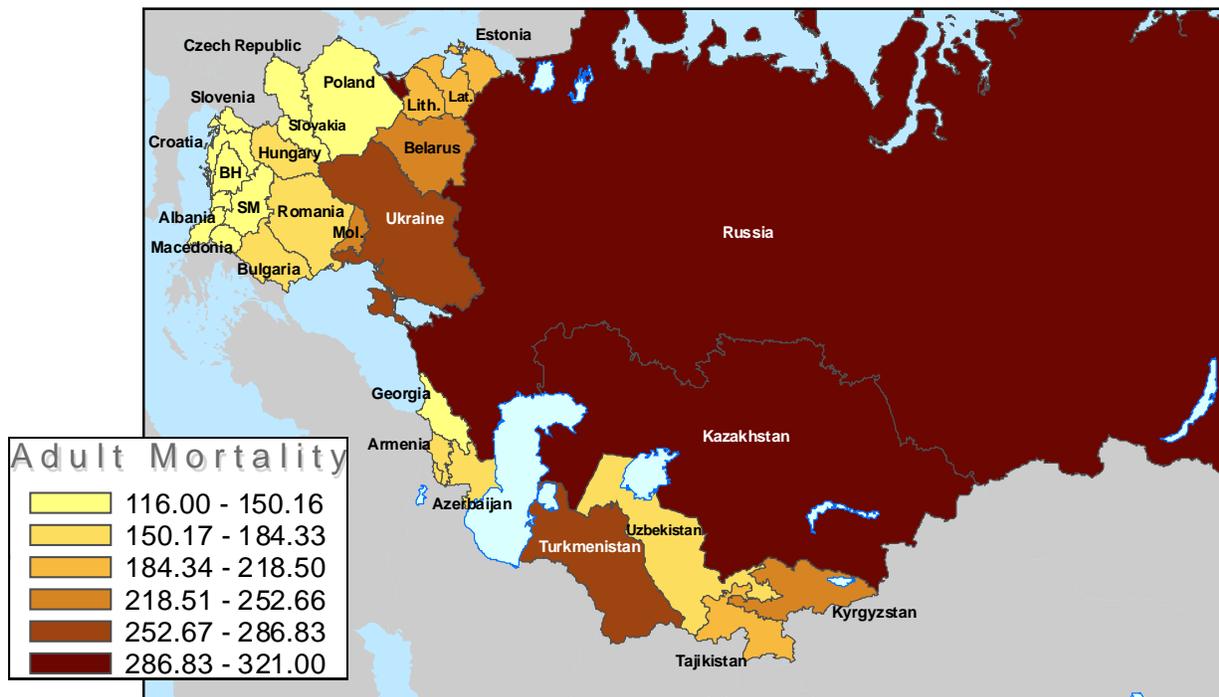
Annex 3. Vulnerability Indicator Maps

Healthy Life Expectancy (2002)



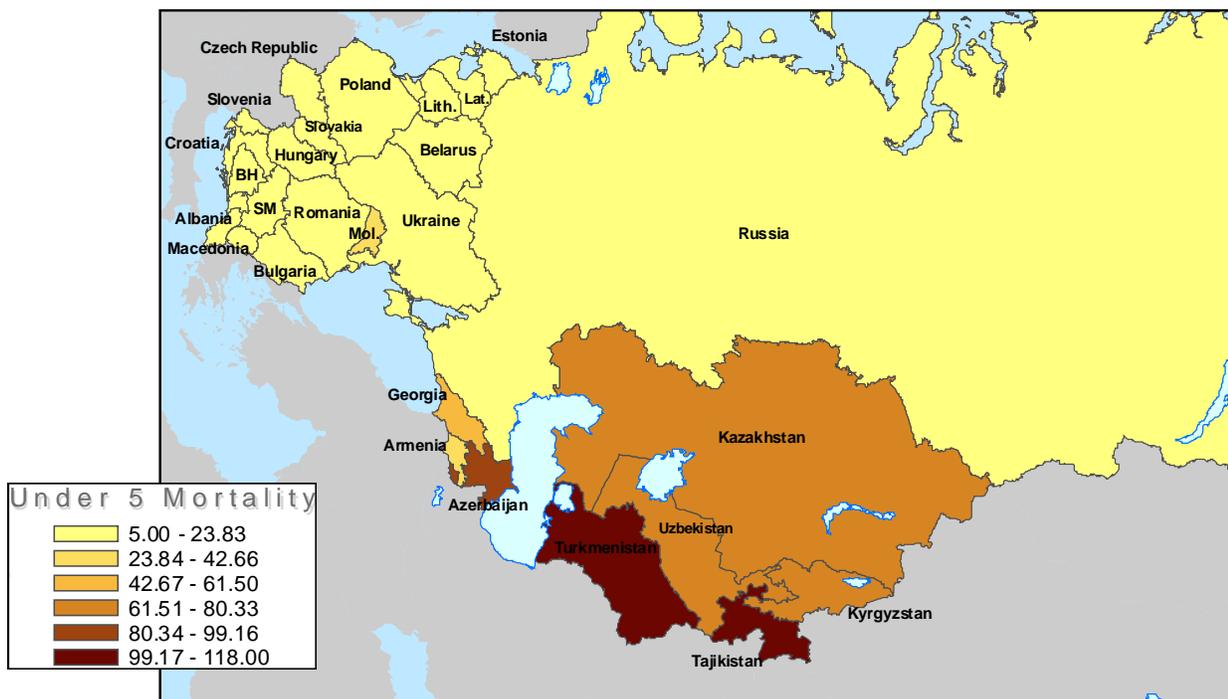
S. Guagliardo, 2005

Adult Mortality Rate (2003)



S. Guagliardo, 2005

Under 5 Mortality per 1,000 live births (2003)



S. Guagliardo, 2005

Public Health Expenditure as % of GDP (2002)*



* For the above map, the data classes with darker greens represent a *desirable* quality of greater PHE as % of GDP. (This classification is reverse from all other maps, whereby darker colors represent unfavorable qualities.)

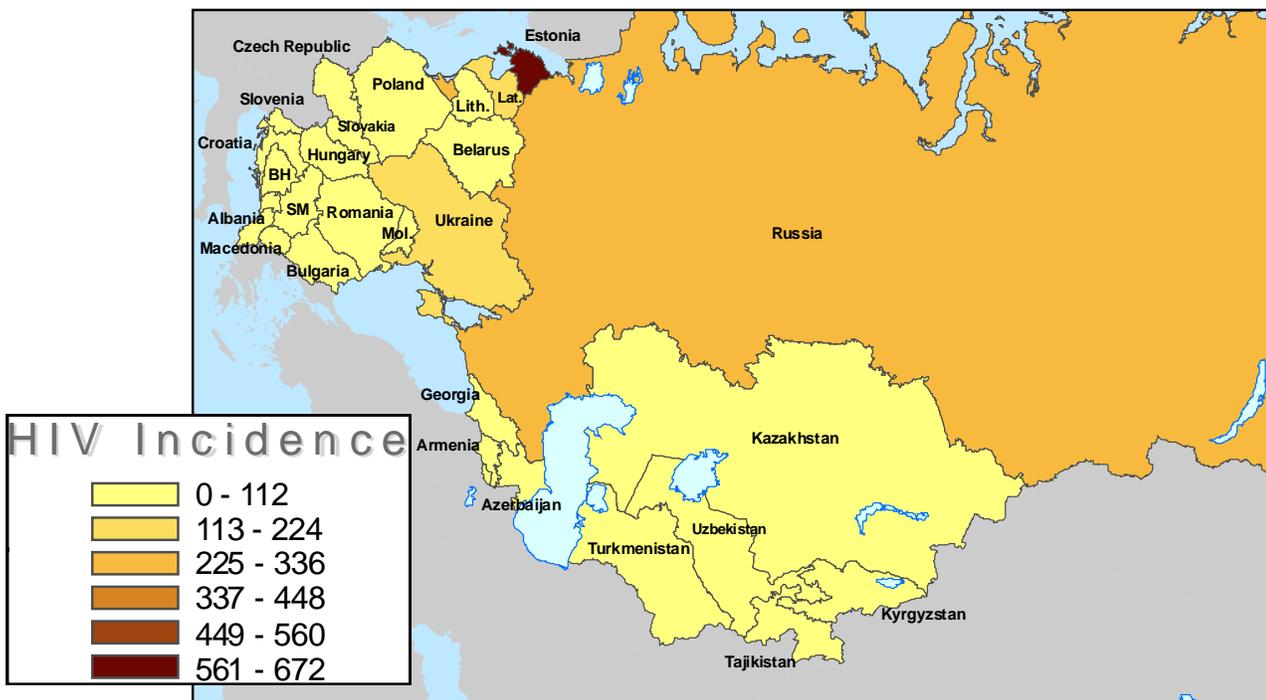
S. Guagliardo, 2005

Tuberculosis Incidence per 100,000 (2003)



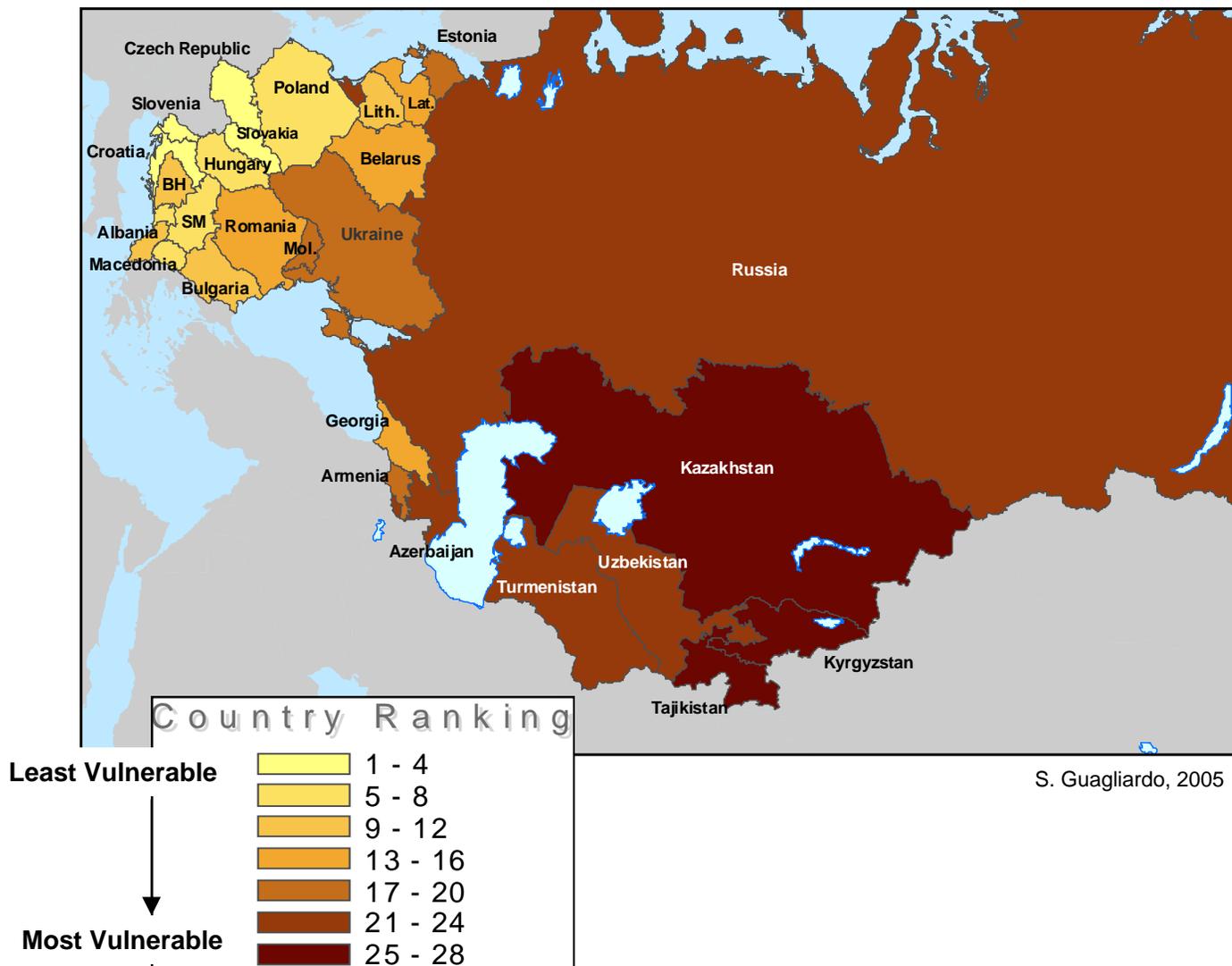
S. Guagliardo, 2005

HIV Incidence per 100,000



S. Guagliardo, 2005

Vulnerability Analysis: Country Ranking



Annex 4. Health Program Components Table

HEALTH PROGRAM COMPONENTS TABLE 2005: COUNTRY RANKING																											
USAID Program Component:	Prevent and control infectious diseases			Reduce transmission and impact of HIV/AIDS			Improve maternal health and nutrition			Improve child survival, health and nutrition			Reduce non-communicable diseases and injuries			Support family planning programs			Enhance health systems capacity								
Indicator:	TB incidence rate per 100,000 population			New HIV infection rate per million population*			Lifetime risk of maternal death, 1 in:			Infant mortality rate			Adult mortality per 1000, total			Modern contraceptive prevalence rate**			Total health expenditure per capita (US\$)								
	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean	Year	Source	# of standard deviations outperforms (or is worse than) the E&E mean						
	2002	WHO		2003	EuroHIV		2000	WHO/ UNICEF/ UNFPA		2000	WHO/ UNICEF/ UNFPA		2003	WHO		varies	WHR		2002	WHO							
Country	Value	Rank		Value	Rank		Value	Rank		Value	Rank		Value	Rank		Value	Rank		Avg std dev diff	Rank	Rank	Country					
Albania	23	3	1.10	6.6	7	0.43	610	23	-0.61	23.1	19	-0.14	130	4	1.00	15	19	-1.36	94	16	-0.44	0.00	12	1	Slovakia		
Armenia	70	15	0.04	9.5	12	0.41	1,200	19	-0.46	31.1	22	-0.65	172	14	0.24	22	16	-0.90	45	20	-0.68	-0.29	17	2	Slovenia		
Azerbaijan	76	18	-0.10	13.9	15	0.38	520	24	-0.64	60.7	27	-2.54	169	12	0.30	12	20	-1.56	27	22	-0.77	-0.71	25	3	Czech Republic		
Belarus	53	12	0.42	72.1	23	-0.05	1,800	13	-0.30	10.3	9	0.68	243	22	-1.03	42	7	0.42	93	17	-0.44	-0.04	13	4	Croatia		
Bosnia & Herzegovina	55	13	0.38	2.9	4	0.46	1,900	12	-0.27	15.1	13	0.38	139	7	0.84	16	18	-1.30	130	12	-0.26	0.03	11	5	Hungary		
Bulgaria	43	9	0.65	8.0	10	0.42	2,400	9	-0.14	13.6	12	0.47	152	11	0.61	25	15	-0.70	145	11	-0.18	0.16	10	6	Poland		
Croatia	43	9	0.65	10.2	13	0.41	6,100	3	0.83	7.3	3	0.87	120	3	1.19	...	...	...	369	4	0.94	0.82	4	7	Serbia & Montenegro
Czech Republic	12	1	1.35	6.0	5	0.44	7,700	2	1.25	4.1	1	1.08	119	2	1.20	63	1	1.80	504	2	1.62	1.25	3	8	Macedonia		
Estonia	50	11	0.49	671.9	27	-4.44	1,100	20	-0.48	8.8	7	0.78	209	20	-0.43	...	...	...	263	7	0.41	-0.61	22	9	Lithuania
Georgia	83	19	-0.26	19.5	17	0.34	1,700	15	-0.33	20.7	18	0.02	133	5	0.95	20	17	-1.03	25	24	-0.78	-0.16	16	10	Bulgaria		
Hungary	29	5	0.97	6.4	6	0.43	4,000	8	0.28	9.4	8	0.74	181	15	0.09	...	...	...	496	3	1.58	0.68	5	11	Bosnia & Herzegovina
Kazakhstan	145	25	-1.67	48.4	20	0.13	190	27	-0.72	33.2	23	-0.78	299	26	-2.05	57	3	1.41	56	19	-0.63	-0.62	23	12	Albania		
Kyrgyzstan	124	23	-1.19	25.3	18	0.30	290	25	-0.70	51.6	26	-1.96	248	23	-1.12	49	5	0.88	14	26	-0.84	-0.66	24	13	Belarus		
Latvia	75	17	-0.08	174.7	24	-0.80	1,800	13	-0.30	11.6	10	0.60	205	19	-0.36	39	8	0.22	203	9	0.11	-0.09	14	14	Latvia		
Lithuania	70	15	0.04	31.9	19	0.25	4,900	4	0.51	8.6	6	0.79	198	18	-0.23	31	12	-0.31	241	8	0.30	0.19	9	15	Uzbekistan		
Macedonia	31	6	0.92	0.5	2	0.48	2,100	10	-0.22	16.3	16	0.30	144	10	0.75	...	...	...	124	14	-0.29	0.32	8	16	Georgia
Moldova	139	24	-1.53	60.5	21	0.04	1,500	16	-0.38	23.6	20	-0.17	224	21	-0.69	43	6	0.48	27	22	-0.77	-0.43	20	17	Armenia		
Poland	31	6	0.92	15.8	16	0.37	4,600	5	0.44	8	4	0.83	140	8	0.83	...	...	...	303	5	0.61	0.66	6	18	Romania
Romania	149	26	-1.76	10.9	14	0.40	1,300	17	-0.43	18.7	17	0.14	171	13	0.25	30	13	-0.37	128	13	-0.27	-0.29	18	19	Turkmenistan		
Russia	112	21	-0.92	275.5	26	-1.54	1,000	21	-0.51	15.5	14	0.35	321	27	-2.45	35	10	-0.04	150	10	-0.16	-0.75	26	20	Moldova		
Serbia & Montenegro	35	8	0.83	9.1	11	0.41	4,500	6	0.41	13	11	0.51	142	9	0.78	33	11	-0.17	120	15	-0.31	0.35	7	21	Ukraine		
Slovakia	24	4	1.08	2.4	3	0.46	19,800	1	4.43	8.5	5	0.80	139	6	0.85	...	...	...	265	6	0.42	1.34	1	22	Estonia
Slovenia	18	2	1.22	7.1	9	0.43	4,100	7	0.30	5	2	1.02	116	1	1.26	...	...	...	922	1	3.72	1.32	2	23	Kazakhstan
Tajikistan	168	27	-2.19	6.7	8	0.43	250	26	-0.71	51.3	25	-1.94	197	17	-0.21	27	14	-0.57	6	27	-0.88	-0.87	27	24	Kyrgyzstan		
Turkmenistan	67	14	0.10	0.0	1	0.48	790	22	-0.57	51	24	-1.92	261	25	-1.35	53	4	1.14	79	18	-0.51	-0.37	19	25	Azerbaijan		
Ukraine	92	20	-0.46	206.3	25	-1.03	2,000	11	-0.25	16.2	15	0.30	255	24	-1.25	38	9	0.16	40	21	-0.71	-0.46	21	26	Russia		
Uzbekistan	115	22	-0.99	70.4	22	-0.03	1,300	17	-0.43	29.7	21	-0.56	184	16	0.03	63	1	1.80	21	25	-0.80	-0.14	15	27	Tajikistan		
Standard Deviation	44.0			136.5			3804.8			15.6			55.4			15.2			199.2								1=least vulnerable, 27=most vulnerable
Mean	71.6			65.6			2942.6			21.0			185.5			35.7			181.1								
United States	5.0			197.0			8.0			7.2			109.9			71.0			5,274								
EU-25***	73.8			89.1			6.2			6.0			111.1			...			1,463								

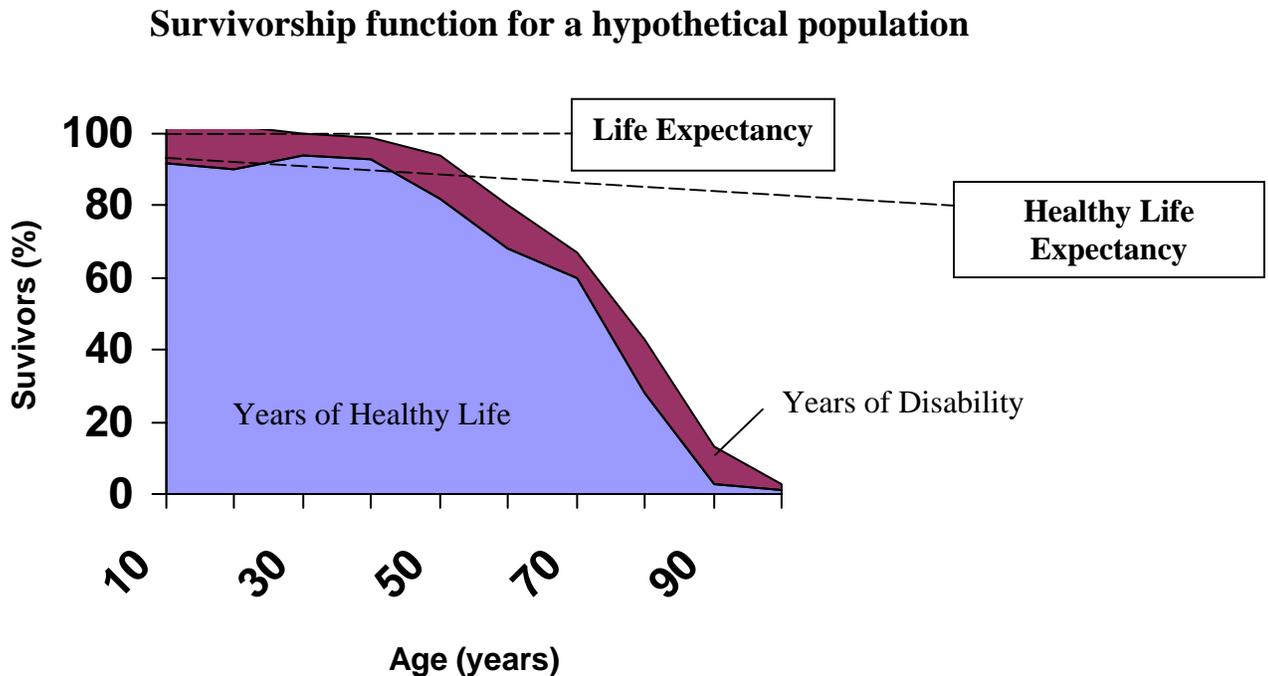
*Estonia's and Turkmenistan's HIV infection rates are for 2002. The U.S. rate is for 2003, reported by CDC. The EU-25 rate excludes France, Malta and Spain.

**EU-25 mean is for the European Union-25, excluding Malta for lack of data.

Annex 5. Healthy Life Expectancy

Healthy Life Expectancy (also Health-Adjusted Life Expectancy) is a measurement based on life expectancy at birth but includes an adjustment for time spent in poor health. It is most easily understood as the equivalent number of years in full health that a newborn can expect to live based on current rates of ill-health and mortality.

In comparison with life expectancy, HALE is a preferable summary measure of population health because it accounts for both *longevity* of life and the *quality* of life. The chart below demonstrates that Life Expectancy includes the number of years lived in disease and/or disability in addition to the number of years lived in health. HALE disaggregates the two conditions.



The difference in Life Expectancies for E&E and the EU is only 3.2 years, whereas the difference in HALE's is much greater at 7.2 years. Again, HALE highlights disparities in health status that standard Life Expectancy conceals.

Life Expectancy and Healthy Life Expectancy (HALE) in E&E

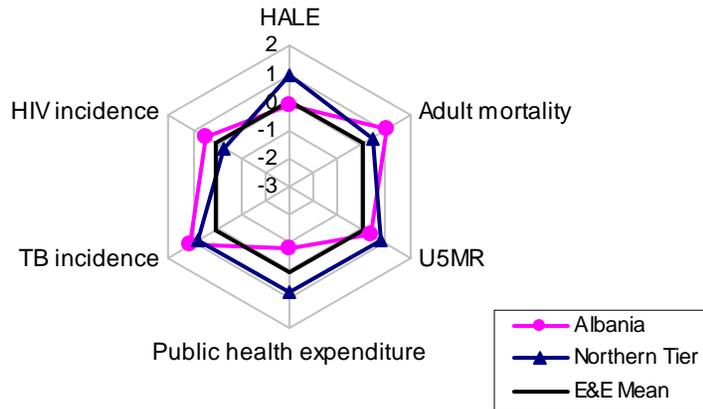
	Total life expectancy 2002	HALE 2002	Expected years lost (total) 2002
E&E mean	70.0	62.0	8.1
EU-25 mean	73.2	69.2	4.0

Source:

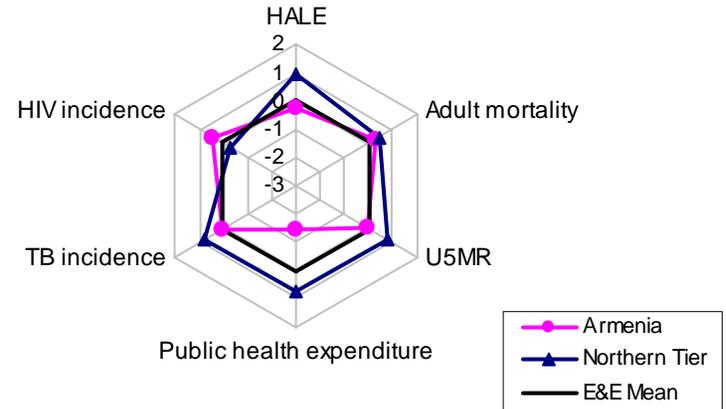
World Health Organization. The World Health Report 2002. Reducing Risks, Promoting Health Life. Geneva: World Health Organization; 2002. <http://www.who.int/whr/2002/en/>

Annex 6. Country Webs for E&E, EU-25, and the United States

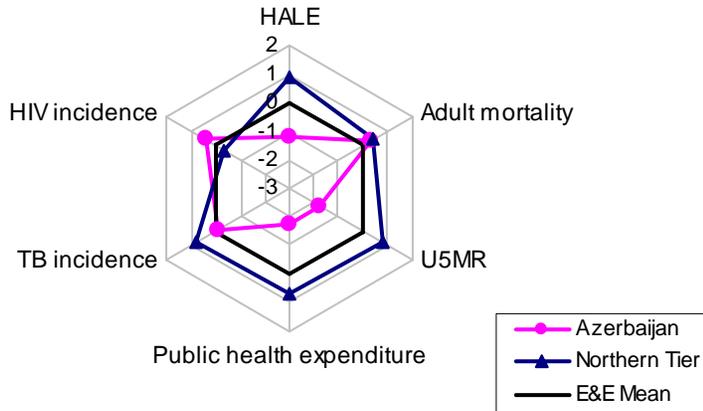
Albania



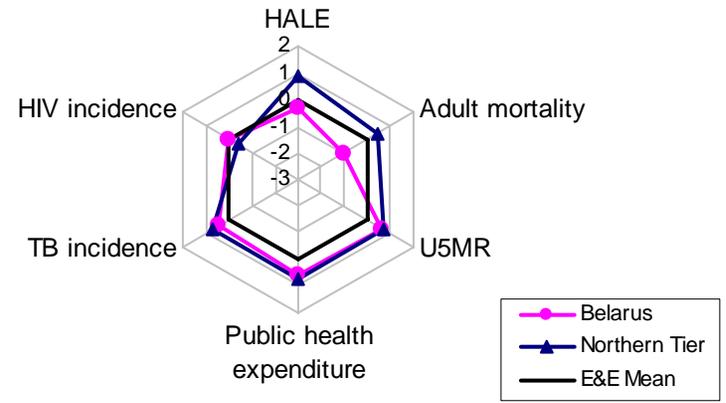
Armenia



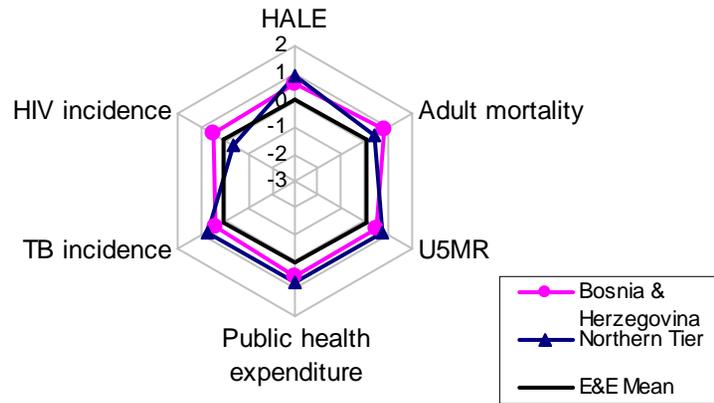
Azerbaijan



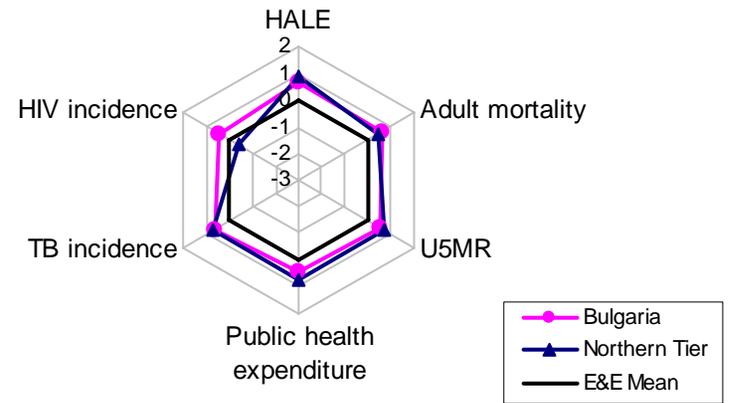
Belarus



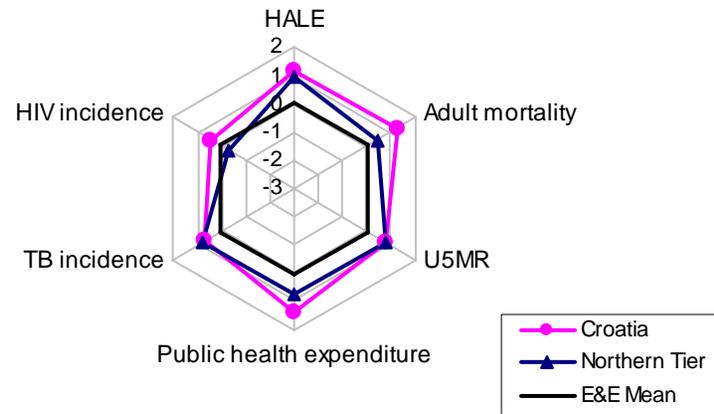
Bosnia & Herzegovina



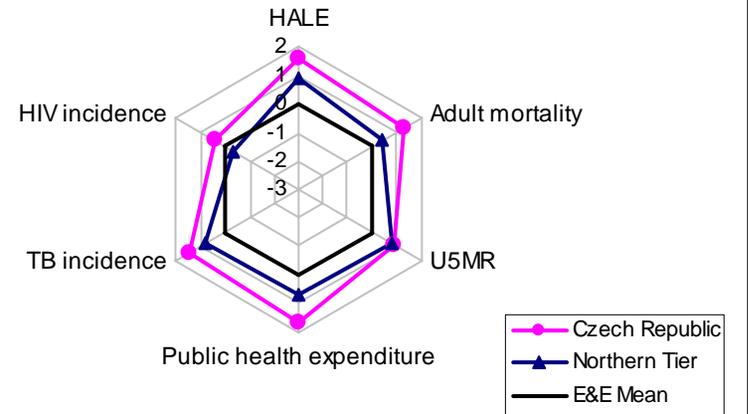
Bulgaria



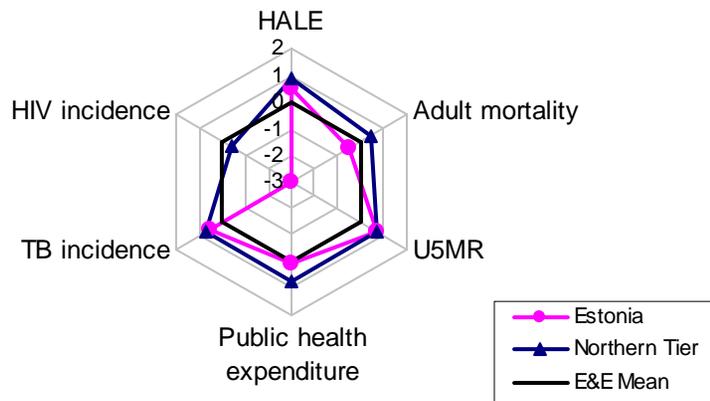
Croatia



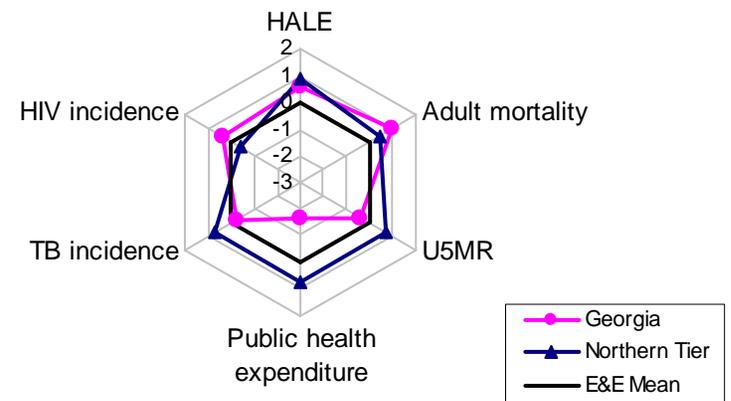
Czech Republic



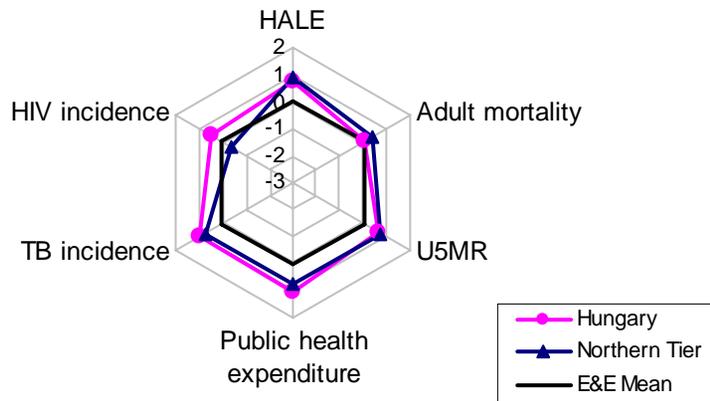
Estonia



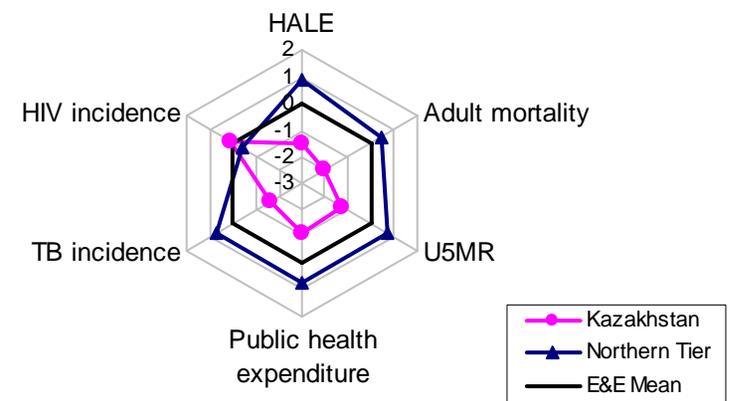
Georgia



Hungary

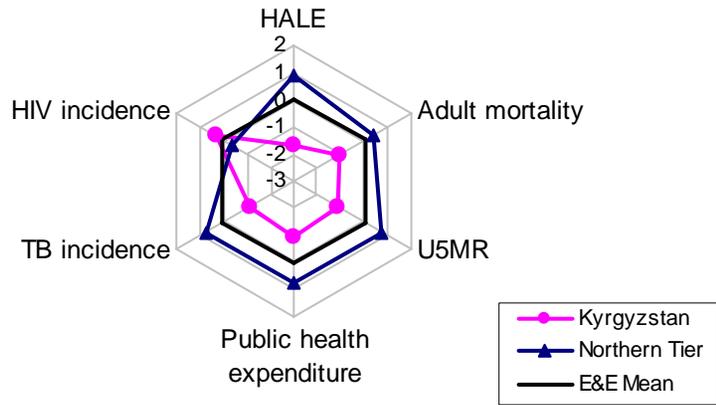


Kazakhstan

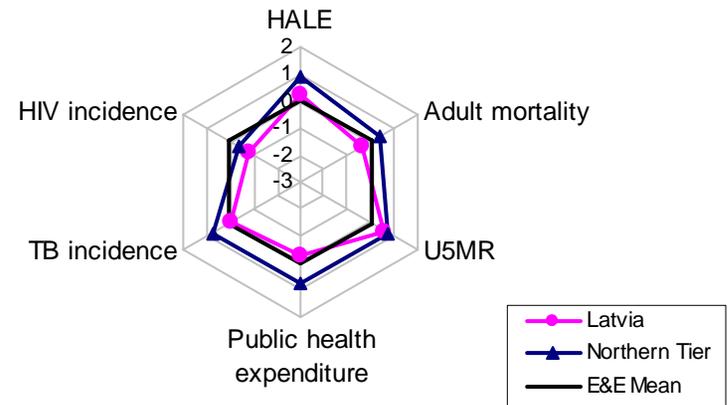


*Estonia's HIV infection rate is shown as only 3 standard deviations below the E&E mean in order to fit the graph. It is actually 4.44 standard deviations below the mean.

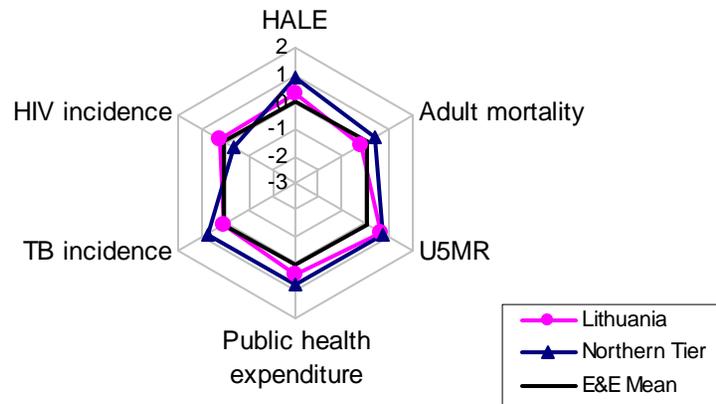
Kyrgyzstan



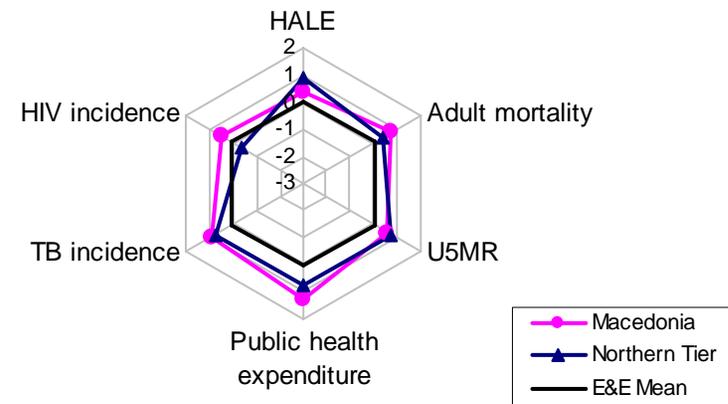
Latvia



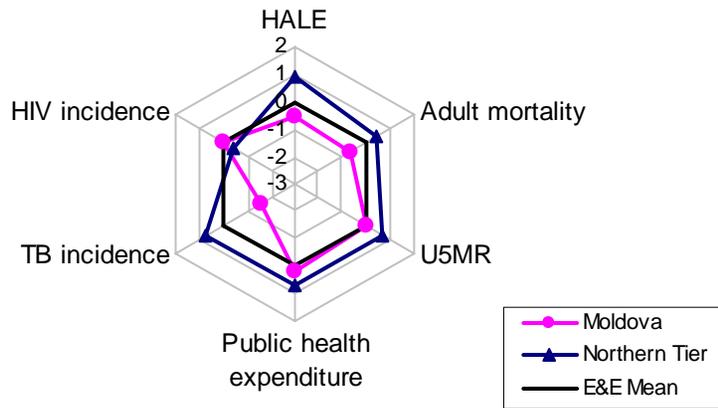
Lithuania



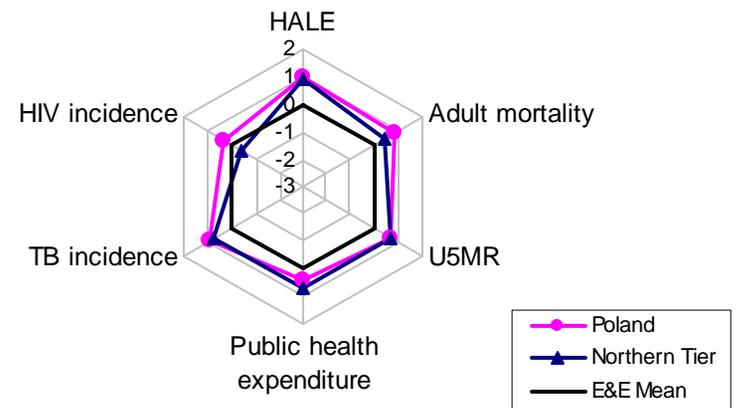
Macedonia



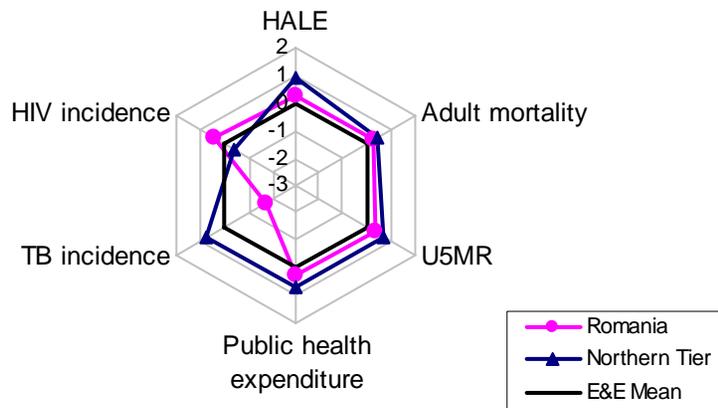
Moldova



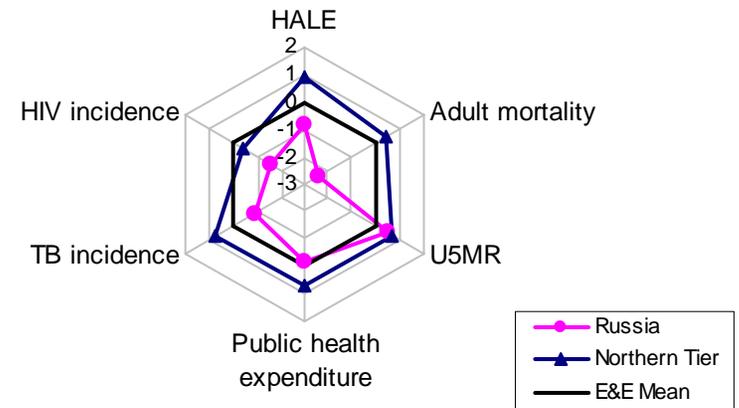
Poland



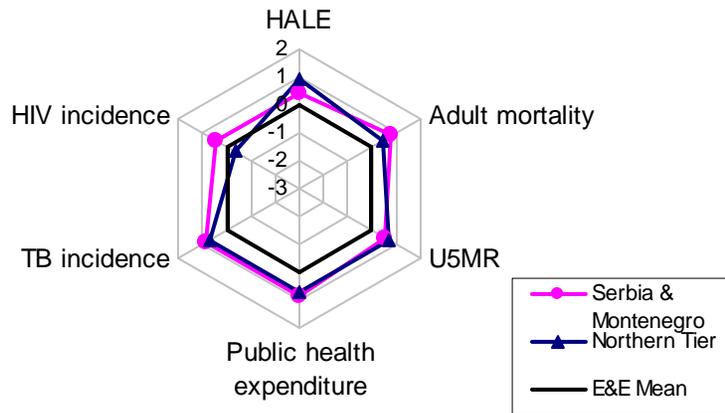
Romania



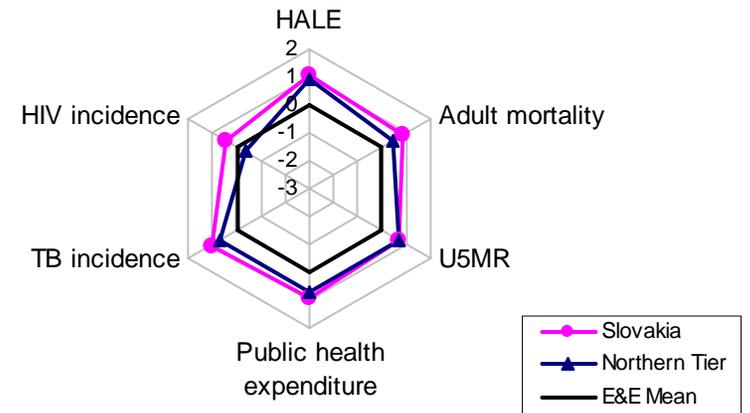
Russia



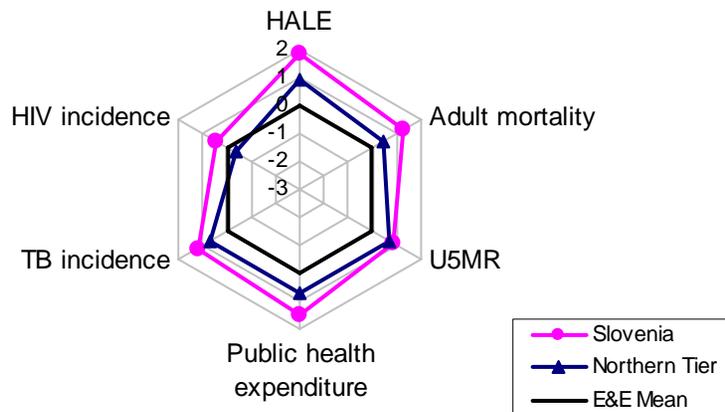
Serbia & Montenegro



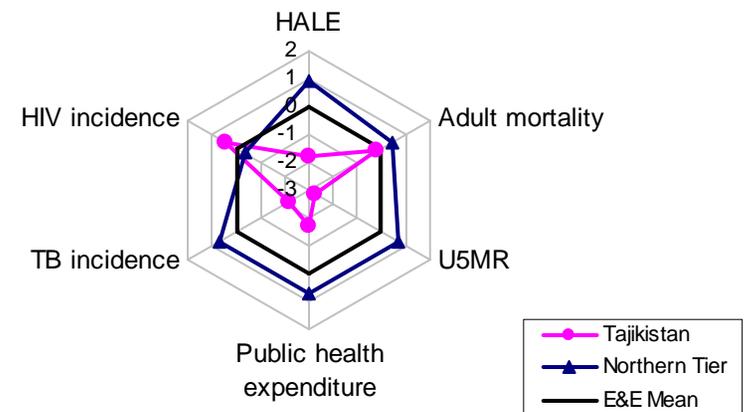
Slovakia



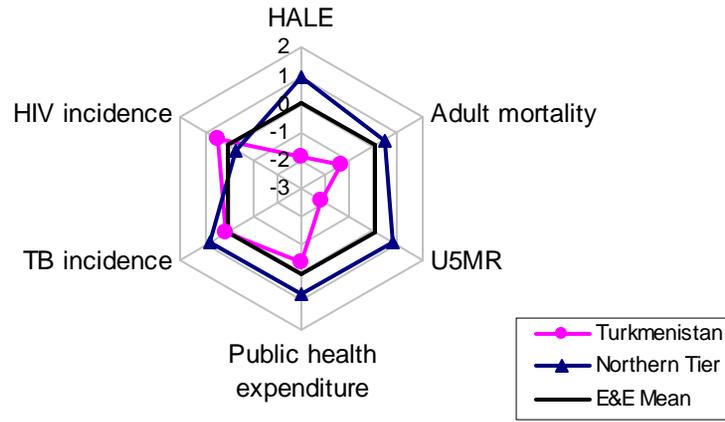
Slovenia



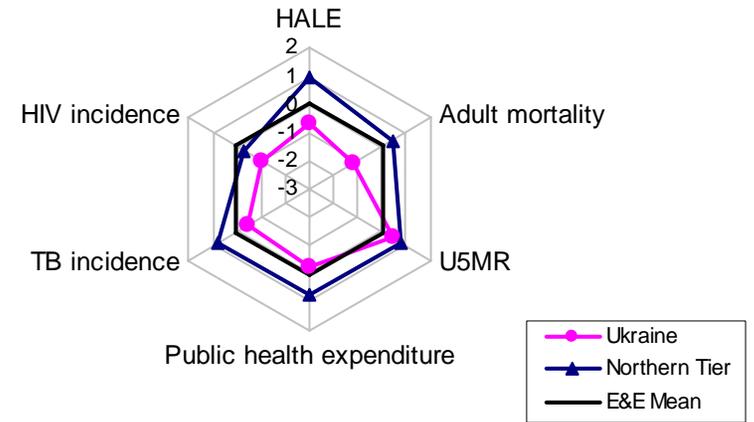
Tajikistan



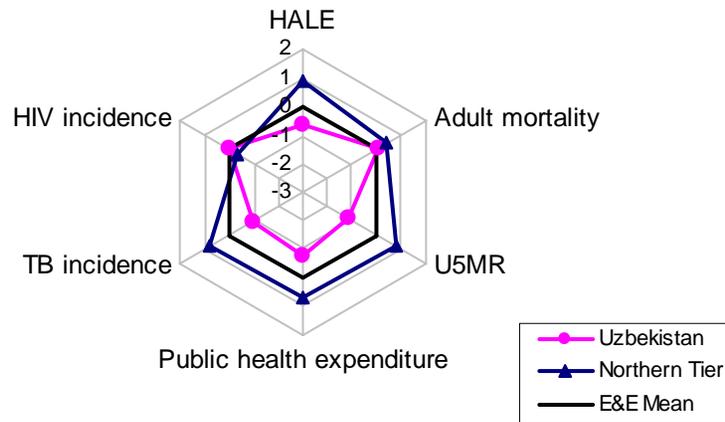
Turkmenistan



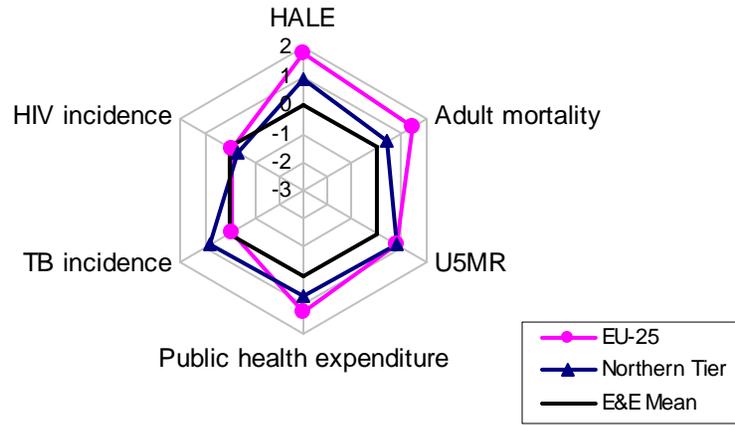
Ukraine



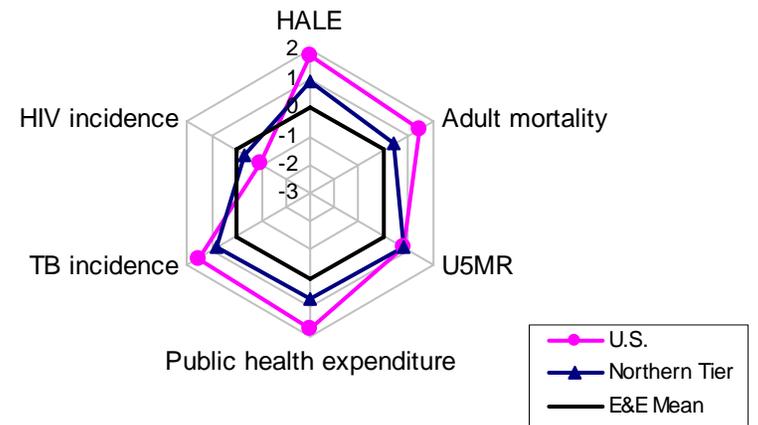
Uzbekistan



EU-25



U.S.



VIII. GLOSSARY OF TERMS

adult mortality rate: the probability of dying between the ages of 15 and 60—that is, the probability of a 15-year old dying before reaching his/her 60th birthday—if subject to current age-specific mortality rates between the ages of 15 and 60, expressed as a rate per 1,000

age dependency ratio: the ratio of dependents to the working-age population, where dependents are those below the age of 15 and above the age of 64 and the working-age population consists of those ages 15-64

Baltics: Estonia, Latvia and Lithuania

Caucasus: Armenia, Azerbaijan, and Georgia

HIV prevalence rate among adults: the prevalence of HIV infection among the population aged 15 to 49 years.

incidence: the number of new cases of a disease or an infection occurring in a population over a period of time (usually a year).

infant mortality rate: the number of infants dying before reaching one year of age, per 1,000 live births in a given year.

life expectancy at birth: the number of years newborn infants would live, on average, if current mortality rates stayed the same throughout their lives.

lifetime risk of maternal death: the probability of dying as a result of pregnancy, cumulated across a woman's reproductive years.

modern contraceptive prevalence rate (MCP): the percentage of married women aged between 15 and 49 years who are practicing, or whose sexual partners are practicing any modern form of contraception. Modern contraceptive methods include female and male sterilization, injectable or oral hormones, intrauterine devices, diaphragms, spermicides, and condoms.

Northern Tier: the Baltics (Estonia, Latvia and Lithuania), Czech Republic, Hungary, Poland, Slovakia and Slovenia

prevalence: the total number of persons with a disease in a population at a given point in time

public health expenditure as a percentage of Gross Domestic Product: consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from nongovernmental organizations and international agencies), and social health insurance funds

Southeastern Europe: Albania, Bosnia & Herzegovina, Bulgaria, Croatia, Macedonia, Romania and Serbia & Montenegro

standard deviation: a statistic used as a measure of the dispersion or variation in a distribution, equal to the square root of the arithmetic mean of the squares of the deviations from the arithmetic mean

total fertility rate: is the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates

total health expenditure per capita: the total amount of health expenditure per capita per year, from all sources (public and private). It includes the provision of health services (curative and preventive), family planning activities, nutrition activities, and emergency aid designated for health, but does not include the provision of water and sanitation.

tuberculosis incidence: the number of new cases of tuberculosis reported in a given year

under-five mortality rate: the probability that a newborn will die before the age of five if subject to current age-specific mortality rates, expressed as a rate per 1,000.