

## Health in Europe 3



# Health and health systems in the Commonwealth of Independent States

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The countries of the Commonwealth of Independent States differ substantially in their post-Soviet economic development but face many of the same challenges to health and health systems. Life expectancies dropped steeply in the 1990s, and several countries have yet to recover the levels noted before the dissolution of the Soviet Union. Cardiovascular disease is a much bigger killer in the Commonwealth of Independent States than in western Europe because of hazardous alcohol consumption and high smoking rates in men, the breakdown of social safety nets, rising social inequality, and inadequate health services. These former Soviet countries have embarked on reforms to their health systems, often aiming to strengthen primary care, scale back hospital capacities, reform mechanisms for paying providers and pooling funds, and address the overall shortage of public funding for health. However, major challenges remain, such as frequent private out-of-pocket payments for health care and underdeveloped systems for improvement of quality of care.

### Introduction

Since the fall of the Berlin Wall in 1989, the trajectories of the former communist countries have varied enormously. Some countries in central and eastern Europe and the Baltic states are now part of the European Union (EU), and benefit from integration into a European single market; others, however, in particular the remaining countries of the former Soviet Union, face a future that is much less certain.<sup>1</sup> In this paper, we explore health and health systems in the Commonwealth of Independent States (CIS)—ie, Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Turkmenistan,

Ukraine, and Uzbekistan (figure 1)—excluding the Baltic states that acceded to the EU in 2004 (health policy in the EU is examined in the previous paper in this Series). Georgia is not a member of this regional grouping, but shares many of the same health and health-related characteristics. Thus we have included it in our discussions.

In many former Soviet countries, one authoritarian regime has been replaced with another, and they now face common challenges, such as serious failures of governance, widespread corruption, enormous inequalities, and a burden of disease and premature mortality that remains far greater than those in western Europe. After the economic collapse that followed the disintegration of the Soviet Union in 1991, the economies of some countries in the region (eg, Russia, Kazakhstan, Azerbaijan) rebounded strongly, largely thanks to reserves of gas, oil, and other natural resources. However, other countries, such as Kyrgyzstan, Tajikistan, Armenia, and Moldova, rank among the poorest countries in Europe. Consequently, total expenditure on health per head in US dollars adjusted

### Key messages

- The countries of the Commonwealth of Independent States still have mortality rates far in excess of those in western Europe, with high mortality from cardiovascular disease and external causes of death, high maternal and infant mortality, and rampaging infectious diseases (particularly HIV and tuberculosis)
- Urgent public health action, including strengthened tobacco control policies and addressing of the demand for and supply of both legal and illegal alcohol, is needed to address these health challenges
- Despite reforms, health systems still fail to respond adequately to population health challenges; health systems also use resources inefficiently
- Health systems need to strengthen primary health care, overcome fragmentation and inefficiencies in financing and service delivery, improve equity across subnational units, and ensure access to health services
- Quality of care is another urgent problem; evidence-based clinical practice is replacing outdated treatment methods far too slowly

### Search strategy and selection criteria

We searched PubMed and Medline for articles about health and health systems in the countries of the Commonwealth of Independent States with the search terms “mortality”, “alcohol”, “tobacco”, “HIV”, “TB”, “health reform”, “health system”, “quality of care”, and “health financing”, in combination with individual country names. We included the most relevant articles published in English, and gave preference to articles published between Jan 1, 2005, and Aug 31, 2012. However, important older papers were also included if relevant. We also reviewed the Health Systems in Transition country profiles published by the European Observatory on Health Systems and Policies.

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**Figure 1: Map of the countries of the former Soviet Union**  
Excluding the Baltic states of Estonia, Latvia, and Lithuania.

	Mid-year population (millions of people)	Total health expenditure (purchasing power parity US\$ per head)	Total health expenditure (as % of GDP)	Public sector expenditure on health (as % of GDP)	Private out-of-pocket payment on health (as % of total health expenditure)
Armenia	3.3	239	4.4	1.8	55.2
Azerbaijan	9.1	579	5.9	1.2	69.6
Belarus	9.5	786	5.6	4.4	19.9
Georgia	4.5	522	10.1	2.4	68.3
Kazakhstan	16.3	541	4.3	2.6	40.1
Kyrgyzstan	5.4	140	6.2	3.5	37.8
Moldova	3.6	360	11.7	5.4	44.9
Russia	141.9	998	5.1	3.2	31.4
Tajikistan	6.9	128	6.0	1.6	66.5
Turkmenistan	5.0	199	2.5	1.5	40.6
Ukraine	45.7	519	7.7	4.4	40.5
Uzbekistan	28.2	184	5.8	2.8	42.7
European Union	499.1	3230	9.9	7.6	16.6

Data are from WHO's European Health for All Database.<sup>2</sup> GDP=gross domestic product.

**Table 1: Key indicators of health in the countries of the former Soviet Union**

for purchasing power parity varies by a factor of more than seven across the former Soviet countries discussed here. Private out-of-pocket expenditure accounts for a large proportion of total health expenditure (almost 70% in Azerbaijan and Georgia; table 1).

Life expectancies in the CIS lag far behind those in western Europe. Already in the 1970s and 1980s, life expectancy in the Soviet Union was stagnating, with reductions in prevalences of infectious diseases counteracted by a growing burden of non-communicable diseases.<sup>3</sup> Life expectancy dropped greatly in Armenia in

1988 (because of a major earthquake in Spitak) and in Tajikistan in 1993 (because of a civil war), but remarkably, even in countries unaffected by wars or natural disasters, life expectancy fell substantially in the first half of the 1990s, particularly in men. This fall was most pronounced in Russia, where male life expectancy decreased by 6.2 years between 1990 and 1994 (from 63.8 years to 57.6 years). The situation began to improve during the economic growth of the 2000s. However, several countries in the region, including Russia, have still not recovered the life expectancies that they had before the dissolution of the Soviet Union (figure 2, table 2). Noticeable gaps in life expectancy exist between the sexes, and are as big as 12 years in Ukraine and Russia and 11 years in Kazakhstan (table 2).

However, even these alarming figures conceal the true scale because official data have overestimated life expectancies, especially in central Asia and the Caucasus. This error is mainly due to an undercounting of infant mortality,<sup>4</sup> but also overestimates of population sizes, which have been depleted by migration.<sup>5</sup> Table 3 compares official life expectancies with those estimated by WHO. Many challenges to population health abound.<sup>6</sup> Although falling, infant mortality is still much higher in the CIS than in the EU, particularly in central Asia. In Kyrgyzstan, for example, the official (and therefore underestimated) rate was 22.3 infant deaths per 1000 livebirths in 2010 (compared with 4.1 per 1000 livebirths in the EU).<sup>2</sup> Survey data, such as those from the Demographic and Health Surveys, show that, in the countries of central Asia and the Caucasus the official infant mortality rates might underestimate real infant mortality rates 1.4–3 times (depending on the country). Maternal mortality is also high, particularly in the Caucasus and central Asia, with an official rate of 50.1 maternal deaths per 100 000 livebirths in Kyrgyzstan in 2010, compared with 6.1 per 100 000 in the EU.<sup>2</sup>

### Causes of low life expectancy

The main reason for low life expectancies is the very high burden of premature mortality at working ages. On the basis of 2010 mortality rates, a 20-year-old man in Russia has only a 63% chance of reaching 60 years, whereas a similar man in western Europe has a 90% chance. The main contributors to this disparity are deaths from cardiovascular disease and external causes (injuries and violence). In 2010, the frequency of age-standardised death from cardiovascular disease was more than 3 times higher in Ukraine (733 per 100 000 population), Moldova (731), Kyrgyzstan (702), and Russia (693) than in the EU (222). Differences for men until 64 years are particularly pronounced; death rates in Russia in 2010 (359 per 100 000 population) were more than five times higher than those in the EU (67). With the exception of the Caucasus and some countries of central Asia, deaths from external causes are also much more common, and in 2010 reached

142 per 100 000 population in Russia compared with 37 per 100 000 in the EU.<sup>2</sup>

Prominent among the proximal causes of high death rates is hazardous drinking. Smoking, poor diet, and inadequate health care (eg, poor coordination and integration, and widespread undertreatment of hypertension<sup>7,8</sup>) also contribute to cardiovascular disease.<sup>9</sup> In 2010, the results of household surveys with 17 914 respondents in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, and Ukraine showed that 68% of respondents had ever been told that their blood pressure was high, but did not take daily drugs for hypertension.<sup>8</sup>

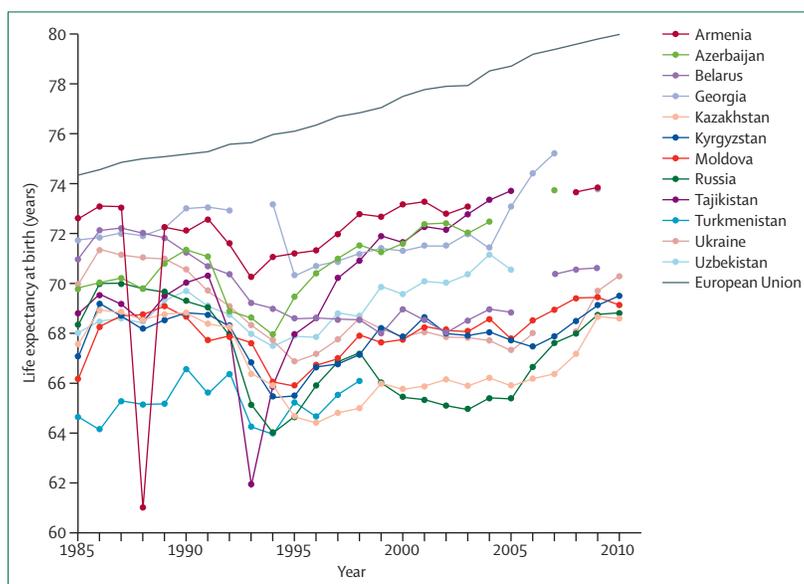
Distal factors—eg, poverty, which is widespread in many parts of the region—also play parts. However, compelling evidence shows that large fluctuations in life expectancy have been substantially driven by rapid societal change in the absence of social safety nets in settings where alcohol is cheap and easily available.<sup>10,11</sup> We now look in more detail at two proximal factors, alcohol and tobacco.

## Alcohol

Across the Soviet Union, although less so in central Asia and parts of the Caucasus (because of the influence of Islam), alcohol consumption was traditionally high. The anti-alcohol campaign launched by Mikhail Gorbachev in the mid-1980s resulted in reduced alcohol consumption and less alcohol-related mortality, but these gains were wiped out as hazardous alcohol use increased substantially after the collapse of communism.<sup>12,13</sup> This increase has been linked to the social dislocation, uncertainty, and impoverishment that resulted from the collapse of communism and the rapid transition to a market economy, together with a growth in the illicit production of spirits and a sharp fall in vodka prices.<sup>12,14,15</sup>

The health effects of increased alcohol consumption have been grave, and that alcohol is the main cause of the fluctuations in mortality in working-age people in Russia is apparent.<sup>16</sup> Epidemiological studies have shown that, for every ten deaths in working-age men, between four and six are caused by heavy or hazardous drinking (such drinking causes about a third of deaths in working-age women).<sup>17–19</sup> The immediate causes of alcohol-related deaths are alcohol poisoning, pneumonia, injuries, suicide, and cardiovascular disorders.<sup>19,20</sup> Poor and less educated men seem to bear the brunt of the Russian alcohol mortality crisis.<sup>21</sup> Frequent hazardous alcohol use has also been reported in some other former Soviet countries.<sup>22</sup> In central Asia, ethnic Russians have a higher mortality than do other ethnic groups—a finding attributed to their higher consumption of alcohol.<sup>23</sup>

Many governments in the Soviet and post-Soviet eras have contributed substantially to the alcohol problem through their failure to tackle the production and distribution of cheap alcohol. When measures have



**Figure 2: Officially recorded life expectancy at birth in the countries of the former Soviet Union, 1985–2010**  
Data are from WHO's European Health for All Database.<sup>2</sup> Data for the European Union refer to all 27 countries of the European Union for all timepoints.

	Men			Women		
	1990	2000	2009	1990	2000	2009
Armenia	62	67	66	70	73	74
Azerbaijan	59	62	66	66	67	70
Belarus	66	63	64	75	74	76
Georgia	65	68	67	72	74	75
Kazakhstan	61	58	59	70	68	70
Kyrgyzstan	61	62	63	68	69	70
Moldova	64	64	65	71	71	73
Russia	63	58	62	74	72	74
Tajikistan	60	62	66	65	65	69
Turkmenistan	58	59	60	65	65	67
Ukraine	65	62	62	75	73	74
Uzbekistan	63	63	66	69	68	71

Data are years and from WHO's European Health for All Database.<sup>2</sup>

**Table 2: Estimated life expectancies at birth in the countries of the former Soviet Union in 1990, 2000, and 2009**

been taken (eg, restricting the hours during which alcohol can be sold), as in Russia, they have been marked by little ambition, poor engagement, and fragmentation between key actors; large alcohol producers have also very effectively blocked action.<sup>24,25</sup> Additionally, alcohol control measures have been circumvented by widespread illegal production and a powerful lobby that benefits from the income from illegally produced and distributed alcoholic beverages.<sup>12</sup>

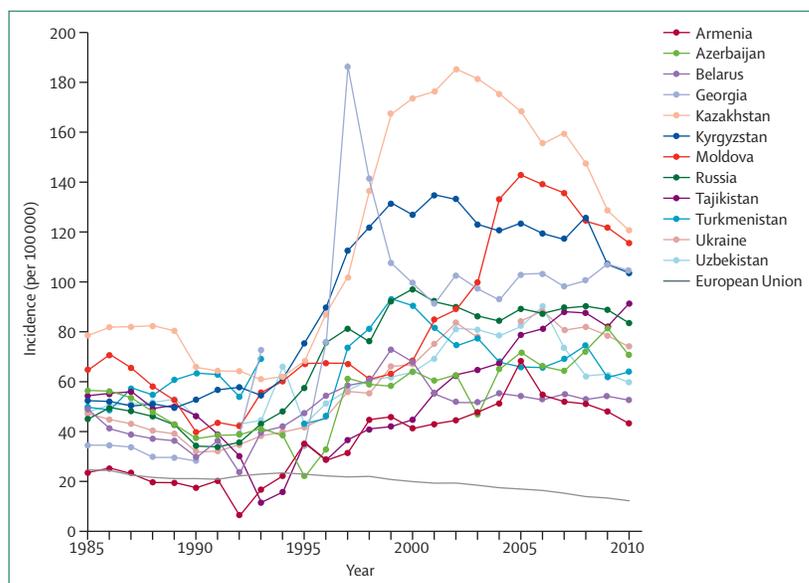
## Tobacco

Heavy smoking in men was the norm in the Soviet era. Cigarettes were cheap and easily available and tobacco

	Official data	WHO estimate	Difference
Armenia	73.9	70	-3.9
Azerbaijan	73.8*	68	-5.8
Belarus	70.6	70	-0.6
Georgia	73.8	71	-2.8
Kazakhstan	68.7	64	-4.7
Kyrgyzstan	69.1	66	-3.1
Moldova	69.4	69	-0.4
Russia	68.8	68	-0.8
Tajikistan	73.7†	68	-5.7
Turkmenistan	66.1‡	63	-3.1
Ukraine	69.7	68	-1.7
Uzbekistan	70.5†	69	-1.5

Data are years and from WHO's European Health for All Database.<sup>2</sup> \*2007 estimate. †2005 estimate. ‡1998 estimate.

**Table 3: Official and WHO estimates of life expectancies in the countries of the former Soviet Union, 2009**



**Figure 3: Officially recorded tuberculosis incidence in the countries of the former Soviet Union, 1985–2010**  
Data are from WHO's European Health for All Database.<sup>2</sup> Data for the European Union refer to all 27 countries of the European Union for all timepoints.

control efforts absent or ineffective.<sup>26</sup> The cigarette market was transformed in the early 1990s when borders opened to transnational tobacco companies, which led aggressive and highly sophisticated marketing campaigns, established a domestic manufacturing presence, and improved distribution systems.<sup>27</sup> Rates of smoking in men are frequently between 50% and 60% in former Soviet countries,<sup>28</sup> and rates are even higher in poor and less educated men.<sup>29–31</sup> The accumulated burden of tobacco-related disease in men younger than 75 years in the CIS is the highest in the world.<sup>32</sup> Rates of female smoking were traditionally low, but much of the marketing efforts of transnational tobacco companies

have been aimed at young women since the early 1990s.<sup>33</sup> In Russia, smoking rates among women increased from 7% to 15% between 1992 and 2003, and increases were particularly pronounced in women younger than 65 years.<sup>34</sup> Similar rises were reported in Ukraine.<sup>35,36</sup>

Evidence<sup>28</sup> suggests that smoking rates might be levelling off in the region; smoking rates have plateaued or slightly decreased in men during the past ten years, especially in men aged 18–39 years. These partial improvements might be the result of intensification of tobacco control measures. All former Soviet countries (excluding Tajikistan and Uzbekistan) have either ratified or acceded to the Framework Convention on Tobacco Control and implemented (to varying degrees)<sup>37</sup> tobacco advertising restrictions, product warnings, health warning labels, smoking bans in public places, awareness-raising campaigns, and some tax increases.<sup>38</sup>

The low price of tobacco products (because of low tax levies) is a major challenge to tobacco control. The 2010 price of a 20 pack of the most sold brands of cigarettes in the CIS is generally US\$2 (adjusted for purchasing power parity), compared with an average of around \$5 (adjusted for purchasing power parity) in EU member states.<sup>38</sup> This disparity is partly because of the tobacco industry's role in the writing of tax codes after independence in countries of the CIS.<sup>33</sup> Public understanding of the adverse health effects of smoking varies substantially across the region, and, although understanding of the measures that governments might take to tackle smoking is generally poor, the widespread view is that they should do more.<sup>39</sup>

### Infectious diseases

Although the overall burden of disease in the CIS is dominated by non-communicable diseases, the threat of infectious diseases, particularly HIV/AIDS and tuberculosis, persists. After the collapse of the Soviet Union, tuberculosis incidence in the 1990s increased steeply, and progress to reduce it is slow (figure 3). Estimated prevalence of tuberculosis reached 382 per 100 000 people in Tajikistan in 2010.<sup>2</sup> Reasons for the resurgence of tuberculosis are complex and include an initial collapse of detection and treatment services and, in some countries, the exacerbating effects of high alcohol consumption.<sup>40</sup> The high rate of incarceration is also a factor;<sup>41</sup> prisons, in effect, act as incubators of disease.<sup>42</sup> Efforts are underway to move beyond the traditional pattern of extended inpatient stays and individualised treatments, introduce evidence-based practices (such as directly observed therapy), and ensure the availability of drugs,<sup>43</sup> but some countries—eg, Belarus, Ukraine—still rely on diagnosis through mass population screening by chest radiography.<sup>44,45</sup> Worryingly, several countries of the CIS have among the highest rates of multidrug-resistant and extensively drug-resistant tuberculosis worldwide, which are expensive and complicated to treat.<sup>46</sup>

HIV/AIDS is another major concern. For several years, some of the former Soviet countries, including Russia and

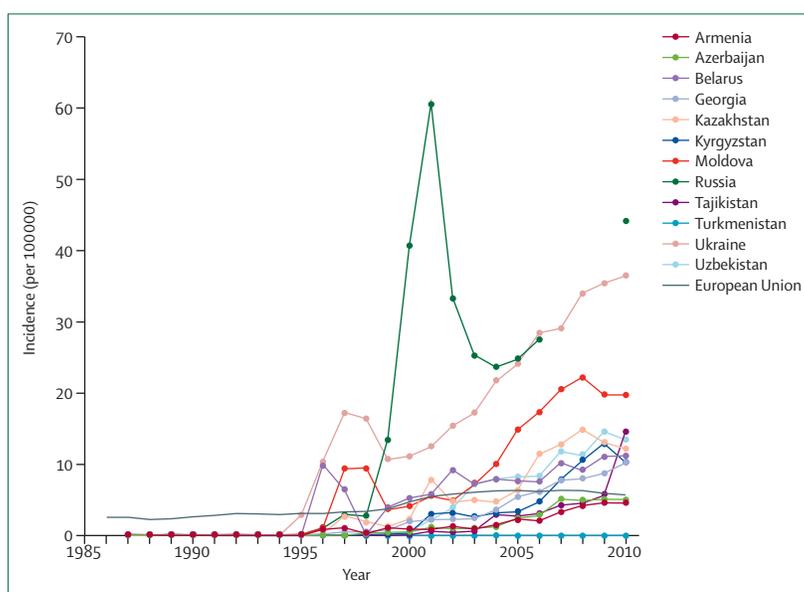
Ukraine, had the fastest-growing HIV epidemics in the world. Most reported infections were attributed to use of injection drugs.<sup>47</sup> However, most governments in the region have been slow to respond adequately to the problem.<sup>48</sup> The scale and scope of HIV programmes remains inadequate, particularly with regard to harm-reduction measures, substitution treatment, and antiretroviral therapy.<sup>49,50</sup> One of the major barriers to improvement of access to HIV prevention and treatment activities in the CIS is the predominance of a punitive approach to injection drug use and people with HIV.<sup>47,51</sup> This approach is also shown by the restricted availability of antiretroviral therapy to drug users.<sup>52</sup> Coverage with harm-reduction programmes is low in many countries of the region and largely relies on external donors.<sup>49</sup> Substitution treatment with buprenorphine or methadone hydrochloride is illegal in Russia and unavailable in some other countries of the region.<sup>50,53</sup> Overall, the harsh drug policies in many countries of the CIS have had particularly negative consequences for access to HIV testing, counselling, and harm-reduction interventions,<sup>53</sup> and official yearly incidences of HIV infection are increasing (figure 4). Prevalence of HIV infection is thought to be 1% or higher in Russia and Ukraine.<sup>54</sup>

### Increasing social inequalities

The country-level trends that we have described are alarming, but they mask the rapid rise in social inequalities in health during the 1990s. The sudden social change in the former Soviet Union, which was associated with a rapid fall in gross domestic product, a breakdown of social institutions, financial instability, rapid mass privatisation in some countries, and unemployment, also resulted in a rapid rise in income inequality.<sup>55,56</sup> Not surprisingly, these changes adversely affected health. Negative mortality trends were much more pronounced in disadvantaged than in privileged groups. In the early years of the transition in Russia, for example, mortality increased by 57% in men with low levels of education and only 35% in men with higher (ie, 3rd level) education.<sup>57</sup> By contrast, the life expectancy of well-educated people (both male and female), especially that of intellectual elites (eg, members of the Russian Academy of Sciences), seems to have been largely unaffected by the transition.<sup>58</sup> The rapid rise in health inequalities will probably contribute to poor health through several mechanisms, including direct effects of material deprivation, unhealthy behaviours, access to health services, and ability to pay for treatment or prescribed drugs.

### Legacies of the Soviet health system

The Soviet Union took pride in its health system. It developed an extensive and well staffed network of health facilities, which provided universal access to a comprehensive range of services free at the point of use. The system was financed from general government revenues and owned and run by the government; health workers



**Figure 4: Officially recorded incidence of HIV infection in the countries of the former Soviet Union, 1985–2010**  
Data are from WHO's European Health for All Database.<sup>2</sup> Data for the European Union refer to all 27 countries of the European Union for all timepoints.

were state employees. Primary care in urban areas was provided in so-called polyclinics, whereas rural areas were served by ambulatory facilities and *feldsher*-midwifery posts (*feldshers* are intermediate-level health workers with skills similar to those of physician's assistants or nurse practitioners in some countries).<sup>59</sup>

However, in addition to the previously mentioned failure to respond to non-communicable diseases, several other systemic flaws have been noted. The emphasis on hospital care was substantial, and primary health care and prevention were paid much less attention.<sup>60</sup> Incentive structures favoured inputs (staffing and beds) rather than outputs (the provision of high-quality care), leading to inefficient provision and low satisfaction (in both patients and providers). Health workers' salaries were low and management was centralised and top-down. The administrative division of the health system into national, regional, and district or city levels might have been efficient for vertical programmes (eg, immunisation) in the past, but resulted in the duplication of functional responsibilities and overlapping population coverage.<sup>61</sup> Health financing and service provision were further fragmented into many specialised health services (including tuberculosis programmes) that delivered care through separate vertical systems in addition to the parallel health systems run by bodies such as the Ministry of Internal Affairs, the Ministry of Defence, and large state companies.<sup>62,63</sup>

### Service provision

The sharp decrease in government expenditure on health after the transitional crisis of the 1990s led to a growing realisation of the need for health reforms. However, changes in health-care provision were in many cases not

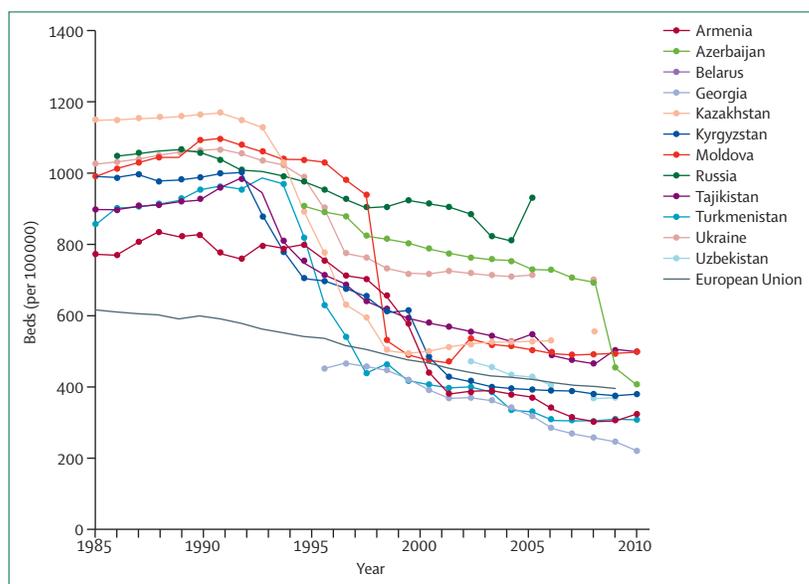


Figure 5: Number of acute care hospital beds in the countries of the former Soviet Union, 1985–2011

Data are from WHO's European Health for All Database.<sup>7</sup> Data for the European Union refer to all 27 countries of the European Union for all timepoints.

the result of comprehensive reform strategies but rather poorly planned reactions to the challenging fiscal situation and administrative changes. Some countries (eg, Azerbaijan, Belarus, Tajikistan, Turkmenistan, Ukraine, Uzbekistan) have retained many features of the Soviet system,<sup>64</sup> and most have retained public ownership of primary care and secondary care facilities. Privatisation has been mainly restricted to pharmacies and dental care, except in Georgia, which has sought to privatise almost all health facilities.<sup>65</sup>

All former Soviet countries have embarked to varying degrees on attempts to strengthen primary health care and thus use resources more efficiently.<sup>66</sup> However, the Soviet model of primary health care delivered by poorly trained doctors able to treat a narrow range of disorders persists, and primary health care based on a model of comprehensive family medicine is confined to pilot sites or rural areas. Exceptions are Kyrgyzstan and Moldova,<sup>62,67</sup> which have developed family medicine centres in buildings that were formerly district polyclinics. With the exception of a few localised pilot schemes, the Soviet model of administration, under which primary care was managed by the central *rayon* (district) hospital, has persisted in Azerbaijan, Kazakhstan, Tajikistan, Uzbekistan, and rural areas of Russia and Ukraine, and thus primary health care has a low priority. Crucially, across the region, most financing still goes to hospitals rather than to primary health care (although the same can be said about many countries in western Europe).

The retraining of specialist physicians as general practitioners (GPs) was a major feature of attempts to strengthen primary health care in almost all countries of the region.<sup>68–70</sup> However, few countries have trained more

than a small proportion of physicians working in primary health care. In Ukraine in 2010, GPs accounted for 32.9% of all physicians working in primary care, and 70% of GPs worked in rural areas.<sup>71</sup> In Russia, progress was very uneven across regions, and, in 2011, GPs accounted for less than 3% of all primary care physicians in a quarter of regions.<sup>72</sup> Common problems are the low salaries and prestige of GPs, insufficient training, and little public support for the new role.

An over-reliance on hospitals persists for disorders that could be treated in primary care. Causes include poor gate-keeping, the linkage between bed occupancy and funding, and the provision by hospitals of social and long-term care rather than acute services.<sup>43,73</sup> In Russia and Ukraine, about a third of all hospitalisations are estimated to be unnecessary.<sup>71,74</sup> So-called acute-care hospitals have very long lengths of stay and, in some countries, extremely low bed occupancy rates (34.1% in Azerbaijan and 37.0% in Georgia in 2010),<sup>2</sup> suggesting gross inefficiency. Yet many people still have trouble in obtaining care.<sup>64</sup>

Faced with an acute funding shortage, countries scaled back the extensive provision of hospital capacity that they had inherited from the Soviet era. Bed numbers in acute hospitals dropped substantially in the 1990s, but in most countries of the region still far exceed numbers in the EU (figure 5). Many small hospitals, especially in rural areas, were closed in all countries. However, in urban areas frequently the number of beds was reduced without closing of facilities, and in some urban areas overprovision even increased. Specialised hospitals in capital cities were largely unaffected. Thus, specialist health-care providers in urban areas have largely successfully maintained overlapping services and avoided hospital closures. Even in a country such as Moldova, where the number of hospital beds dropped steeply in the second half of the 1990s, much duplication and oversupply is noted in the capital Chişinău.<sup>67</sup> Georgia has opted for extreme privatisation, but regulation has been weak; bids that promised capacity in excess of what was required were viewed more favourably and interest from investors focused on prime sites in the capital Tbilisi.<sup>65</sup>

The equity and efficiency of health systems is further undermined by the continued existence of another Soviet legacy—namely, parallel health systems outside ministries of health. However, the importance of these parallel systems varies in terms of the part played in relation to the mainstream health system and the financial allocations received. In Ukraine, parallel health systems account for 10% of all hospitals and 11% of total public expenditure on health,<sup>71</sup> whereas in Georgia they account for less than 1% of total health expenditure.<sup>65</sup>

Geographical inequities in the distribution of per-head financing, health facilities, and health workers are challenges that all countries of the CIS share. Capitals and major cities are often oversupplied; meanwhile shortages are noted in rural areas and primary health care. Major regional variations also exist within countries. In Russia,

government health financing per head varies between regions by as much as 6·8 times.<sup>72</sup> In Armenia, about two-thirds of all health workers are based in the capital, Yerevan, where about only a third of the population lives.<sup>75</sup>

## Financing

The most fundamental challenge facing health systems is the substantial fall in government funding for health that occurred in the 1990s, which has yet to be reversed. This decrease in public financing was most acute in countries with the economies worst affected by the dissolution of the Soviet Union—ie, those in central Asia and the Caucasus—and led to a growing share of private health expenditure in the form of frequent (often informal) out-of-pocket payments by patients. Although some countries, such as Kyrgyzstan, Moldova, and Russia, have given priority to increasing the allocation of public funds to the health sector, the extent of private expenditure remains substantial (table 1).

This shift of financial burden to patients resulted in a growing gap between formal government commitments and officially available resources, particularly in countries with constitutions that maintain the Soviet-era guarantee of free access to publicly funded health services—ie, Belarus, Kazakhstan, Russia, Ukraine, and Uzbekistan. All countries of the region, except Azerbaijan (which introduced formal user fees but abolished them in 2008) and Belarus, have responded by defining benefit packages of health services guaranteed for free (so-called positive lists) and chargeable health services (so-called negative lists), for which user fees were introduced.<sup>66,75-79</sup> Furthermore, health facilities in most former Soviet countries (except Ukraine) were allowed to provide health services from positive lists on a chargeable basis for patients who agreed to pay. Thus, the boundaries between free and chargeable health services have become blurred.

Ukraine still officially provides free universal access to a wide range of health services at public facilities, but in reality user fees are widespread.<sup>71</sup> The scope of services covered by public funds differs greatly between countries. Belarus essentially maintains Soviet-era entitlements,<sup>45</sup> whereas in Georgia only the population registered as being below the poverty line and some state employees have comprehensive cover for most health services.<sup>65</sup>

In addition to the emergence of official user fees, a steep rise in informal so-called under-the-table payments has been noted in the former Soviet countries.<sup>80</sup> Although evidence for the extent and magnitude of such payments is necessarily incomplete and the boundaries between formal and informal fees keep shifting, under-the-table fees are a major source of health expenditure.<sup>80,81</sup> A rare exception is Belarus, where informal payments are not tolerated by the authorities and thus do not seem to be as widespread as they are in some other former Soviet countries.<sup>45</sup> An important factor in the persistence of informal payments is the low status and salaries, which

are generally less than average national incomes, of health-care workers. In Azerbaijan in 2007, for example, health workers received only 43% of the average national salary.<sup>82</sup> Other factors include weak systems of patients' rights, a failure to enforce regulations, and confusion in patients about which payments are official and which are not.<sup>81,83,84</sup> Additionally, political commitment to address the problem has been poor.<sup>85</sup>

Out-of-pocket payments (both formal and informal) create major problems. They are regressive because people on low incomes pay proportionally more than do those on high incomes,<sup>79</sup> and encourage expensive and unnecessary treatments. In several countries in the region, private expenditure is driven to a large extent by expenditure on drugs. Consequences for accessibility of health services can be enormous. In a survey done in 2010 simultaneously in Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Moldova, Russia, and Ukraine, almost 50% of respondents with a health problem in the previous month had not sought care, most often because of the costs.<sup>64</sup> However, unaffordability differed hugely between countries; the proportion of people unable to afford treatment ranged from 69·7% in Georgia and 58·1% in Azerbaijan to 4·6% in Russia and 2·9% in Belarus.<sup>64</sup> Most respondents who sought care made out-of-pocket payments, although amounts varied substantially, from \$13 in Belarus to \$100 in Azerbaijan.<sup>64</sup> Differences in terms of what was paid for were also pronounced. Payments for inpatient care and drugs were common, but only 5·7% of respondents in Russia reported payments for outpatient care, compared with 43·6% in Kazakhstan.<sup>64</sup>

To increase or stabilise the amount of public funding for the health sector, several countries of the region have introduced mandatory health insurance systems.<sup>86</sup> Russia was the first (in 1993) to introduce such a scheme, and was followed by Georgia in 1995 (subsequently abandoned in 2004), Kyrgyzstan in 1996, Kazakhstan in 1996 (abandoned in 1998), Moldova in 2004, and Turkmenistan in 2006. Since 2008, households in Georgia that are registered as being below the poverty line have been entitled to vouchers for purchasing of private health insurance policies.<sup>65</sup> The governments of Azerbaijan, Tajikistan, and Ukraine are considering the introduction of mandatory health insurance schemes in the near future.

Contributions as a percentage of salary tend to be low, and budgetary funds continue to be the main source of public health financing.<sup>86</sup> Population coverage of mandatory health insurance differs between countries. In Russia, coverage progressively expanded to almost the whole population.<sup>87</sup> In Moldova, where self-employed people are expected to pay flat-rate contributions but often fail to do so, 22% of the population was uninsured in 2008, and coverage was even lower in poor rural areas.<sup>88</sup>

After the dissolution of the Soviet Union in 1991, several countries—eg, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Ukraine—embarked on administrative

and budgetary decentralisation. These processes were inspired by the desire to overcome the bureaucracy of centralised Soviet administration and the hope that regional and local authorities would act effectively in the interests of the local populations. Thus, the administration and financing of health systems were decentralised. However, the countries soon realised that decentralised financing did not inevitably lead to more efficient health systems, but rather to increased fragmentation of financial pooling and corresponding funding inequities between regions. Some countries implemented reforms to overcome this fragmentation. In 2000, Ukraine introduced a new system of interbudgetary transfers from national authorities to regional and local authorities, decreasing territorial inequities in public health financing.<sup>89</sup> The reform envisaged the creation of a single pool for health funds regionally and started in three pilot regions in 2011. Armenia, Georgia, and Uzbekistan also decentralised their health systems in the mid-1990s, but did so gradually.

Mandatory health insurance funds not only are an instrument for creation of additional revenue, but also can stimulate wider health financing reforms through pooling of funds, introduction of a split between providers and purchasers, and strategic purchasing, increasing overall efficiency and transparency in the health system.<sup>67,90</sup> In Kyrgyzstan, many of these changes occurred. The newly created Mandatory Health Insurance Fund became the single purchaser of health services, with pooling of funds nationally (after initial pooling at *oblast* level),<sup>62,91</sup> and abolishment of the previous fragmented budgetary structure.<sup>63,91</sup>

In Russia, mandatory health insurance initially supplemented the budget-financing system, and pooling takes place in both systems.<sup>72</sup> However, the share of funds accumulated under the mandatory health insurance scheme has gradually increased. The modernisation of the Russian mandatory health insurance system that began in 2011 envisages the full centralisation of funds and administration. Moldova and Kyrgyzstan have introduced national pooling, which has led to more equitable resource allocations in both countries.<sup>62,92</sup>

New mechanisms for payment of health-care providers also featured in financing reforms. These mechanisms seek to provide incentives for rationalisation and increased efficiency. In the Soviet period, allocations to providers depended on inputs (eg, beds, staff) and followed strict line items, resulting in structural inefficiencies, excess capacity, and very little managerial autonomy. This approach is still used for payment of health-care providers in Azerbaijan and Ukraine (except in some pilot regions)<sup>71,82</sup> and hospitals in Belarus and Tajikistan.<sup>45,93</sup> However, Belarus and Tajikistan have now introduced capitation payment for primary health care, and this model is increasingly used across the region.<sup>45,65,67,75</sup> In Russia, partial fundholding for outpatient facilities has been implemented in several pilot regions, which has created incentives for providers of outpatient

care to increase their effectiveness and resulted in decreased hospital admissions and ambulance visits.<sup>72</sup>

Hospitals are now generally paid on the basis of global budgets (ie, a fixed budget to cover all hospital expenses) or cases treated,<sup>94</sup> although Kazakhstan has replaced a case-based payment system with reimbursement of actual expenditures. In Russia, payment of hospitals differs between regions; finished episodes and bed days are the most common methods to calculate payments. However, this system has not introduced incentives to improve the efficiency of hospital care because mandatory health insurance funds are obliged to contract with all state-owned hospitals, thus undermining any benefits that might be achieved through selective purchasing.<sup>72</sup> Excess capacity remains a challenge across the region (figure 5).

### Quality of care

The final challenge is improvement of quality of care. Modern, evidence-based medicine and clinical practice guidelines are increasingly being introduced in the region with the support of bilateral and international agencies, such as the US Agency for International Development or the World Bank. Centres for evidence-based medicine have been established in several countries. In Kyrgyzstan, involvement of local communities and non-governmental organisations in the development and implementation of high-quality improvement programmes has been very effective.<sup>62</sup>

However, in many countries of the region, improvements are often limited to a few priority programmes, such as mother-and-child health or primary health care. Even when evidence-based clinical guidelines have been adopted, mechanisms for their implementation might be absent. Overall, overdiagnosis and the use of ineffective or even harmful remedies remain widespread.<sup>95</sup> Many of these treatments have their roots in Soviet ideology and practice and a model of science that developed largely in isolation from the western world.<sup>96,97</sup> The Soviet concept of evidence assumed that all knowledge was consistent with statements by the fathers of communism or individual disciplines, such as Ivan Pavlov in physiology or Ivan Michurin in biology,<sup>97</sup> and little attention was paid to research published in international journals and no rigorous assessments of treatment procedures were done.<sup>96,97</sup> These legacies continue to be felt today. Many practitioners are isolated from the international research community and have little access to international journals and conferences.<sup>98–100</sup> An estimated 95% of doctors in Russia are unable to read in English and the remaining 5% often do not have access to up-to-date research.<sup>101</sup> Modern epidemiology and statistical analysis skills are still scarce.<sup>102</sup>

Several problematic medical specialties have been identified, including obstetrics. Expectant mothers with normal pregnancies are often admitted for several weeks and given infusions of vitamins, minerals, and other substances with no therapeutic value.<sup>102,103</sup> Outdated treatment methods for drug addiction are another

concern because they are among the drivers of the HIV epidemic.<sup>104</sup> Services for drug users provide social control and enforcement but do little to treat addiction.<sup>98</sup> Treatment for drug and alcohol dependence is usually provided in narcology hospitals, where patients stay for 3–4 weeks.<sup>105</sup> The approach is draconian,<sup>98,106,107</sup> emphasises short-term detoxification, and does not provide for follow-up.<sup>98,106,108,109</sup> Detoxification for alcohol addiction relies heavily on suggestions, believed by many patients, that the patient will suffer harm or death should they recommence drinking.<sup>73</sup> In Russia, as in other countries of the region, very few studies have been done of the efficacy of brief interventions in reduction of alcohol-related harm,<sup>110</sup> despite the effectiveness of such interventions in most other settings. The absence of country-specific evidence of effectiveness is a major obstacle to the adoption of brief interventions.

In former Soviet countries, many infants who would be classified as normal in international practice are subject to extensive surveillance and, in some cases, treatments. Children with developmental disabilities are offered exotic treatments, often at high personal cost to the family.<sup>95</sup> Unnecessary and prolonged hospital treatment of children is very common; most of these children receive ineffective treatments.<sup>104</sup>

Several factors other than poor access or entrenched resistance to internationally accepted evidence undermine the quality of care in countries of the CIS. These include poor investment in facilities and technologies, the costs of drugs, poor training of health workers, underdeveloped patients' rights, the proliferation of out-of-pocket payments, and the persistence of incentives to hospitalise patients.<sup>104</sup> Crucially, systems for the regulation, control, and improvement of quality of care are poorly functioning.<sup>62,65,75,82,93</sup>

#### Contributors

All authors conceived the structure of the paper. BR wrote the first draft, which the other authors subsequently revised. All authors have seen and approved the final paper.

#### Conflicts of interest

We declare that we have no conflicts of interest.

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