

The Development of Post-Soviet Health Systems: A Mixed Methods Historical Case Study



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Abstract

After independence, post-Soviet countries embarked on various trajectories of health system development, some more successfully than others. Several countries throughout the region, limited by political and economic constraints, continue to struggle with health systems strengthening, leading to negative downstream effects on population health. For countries further behind in their development trajectories, learning from successful reform experiences could support health policymaking, though health policy and systems research on this topic is scarce, particularly in the former Soviet Union.

To begin to address this gap, a mixed-methods historical case study was conducted, analysing and comparing two post-Soviet health system development experiences—in Estonia and Moldova. The cases were selected on the basis of specific differentiators, to capture a wider range of regional experiences. The country case studies focused analysis on four health systems areas, in accordance with the European Observatory on Health Systems and Policies' Health Systems in Transition framework—namely organisation and governance, financing, physical and human resources, and provision of services. Quantitative and qualitative data were synthesized, with quantitative data including select demographic, macroeconomic, and population health indicators, and qualitative data including thematic analysis of policy and research materials. The study utilised a combined complex adaptive systems and historical institutionalist perspective.

The subsequent cross-country comparative analysis sought to identify 'good health at low cost' practices appropriate to a post-Soviet context, with the aim of drawing lessons towards health systems strengthening in the broader region. Study findings suggest that political commitment to the health system development project is key; specific policies around revenue collection and pooling mechanisms are important; privatisation should be applied strategically; a holistic strategy around service provision is necessary, balancing hospital, primary health care, and public health reform; engaging external organisations in terms of financial and technical assistance can be advantageous; and health worker supply issues must be addressed. Given the contextual dissimilarities between the two country case studies, overlapping reform trends are likely indicative of regional specificities. Such knowledge can be leveraged to benefit other post-Soviet states, towards optimal health system development along the post-Soviet historical pathway.

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Acronyms and Abbreviations

CAS	Complex adaptive systems
CeHWIS	Centre of Health and Welfare Information Systems
CIS	Commonwealth of Independent States
CMHS	Community Mental Health Centres
CSF	Central Sickness Fund
CVD	Cardiovascular diseases
EHIF	Estonian Health Insurance Fund
EHIS	Estonian Health Information System
ENP	European Neighbourhood Policy
EU	European Union
FMM	Family medicine model
FSU	Former Soviet Union
GDP	Gross domestic product
GHLC	Good health at low cost
GP	General practitioner
HCB	Health Care Board
HiT	Health Systems in Transition
HIV/AIDS	Human immunodeficiency virus/acquired immune deficiency syndrome
HMP	Hospital Master Plan
HNDP	Hospital Network Development Plan
HPSR	Health policy and systems research
HREC	Human Research Ethics Committee
HSD	Health system development
HSPA	Health system performance assessment
HSS	Health systems strengthening
IT	Information Technology
LMIC	Low- and middle-income country
MDR-TB	Multidrug-resistant tuberculosis
MHI	Mandatory Health Insurance
MoH	Ministry of Health
MoSA	Ministry of Social Affairs
NATO	North Atlantic Treaty Organisation
NCD	Non-communicable disease
NCHM	National Centre of Health Management
NCPH	National Centre of Public Health
NDP	National Development Plan
NHIC	National Health Insurance Company
NHP	National Health Plan
NIHD	National Institute for Health Development
OOP	Out-of-pocket
OECD	Organisation for Economic Cooperation and Development
PHC	Primary health care
PRO	Patient-reported outcome
SAM	State Agency of Medicines
San-epid	Sanitary-epidemiological
SDG	Sustainable development goal
SHI	Social Health Insurance
SSPHS	State Service on Public Health Surveillance
SSR	Soviet Socialist Republic
SUS	<i>Sistema Único de Saúde</i> or Unified Health System

USSR	Union of Soviet Socialist Republics
TB	Tuberculosis
TSA	Time series analysis
UCT	University of Cape Town
UHC	Universal health coverage
UN	United Nations
UVA	University of Virginia
VATEK	Estonian Mental Health and Well-Being Coalition
VHI	Voluntary Health Insurance
WHO	World Health Organisation

Glossary

Complex Adaptive Systems	Systems that are self-organising, constantly changing, tightly linked, governed by feedback, non-linear, history-dependent, counter-intuitive, and resistant to change.
Critical Interpretive Synthesis	A qualitative approach to data synthesis, allowing for the integration of qualitative and quantitative data through an interpretive process.
Health Policy and Systems Research	An interdisciplinary research field, focused on issues related to the central elements of health systems, health system development or strengthening, health policy, and health policy analysis.
Health System	All organisations, institutions, and resources involved in promoting, improving, or maintaining health; defined as comprising six building blocks: service delivery, health workforce, health information systems, access to essential medicines, financing, and leadership/governance.
Health System Development	A neutral term referring to the process of health system change, which can be either positive, negative, or neutral.
Health Systems Strengthening	A term referring to the positive subset of health system development, or successful health system development.
Historical Institutionalism	A theoretical framework characterised by its historical orientation and emphasis on how institutions shape behaviour and outcomes through path dependence.
Thematic Analysis	A method of qualitative data analysis that seeks to identify and collate the main patterns and themes in the data, as determined by the specific research question.
Time Series Analysis	A method of quantitative data analysis that involves time series data, or data that is measured at regular intervals over a period of time.
Universal Health Coverage	A health system framework within which all people have equitable access to health services of adequate quality, with financial risk protection.

Table of Contents

Plagiarism Declaration	i
Abstract	ii
Acknowledgements.....	iii
Acronyms and Abbreviations.....	iv
Glossary	vi
PART A: PROTOCOL	1
Introduction.....	1
Scoping Review.....	1
<i>Health system development.....</i>	<i>1</i>
<i>Post-Soviet health system development</i>	<i>4</i>
<i>Post-Soviet population health</i>	<i>6</i>
<i>Health system performance assessment</i>	<i>9</i>
Research Purpose and Question.....	11
Methods.....	11
<i>Theoretical framing.....</i>	<i>12</i>
<i>Phase 1: Scoping review.....</i>	<i>15</i>
<i>Phase 2a: Context analysis.....</i>	<i>15</i>
<i>Phase 2b: Individual case studies.....</i>	<i>16</i>
<i>Phase 2c: Cross-case comparative analysis</i>	<i>20</i>
Rigour.....	20
Ethical Considerations.....	20
Study Limitations.....	20
Communication of Findings	21
Timeline	21
Estimated Budget	21
References	21
PART B: JOURNAL ARTICLE.....	1
Abstract	1
<i>Soviet health system model</i>	<i>4</i>
<i>Post-Soviet health sector reforms</i>	<i>6</i>
<i>Post-Soviet reform context.....</i>	<i>7</i>
Methods.....	8
<i>Theoretical framing.....</i>	<i>11</i>
Results.....	12
<i>Estonia.....</i>	<i>12</i>

<i>Moldova</i>	20
<i>Cross-case comparison</i>	27
Discussion	31
Conclusion	34
References	36
PART C: APPENDICES	1
Appendix A	1
Appendix B	2
Appendix C	8
Appendix D	9
Appendix E	14
Appendix F	19
Appendix G	36
Appendix H	48
Appendix I	60
Appendix J	71
Appendix K	82
Appendix L	88
Appendix M	95

PART A: PROTOCOL

The Development of Post-Soviet Health Systems: A Mixed-Methods Historical Case Study

Introduction

In 1978 at Alma-Ata, in the Kazakh Soviet Socialist Republic (SSR), the World Health Organisation (WHO) and the United Nations (UN) International Children's Fund jointly declared health a human right, calling for "Health for All by the Year 2000" [1]. The Alma-Ata Declaration and the 1948 WHO Constitution launched the movement for universal health coverage (UHC) [2]. Three main objectives embody UHC: equitable access to health services, adequate quality of health services, and financial risk protection [3]. Universal health coverage rose to the top of the global health agenda in recent years [4], as the UN advised all governments to "urgently and significantly scale up efforts to accelerate the transition" towards UHC [5]. In 2015, 193 countries adopted the UN sustainable development goals (SDGs), setting UHC as a key objective [6]. However, global progress towards UHC is slow [7]—an issue exacerbated by the COVID-19 pandemic [8].

Progressing towards UHC requires health systems strengthening (HSS), defined as the "significant and purposeful effort to improve the [health] system's performance" [9]. Regarding UHC, HSS represents the policy instruments, where UHC is the framework outlining specific policy objectives [9]. Based on this—and according to WHO and UN reports—HSS must accelerate for UHC to be achieved [7, 8].

Health system reform is integral to HSS [9, 10]. However, developing an effective reform strategy is challenging, especially in low- and middle-income countries (LMICs) where fiscal capacity is limited [5]. Further, evidence of what works at the health policy level, in terms of HSS, is generally insufficient [11, 12]; particularly in the four geographic regions with the largest health research deficits: the Middle East, North Africa, the Pacific Islands, and the former Soviet Union (FSU) [13-15]. According to Bloom, studying positive examples of health system development (HSD) provides important evidence on effective reform strategies [16], supporting health policymaking in other countries [17, 18].¹ More research is needed to identify best practice strategies and reforms, particularly where research is scarce [16].

This study focuses on HSD in the post-Soviet region. The fifteen post-Soviet countries inherited the same Soviet health system design, though embarked on different trajectories of health system reform from 1991, when the Soviet Union dissolved [19]. As such, research on the post-Soviet region may provide important insights on HSD and the impacts of health reforms on population health [20, 21]. However, research in this area is limited [13, 22, 23], or at least is rarely reported in the global health systems policy and research arena [24]. By exploring the topic of post-Soviet HSD, comprehensive and partial reforms effective at HSS may be identified [19], applicable to the post-Soviet region, transition contexts, and beyond [14, 21].

Scoping Review

A scoping review was conducted, assessing the availability of information about health system architecture and HSS efforts towards UHC in all of the former Soviet countries and the Eastern European geographic area (see Phase 1, Methods below).

Health system development

The WHO defines health systems as "all organisations, institutions, and resources that produce actions whose primary purpose is to improve health" [25]. The WHO health system framework comprises six

¹ Authors tend to use the terms 'health system strengthening', 'health system development' and 'health system reform' interchangeably. For this study we have chosen the term 'health system development' as the main term – see below for more on this.

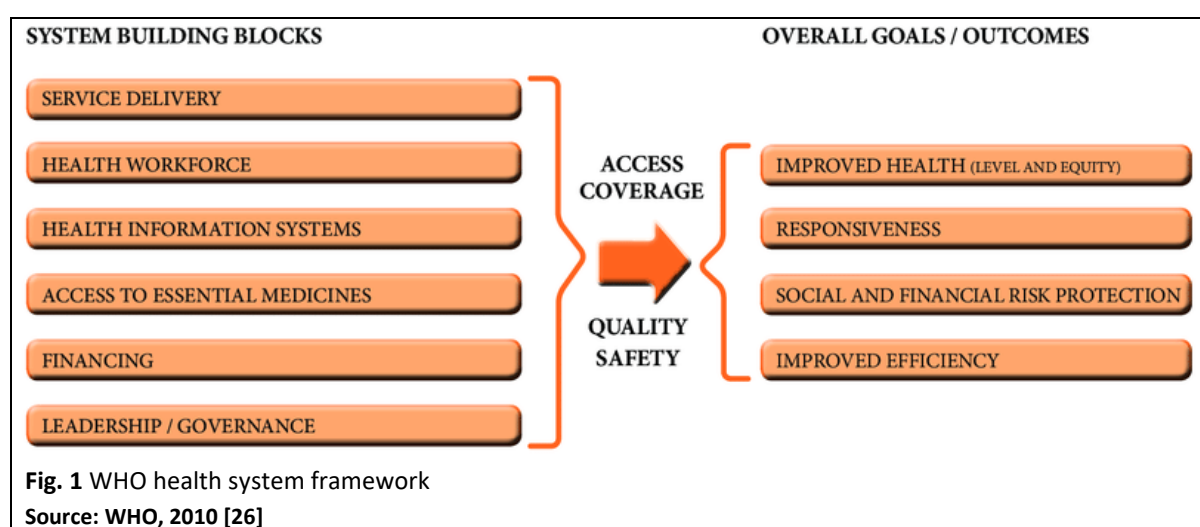
building blocks: service delivery, health workforce, health information systems, access to essential medicines, financing, and leadership/governance [26], as presented in Figure 1. Health system development and HSS are health systems phenomena [27]. While often used synonymously, the concepts will be differentiated for the purposes of this study. Here, HSD refers to the process of health system change [16]—this change can be positive, negative, or neutral. On this basis, HSS represents the positive subset of HSD or successful HSD, involving changes across the health system building blocks towards improving health, including to organisational structures, relationships, and policies and regulations [10].

Health system development is a sub-field of interest within health policy and systems research (HPSR), alongside health systems and health policy analysis [27]. Research on HSD is important, and contributes to the evidence base supporting HSS. In a 2013 study, Bloom and Wolcott describe the significance of HSD research as follows:

There is a general agreement that the outcome of an intervention depends a great deal on the way that a large number of agents respond. Their response is influenced by the institutional relationships that mediate relationships between health sector actors and also by their understandings and expectations of how other actors will respond. The impact of a policy or specific intervention is difficult to predict and there is a substantial risk of unintended outcomes. This creates the need for an iterative learning approach in which widespread experimentation is encouraged, good and bad experiences are evaluated and policies are formulated on the basis of the lessons learned [28].

Under this premise, the authors delineate five focus areas for HSD research: health system functioning, including impact studies of experimental interventions; evaluation of “emergent innovations;” analysis of governance structures, as relates to the health system; health system stewardship, including both retrospective and prospective studies of development pathways; and historical studies, based on an understanding of institution-building as a “context-specific, historically informed, process” [28]. Bloom and Wolcott identify the latter as an important research gap, stating “it is notable how few countries use a systematic knowledge of their historical legacy as a basis for policy development” [28]. Grundy et al. also highlight this gap [29], citing the need for more research that situates HSD in its historical, political, and economic context, as characterised by Bloom [16].

Historical research in HPSR is limited. Out of over 700 abstracts submitted to the Fifth Global Symposium on Health Systems Research in 2018, only two appear to be historical studies [30]. This is a missed



opportunity—historical study can be a valuable approach to HPSR generally, and HSD specifically [16]. Indeed, according to Grieve and Olivier:

A historical lens provides the opportunity to examine why a health system has evolved to its current state, what factors have been important in change, how to predict and possibly prevent similar (unintended) consequences in the future and what this might mean for better understanding the complex adaptations of the current system [31].

Woolcock et al. support this assertion, arguing that the historical perspective is useful for framing and viewing development—which is, by its nature, long-term [32]. Such a lens can identify successful strategies used by past health reformers [33], particularly those resulting in delayed successes [34, 35]. Population health is representative of this notion, as the impacts of health policies on mortality trends are often deferred [36, 37]. As such, a longitudinal view is advantageous when evaluating the extent of progress towards improving health [35].

At the macro level, historical HSD research can be country-specific or cross-country comparative. Both study approaches provide insight into the scope for HSD, as determined by a country’s historical, institutional, and cultural context [38]. Assuming a multiple equilibria model, Nunn argues that a historical event will have permanent effects if it shifts cultural or behavioural norms, or establishes a new equilibrium [39]. Understanding these events helps to identify structural barriers, and relevant social and cultural forces [33]. Per Grundy et al., by applying historical analysis and understanding, “the capability of health...systems to operate optimally along their own historical pathways is enhanced” [29].

Recent country-specific research focuses on Brazil, Ecuador, Ghana, South Africa, and several Asian countries, including Cambodia and Thailand, among other settings [31, 40-46]. Such studies detail the operation of the health system, the context in which it is embedded, obstacles to policy goals, and both proven and potential strategies to overcome them [28]. Two Brazil studies, conducted by Paim et al. and Cornwall and Shankland, are good examples of this. The studies discuss the historical development of Brazil’s *Sistema Único de Saúde* or Unified Health System (SUS) —a universal, publicly funded, rights-based health system [40, 41]. The authors identify potential challenges to the SUS, within the context of historical, political, and economic phenomena. For example, growing state support for the private sector, partially rooted in the 20th century international push for neoliberalism, as a threat to public funding. Following this, the studies suggest possible strategies for success, such as restructured health financing, and draw general lessons from the SUS experience—one being the effectiveness of a rights-based legal framework, in terms of encouraging citizen engagement in health policy debate [40].

Cross-country comparisons involve analysing the similarities and differences between two or more countries [47]—this can be useful for policy learning [48, 49]. According to Rechel et al., three main functions of comparative analysis include learning about health systems, learning how they develop, and drawing lessons for external application [50]. Towards these ends, researchers conducted several cross-country comparative studies in recent years. One study mapped the HSD experiences of five countries in East and Southeast Asia. The authors aimed to achieve a “nuanced understanding of how to ‘change the channel’ in policy terms, in order to tune into the historically defined development trajectories” [29]. In another study, researchers carried out nine country case studies, seeking to identify key HSS strategies and factors affecting implementation [51]. According to Bloom, these studies:

Present case studies of ‘successful’ processes of health system reform and development and derive general lessons from these experiences. Both...conclude that the specific design of a particular policy

is much less important than the management of change and development. They conclude that in-depth studies of specific change processes are needed [16].

Another major study in this category is the 2013 ‘good health at low cost’ (GHLC) study, which analysed HSD in five countries. Like the previous two studies, the GHLC researchers sought to understand how successful health system reformers achieved HSS, and what lessons could be drawn from these experiences towards HSS in other countries [12]. Such knowledge is beneficial to health policymakers, particularly in countries with similar contexts [38, 52] and common problems to address [53].

Post-Soviet health system development

The post-Soviet countries share the legacy of Soviet governance, the Soviet health system design (see below), and rapid social, political, and economic transition from the 1990s [14, 19, 50]. Based on this legacy, the countries face comparable challenges [54]. This indicates an opportunity for intraregional lesson-drawing, supported by historical HSD research [50, 55, 56]. A few comparative and country-specific post-Soviet HSD studies are available [14, 19, 20, 50, 54, 56, 57], including the European Observatory on Health Systems and Policies’ Health Systems in Transition (HiT) series [58]; however, published literature on the region remains limited [13].

The Soviet Union, officially the Union of Soviet Socialist Republics (USSR), was founded in 1922 following the Russian Civil War. Between 1922 and 1940, the USSR annexed several Central Asian and Eastern European territories, establishing fifteen SSRs by 1956. In 1991, the USSR collapsed and the fifteen SSRs became the independent countries of Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. The post-Soviet countries are often divided into two main geopolitical groupings: the Baltic states—Estonia, Latvia, and Lithuania—and the Commonwealth of Independent States (CIS). The CIS is a regional intergovernmental organisation, created in 1991. The organisation consists of nine members: Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, and Uzbekistan. Turkmenistan is an associate state, while Georgia and Ukraine withdrew all formal participation in 2009 and 2018, respectively. The three Baltic states refused to join the CIS, opting instead for the European Union (EU), Eurozone, Organisation for Economic Cooperation and Development (OECD), and North Atlantic Treaty Organisation. The Baltic/CIS split reflects “political, economic and social divisions...driven by the EU and Russia as the two main poles” [59].

The post-Soviet countries all inherited health systems modelled against the Soviet health system design, which is a centrally planned, hospital-centric system with formally free universal access [60]. Shortly after independence, the inherited system in most of these countries fell apart. New governments found themselves unable to raise the funds necessary to support the model, pharmaceuticals and new technologies became unaffordable, and there was a large loss of skilled health workers [14]. As such, most countries abandoned the Soviet model from the 1990s, embarking on reforms focused largely on health system organisation, financing, and service delivery improvements [20]. The Soviet era and health system model were integral in shaping post-Soviet health systems; indeed, the various post-Soviet HSDs represented both a “reaction against the previous structure as well as a continuation of some of the patterns shaped during the Soviet era” [61], including the inherited expectation of UHC [14].

Universal health coverage is the idea that “all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship,” per the WHO definition [2]. The history of UHC traces back to the late 1800s, when Bismarckian Germany pioneered the first largescale social health insurance system [62]. The concept gained steam in the early 1900s, amid the

worldwide emergence of national labour-related political movements, which sought expanded access to state-funded health services [62]. This led several countries to adopt national health systems, and the League of Nations Health Organisation—influenced by Polish, Czechoslovak, and other Eastern European advocates—to shift its focus to social medicine in the 1930s [63]. The Soviet health system “attracted much observer interest as an ideal type,” in this regard [62]. Indeed, the Soviet model was one of the first to deliver UHC to its population [64], albeit with pervasive quality, efficiency, and responsiveness issues [65]. As such, according to Field, post-Soviet citizenries expect the state to provide health care as needed at no or minimal cost, with failure perceived as “state desertion” and a violation of the social contract [61].

Over the post-Soviet era, specific health policies differed by country; although several key themes emerged across the region, including decentralisation and recentralisation, privatisation, changes in health financing arrangements, primary health care (PHC) reform and the implementation of the family medicine model, and public health system and hospital sector reform [20, 60, 66]. However, despite similar reform events and trajectories, development outcomes and results varied. As Bloom noted (see above), this suggests specific policy design is less important than the management of health system change [16]. On this basis, post-Soviet HSD analysis can yield important lessons [55, 60].

Along these lines, two key studies present a broad framework for post-Soviet HSS. According to Davis, successful reformers are those able to cope with three policy challenges: coordination of economic and health sector reform policies, consistency of reforms across health sector institutions, and coordination of national health policies with health projects sponsored by foreign entities [67]. Kutzin et al. propose an alternative framework, defining successful reformers as those who (1) set clear policy objectives and display progress towards these objectives, (2) successfully transition to a health system design aligned with these objectives, and/or (3) in more challenging settings, implement a realistic strategy to progress towards these objectives [19]. Based on these criteria, Kutzin et al. identified Estonia, Kyrgyzstan, and Moldova as the best performers [19], and asserted the following:

The countries we did not highlight as successful reformers continue to grapple with both design and implementation of a coherent and well performing health-financing system...In these countries, the reform agenda remains to a greater or lesser degree similar to that outlined in this article. For those countries highlighted as successful reformers, the reform agenda is slightly shifting away from major health financing and structural reforms towards improving the content of clinical care [19].

This highlights the need for HSD-related guidance in post-Soviet countries, particularly for those further behind in their development trajectories, such as the CIS states. These countries continue to be hampered by low earnings, large informal sectors, and extensive corruption, among other challenges, inhibiting progress towards UHC [20]. Comparative HSD research can offer lessons for health reform; however, such studies are lacking, especially those drawing on the post-Soviet experience [56, 68].

Of the existing comparative studies, some do focus on the CIS states. The studies identify areas for improvement and/or draw lessons around HSS in the region. One study concludes that better data, reduced inequities, improved access and quality, more efficient use of resources, stronger governance, and greater health expenditure are important goals for the CIS region, in terms of HSS [50]. Rechel et al. conducted two related studies, in 2012 and 2013, respectively. The 2012 study analysed health reform in post-Soviet Central Asian countries, concluding that effective governance, coordination of donor activities, linkage of structural reforms to economic instruments, pilot projects, and health worker/public support are important factors in HSS [56]. In the 2013 study, the authors outlined major problem areas, including low investment in facilities

and technologies, high pharmaceutical costs, poor training of health workers, underdeveloped patients' rights, excessive out-of-pocket (OOP) payments, and persistent hospitalisation incentives [54].

Other studies compare within the Baltic states [69, 70] and across both subregions [14, 20, 57, 71]. The studies point to an inextricable link between HSD and the social, cultural, political, and economic setting for reform [72]; historical HSD research is embedded in such context. For example, Balabanova et al. conducted two studies—once in 2004 and again in 2012—examining access to health services in eight post-Soviet countries [14, 71]. The authors concluded that improvements were largely determined by level of state health expenditure, and the countries' political and economic situations [14]. Romaniuk and Szromek came to a similar conclusion. Their study analysed the evolution of health system outcomes in the region, as relates to social, economic, and political factors, finding that—while public health expenditure was an important factor in outcomes—the primary determinant was economic context [57]. Rechel and McKee observed that politics had a similarly outsized influence on health policymaking, as compared to evidence-based research. Per the authors, health policies were grounded in values and beliefs, political issues, stakeholder interests, and path dependency—all factors with political and historical roots [20].

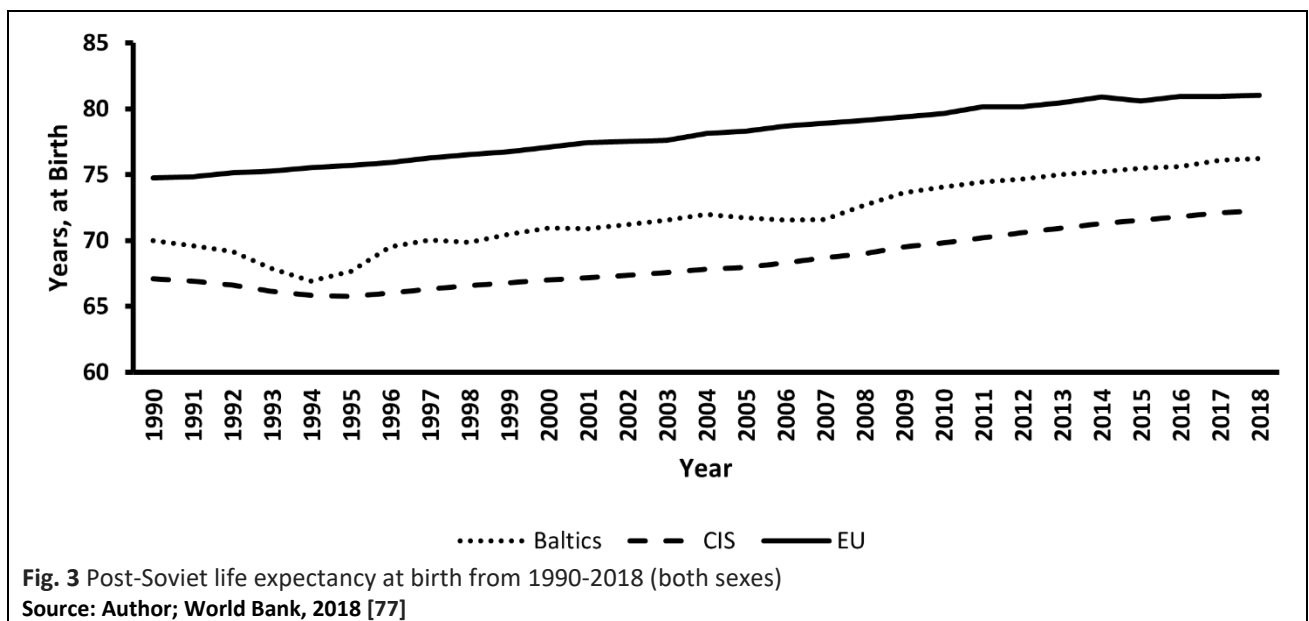
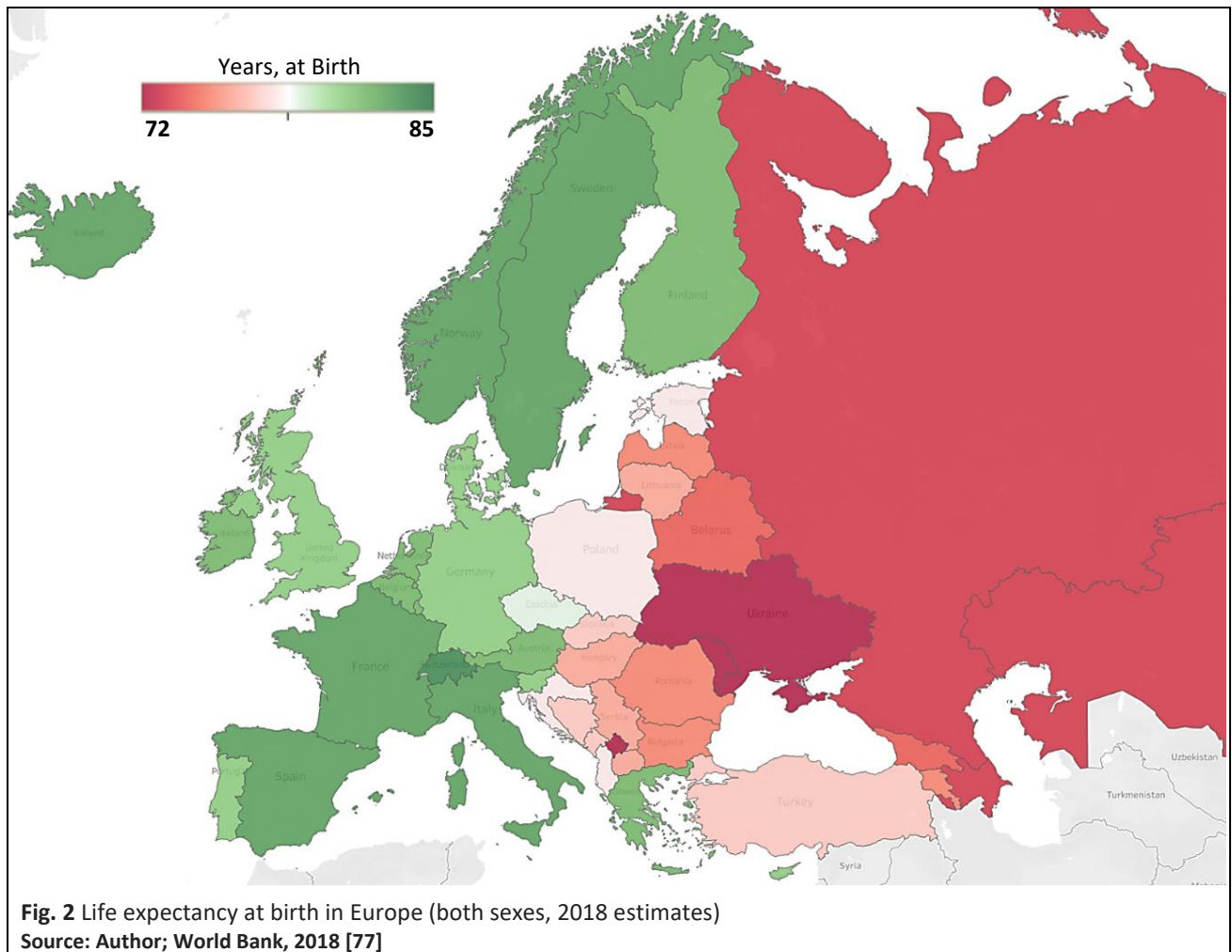
Rechel and McKee identify an additional research gap, asserting that evidence on whether health reforms achieved their intended results is limited [20]. Stuckler et al., and Romaniuk and Szromek, also observe this gap, pointing to a lack of research on the effects of health reforms on health outcomes [57, 73]. As stated previously, a historical lens is useful in identifying reform processes that positively impact mortality trends; this is important in the post-Soviet region, where population health is poor, particularly as compared to Western Europe [74].

Post-Soviet population health

The East-West population health divide has persisted since the 1960s, with no major convergence in the post-Soviet era [72, 75], as shown in Figure 2. The FSU is one of two regions in the world, along with sub-Saharan Africa, where mortality trends worsened over the past several decades [13]. Within the FSU, “life expectancy clubs” emerged, representing the two main post-Soviet subregions: the Baltic states, and the former and current CIS countries [74, 75], as shown in Figure 3. Population health indicators in the Baltics trended upwards since 1994; however, sustained improvements in the CIS region only began in the mid-2000s [75, 76]. According to 2018 estimates, life expectancy in the CIS countries lags an average of four years behind the Baltics, which remain nearly five years below the EU average [77]. Per Mackenbach, the East-West divide is an “alarming phenomenon” that should be a priority of European policymaking [78].

Health outcomes are shaped by multiple interacting determinants [12], including: social, which involves factors such as income, education, and social support; physical environmental, reflecting the built environment; health care, referring to quality of and access to health services; behavioural, comprising lifestyle factors such as diet and exercise; genetic; and biological [79]. Mortality trends in the FSU are generally attributed to the unstable conditions of the Soviet and post-Soviet eras [78, 80]. The USSR fostered a supranational Soviet identity and developed the doctrine of the ‘Soviet People’² as a “new historical community” [81, 82]. Vågerö hypothesised that the ‘Soviet People,’ having faced a “20th century history of wars, revolutions, starvation periods, food shortage and massive repression,...[are] an unusually vulnerable population...prone to unhealthy behaviours, circulatory disease and death from violent causes” [59].

² The concept of the ‘Soviet People’ (*Sovetskii narod*) as a political-sociological entity was popularised by former Soviet leader Leonid Brezhnev during a 1971 speech to the Central Committee.



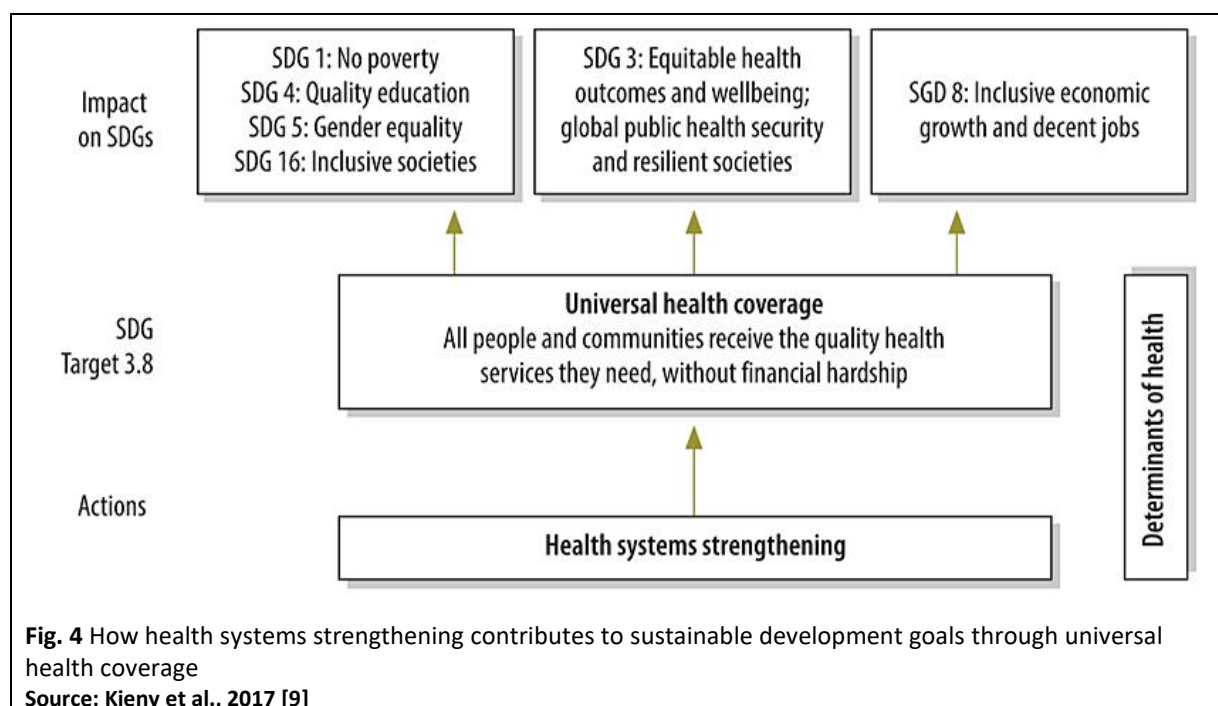
Social and lifestyle factors—including alcohol and tobacco consumption, illicit drug use, poor nutrition, unemployment, poverty, and psychosocial stress—all contribute to high rates of chronic and infectious disease in the region [66, 78]. Of the chronic illnesses, cardiovascular diseases (CVD) are the most prevalent, with rates two-to-three times higher than the EU average [78]. A number of infectious diseases, largely controlled during the Soviet era, re-emerged in the 1990s as health systems across the FSU collapsed [76]. Further, new diseases emerged, including multidrug-resistant TB (MDR-TB) and human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) [76]. As of 2013, 15 of the 27 countries with a high burden of MDR-TB were in Central and Eastern Europe and the FSU [76, 80]. Deaths and injuries from road accidents and violence are also prevalent, though rates improved since the 1990s [83].

Health care played an important role, beyond these factors. In the 1990s and early 2000s, multiple studies suggested a link between badly designed, inefficient health systems and poor population health [83]. As post-Soviet economies rapidly destabilised in the 1990s, gross domestic product (GDP) and government revenues declined, leading to a decrease in health budgets [84, 85]. Relatedly, Velkova et al. observe in a 1997 study that the “contribution of medical care to the gap in life expectancy may not be as limited as has often been asserted” [86]. Similarly, Davis argues mortality trends in the FSU were influenced significantly by the breakdown of health institutions in the 1990s, resulting from weak transition economies and inadequate government support [67].

As post-Soviet economies began to recover in the early to mid-2000s, health care in some countries progressed. According to Nolte et al., the more economically successful countries saw demonstrable improvements in outcomes attributable to medical care, suggesting better access to and quality of health services [87]. Other studies support this notion. According to McKee and Fister and Mackenbach et al., post-Soviet health gains were driven by reduced CVD-related mortality, largely attributable to improved health care [76, 88]. Further, per Mackenbach et al., some health disparities between post-Soviet countries may be attributed to differences in their health policies [89].

‘Good health’ requires an integrated approach to social, economic, and health policymaking [12, 79, 90]. Per the 2012 UN General Assembly Resolution ‘The Future We Want,’ UHC is a “key instrument in enhancing health, social cohesion and sustainable human and economic development” [91]. Figure 4 shows the pathway from HSS to UHC, and the multisectoral impacts of UHC on various SDGs. The SDGs in the figure reflect determinants of population health, demonstrating the relationship between population health, and HSS and UHC [9].

Success is contingent on a number of factors. According to the 1985 GHLC study, positive health outcomes are dependent on societal values of equality, a national commitment to health as a social goal, political participation and community involvement in health, high investment in PHC, strong intersectoral linkages for health, and sufficient education [12, 92]. Moreno-Serra and Smith found that improving population health through UHC requires good governance, high quality standards, strategic choice of benefits package, and attention to vulnerable populations [11]. Further research on how to maximise the effectiveness of coverage is needed [11]. Historical HSD research can contribute to this knowledge base and identify reform processes that favour success in population health indicators [68] in a post-Soviet context—and beyond.



Health system performance assessment

To identify effective reform processes, health system performance assessment (HSPA) should be conducted. According to Marmor and Wendt, “without performance information, there is no strong evidence with which to design healthcare reform” [52]. HSPA seeks to monitor, evaluate, and disseminate information on progress towards health system goals [93]. Within the HSPA literature, there is a general consensus that health, responsiveness, financial protection, and productivity are key objectives [93]. Dimensions of performance, based on these objectives, include: patient-reported outcome (PRO) measures and performance measurement, clinical quality and appropriateness measures, measurements of financial protection in health, measurements of the acceptability of systems and system processes from the user’s perspective, equity in access to care measures, health system productivity and efficiency, and population health [93]. The performance of post-Soviet health systems is important to assess; as such, the appropriateness of HSPA measures for the post-Soviet context should be evaluated

Patient-reported outcome measures assess health-related quality of life [93, 94]. PROs involve direct feedback from patients “on their feelings or what they are able to do as they are dealing with chronic diseases or conditions,” reflecting a more holistic version of the patient experience [94, 95]. However, PRO data is not widely available, particularly in Eastern Europe and Central Asia [96].

Clinical quality and appropriateness are evaluated using clinical process indicators—descriptive statements about a specific aspect of care and the type of patient receiving that care [93]. Lilford et al. outline four main advantages of process over outcome measures: reduced case-mix bias, lower stigma, greater encouragement of wider action, and better usefulness for delayed events [97]. Process measures require a strong link between process and outcome, updated regularly to keep up with advancements in medical research [98]. However, evidence-based practices are not widely embraced in the post-Soviet region [85], where ineffective—and even harmful—clinical processes persist, rooted in a Soviet model of science developed largely in isolation from Western research [80].

Per the WHO, financial protection occurs when direct payments for health services do not threaten living standards or result in financial hardship [99]. Financial protection measures are often used to ascertain

progress towards UHC [2, 100]. The two main measures of financial protection are catastrophic expenditure and impoverishing expenditure, based on OOP medical costs [93, 101]. Moreno-Serra et al. suggest a broader set of metrics, including new indicators that identify those who cannot afford health services and/or engage in little or no health spending [101]. Health expenditure data is available for the post-Soviet region [50, 102]; however, underestimates of OOP expenditure limit the quality of data in several countries, including Kazakhstan, Ukraine, and Uzbekistan, where systematic household surveys are not conducted [50, 103].

Measures of system and process acceptability are used to measure health system responsiveness. Responsiveness refers to how individuals are treated during health system interactions [104]. Responsive health systems predict and adapt to current and future health priorities, contributing to positive health outcomes [105]. Acceptability measures cover a set of interpersonal dimensions of quality of care, i.e. non-clinical and non-financial [93, 104]. While such measures are gaining recognition, responsiveness is a newer concept and data is limited [105].

Health systems should aim to ensure effective treatment for individuals in need of health care—an objective broadly defined as equity in health [93]. This concept encompasses three principles: equal access to available care for equal need, equal utilisation for equal need, and equal quality of care for all [106]. Measuring equity requires gathering patient-reported information on health status, socioeconomic status, health care utilisation, experiences with health care, and other access-related factors [93]—such data is only available in some post-Soviet countries [50].

Cost-effectiveness measures gauge health system productivity and efficiency. Such analyses consider the use of health system resources and the associated scope for improvement [93], with efficiency divided into two main concepts: technical and allocative. Technical efficiency refers to the extent to which maximum output is achieved from a given input; whereas allocative efficiency occurs when the input or output combinations minimise cost or maximise revenue, respectively [107]. Measuring cost-effectiveness in health is challenging; issues include how to measure health outcomes, how to quantify and place value on outputs, and how to account for changes in quality [108]. More progress must be made before cost-effectiveness measures effectively capture health system productivity [93]. As such, at this stage, these measures are of limited use in international comparisons [93].

Population health measures are used regularly in cross-country and within-country comparative analyses [93]. Mortality indicators are standard measures, being both widely available and clear-cut [21, 93]. The cross-country comparative GHLC study uses six measures, four of which are mortality indicators: under-5 mortality (per 1,000 live births), infant mortality (per 1,000 live births), maternal mortality (per 100,000 live births), life expectancy (years, at birth), births attended by skilled health personnel (%), and antenatal care coverage (%) [12]. According to Balabanova et al., “these indicators...have the benefit of being available over time and of capturing a series of diverse processes within the health system” [12]. The main drawback of mortality statistics, however, is the difficulty in determining whether mortality is attributable to the health system or external factors [93]. Amenable mortality rates theoretically account for this. These rates—touted as a more direct measure of health system effectiveness [109]—refer to deaths which should not occur assuming timely access to appropriate health care [110]. Hoffman et al. conducted a study assessing 644 ICD-9 causes of death as indicators of amenable mortality, finding 14 conditions that passed rigorous selection criteria, including CVD [109]. Relatedly, Mackenbach et al. propose contextualised analysis of amenable mortality rates, including timing, scale, and pace of change [111]. Absolute mortality rates are not recommended for cross-country comparisons [109, 111].

Research Purpose and Question

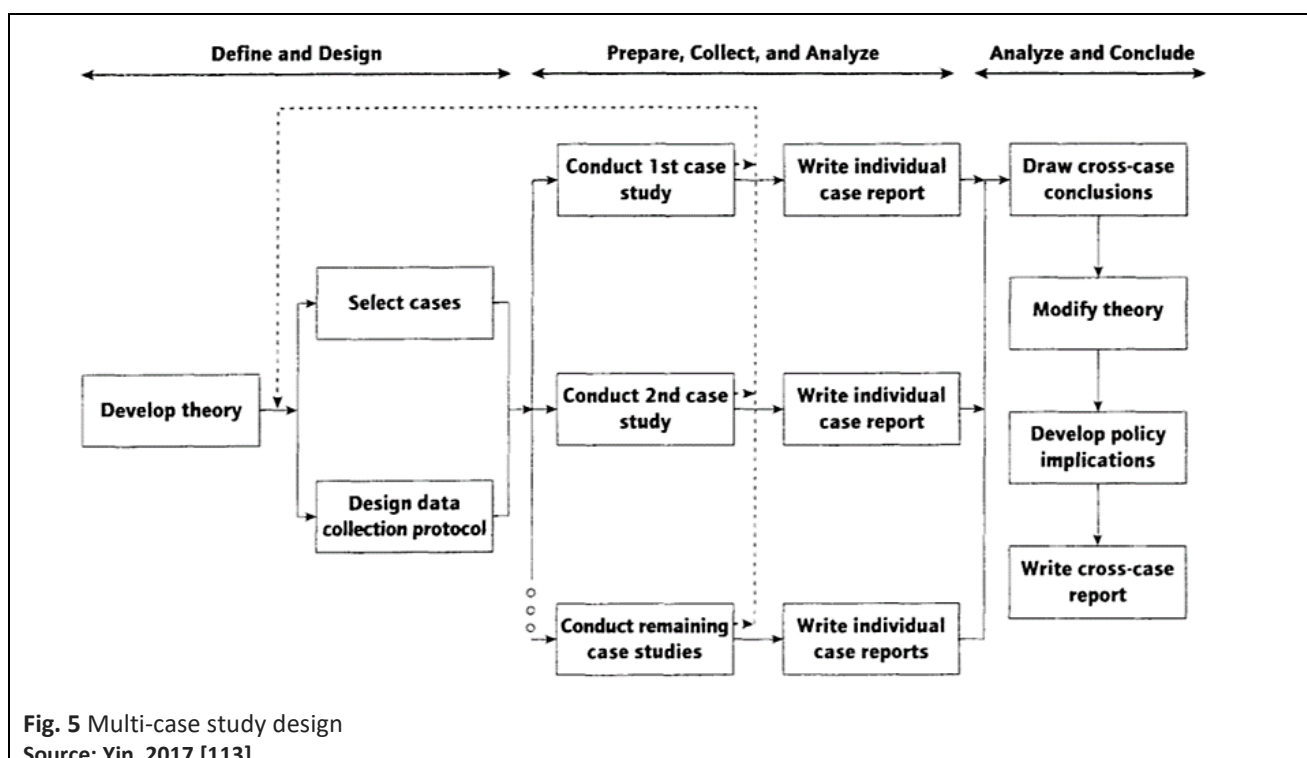
From independence in 1991, the post-Soviet countries undertook HSD, with mixed results. Successful reformers engaged in HSS, implementing health reforms in line with the inherited expectation of UHC. Other countries struggled with HSD, often limited by organisational and financial constraints. Population health in the post-Soviet region continues to lag behind Western Europe, as weak health systems negatively impact mortality trends [80, 87]. According to Mackenbach, “large health gains could be made if all countries...adopted the health policies of the best performing country” [78]. Historical analyses of post-Soviet HSD experiences may help identify GHLC practices effective at HSS; however, research in this area is limited. Studying successful reformers should offer opportunities for lesson-drawing, aiding policymaking aimed at bridging the East-West population health gap [74].

The study will aim to answer the following research question: *How have post-Soviet health systems developed since 1991—and what lessons can be drawn from these experiences to support health systems strengthening in other post-Soviet countries?*

The study will occur at the macro level as the research question pertains to national health systems; per Gilson and the WHO, the macro level is “traditionally focused mainly on the national, or domestic, health system” [27].

Methods

The study is a flexible and descriptive historical case study, to be conducted in two phases. It will rely on secondary analysis of existing literature and data. No primary data will be used. Descriptive studies develop a profile of people, events, and situations [27, 112]—this study aims to provide a comprehensive account of selected post-Soviet HSD experiences. The study will follow a mixed methods, historical, multi-case study design. The multi-case study design is shown in Figure 5. Case studies investigate a specific phenomenon within a real-world context [113]. The post-Soviet HSD experience in selected countries will be investigated as cases, with the countries representing case sites.



Within the case study, cross-country comparative analysis will be conducted, with the study limited to two cases to allow for more in-depth comparative analysis [52]. For few-country comparisons, a mixed methods case-oriented approach is common [47]. The mixed methods approach, integrating qualitative and quantitative data, is useful for contextualising information and trends, developing a more comprehensive understanding of the problem, and analysing processes and outcomes towards capturing a holistic picture of the health system [114]. Case-oriented comparative research often uses a multi-case study design, in which each selected case is analysed as a single unit before cross-case comparative analysis is performed [47, 113]. The case study will be conducted in two phases. The first phase is the scoping review; the second phase is the case study, consisting of three subphases: context analysis (phase 2a), individual case studies (phase 2b), and cross-case comparative analysis (phase 2c).

Three different topics will be explored in the context analysis subphase, including the Soviet health system model, post-Soviet health sector reforms, and the post-Soviet reform context. For all three topics, inductive thematic analysis will be used to generate descriptive themes [115], collated in a narrative summary; for the third topic, time series analysis (TSA) will be used for the quantitative data. Mixed methods individual case reports will be produced in phase 2b, using deductive thematic analysis for the qualitative data and TSA for the quantitative data. Cross-case comparative analysis will be conducted in the final subphase, drawing on the individual case reports generated in phase 2b. Health system development experiences and population health trends will be compared using thematic analysis and TSA, combined in a narrative summary. Figure 6 shows the research plan diagram for the study.

The European Observatory on Health Systems and Policies' HiT reviews are "designed to help others undertake cross-country comparisons" [50]. As such, the study will utilise the HiT review template to structure the individual case reports and cross-case comparative analysis [110]. HiT reviews describe the health system in four parts: organisation and governance, financing, physical and human resources, and provision of services—followed by HSPA. The HiT reviews are applied in five similar longitudinal comparative analyses focused on the post-Soviet region [20, 50, 54, 56, 70]. Based on the 2014 Rechel et al. study, the provision of services area will be further subdivided into public health, PHC, and specialised and inpatient services [50].

Theoretical framing

Several frameworks may be applied to HSD analysis. In a 2013 study, Bloom and Wolcott identified two main analytical approaches: complex adaptive systems (CAS) or systems thinking, and historical institutionalism [28].

Systems thinking sees problems as situated in a wider dynamic system, requiring an appreciation for the behaviours, interactions, linkages, and relationships among the elements within the system [116]. Complex adaptive systems are self-organising, constantly changing, tightly linked, governed by feedback, non-linear, history-dependent, counter-intuitive, and resistant to change [116, 117]. Understanding health systems as CAS means applying a 'whole system' perspective to the design and assessment of health reform, recognising the key role played by system actors [118]. According to Paina and Peters, applying systems thinking to HSD analysis is useful in understanding pathways for change, particularly in LMIC contexts [119]. Systems thinking is also relevant to understanding complex causality, the idea that "an effect is not linked by a linear and predictable path to a cause, but that there are multiple-interacting causes generating a set of often unpredictable effects" [27].

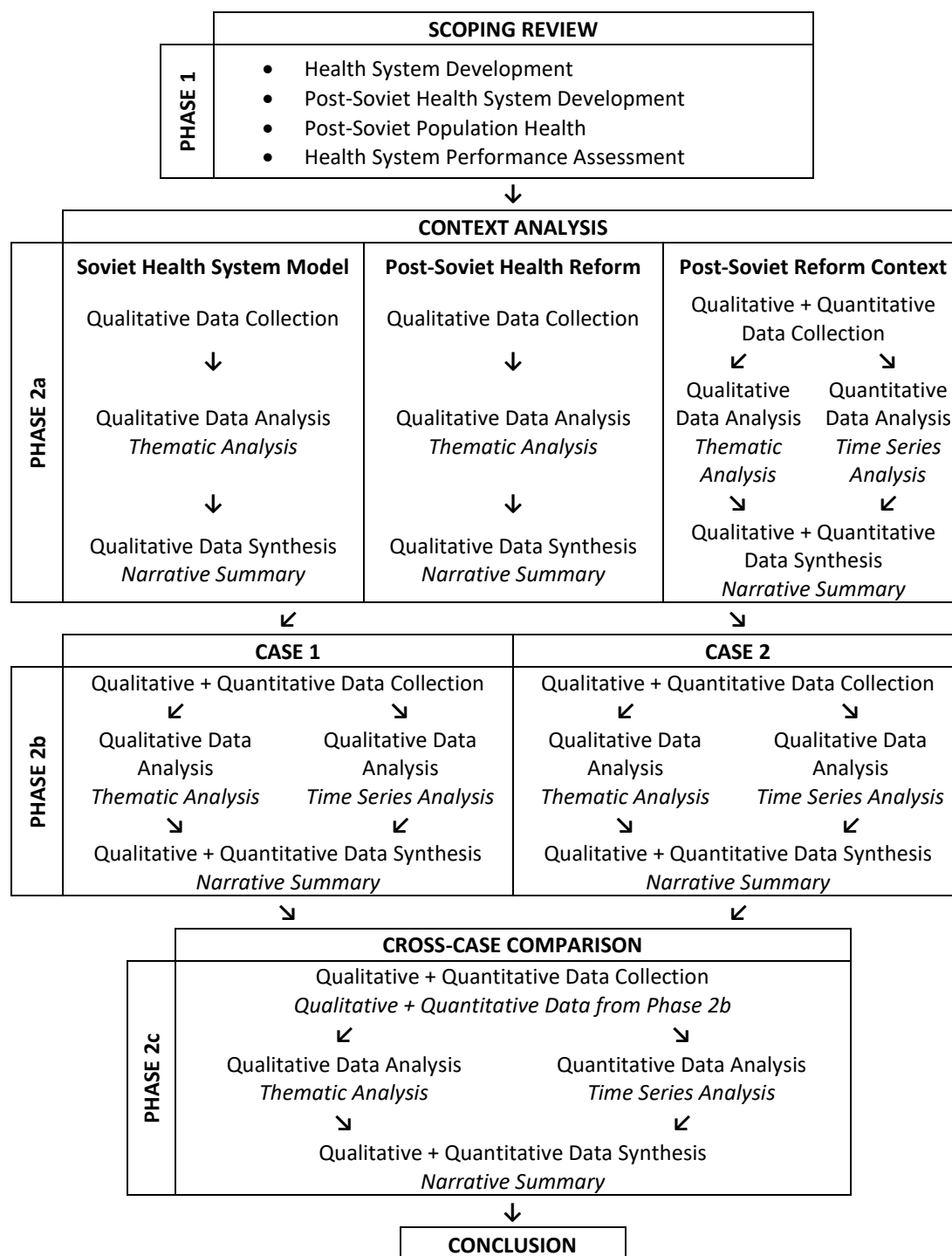


Fig. 6 Research plan diagram

Source: Author

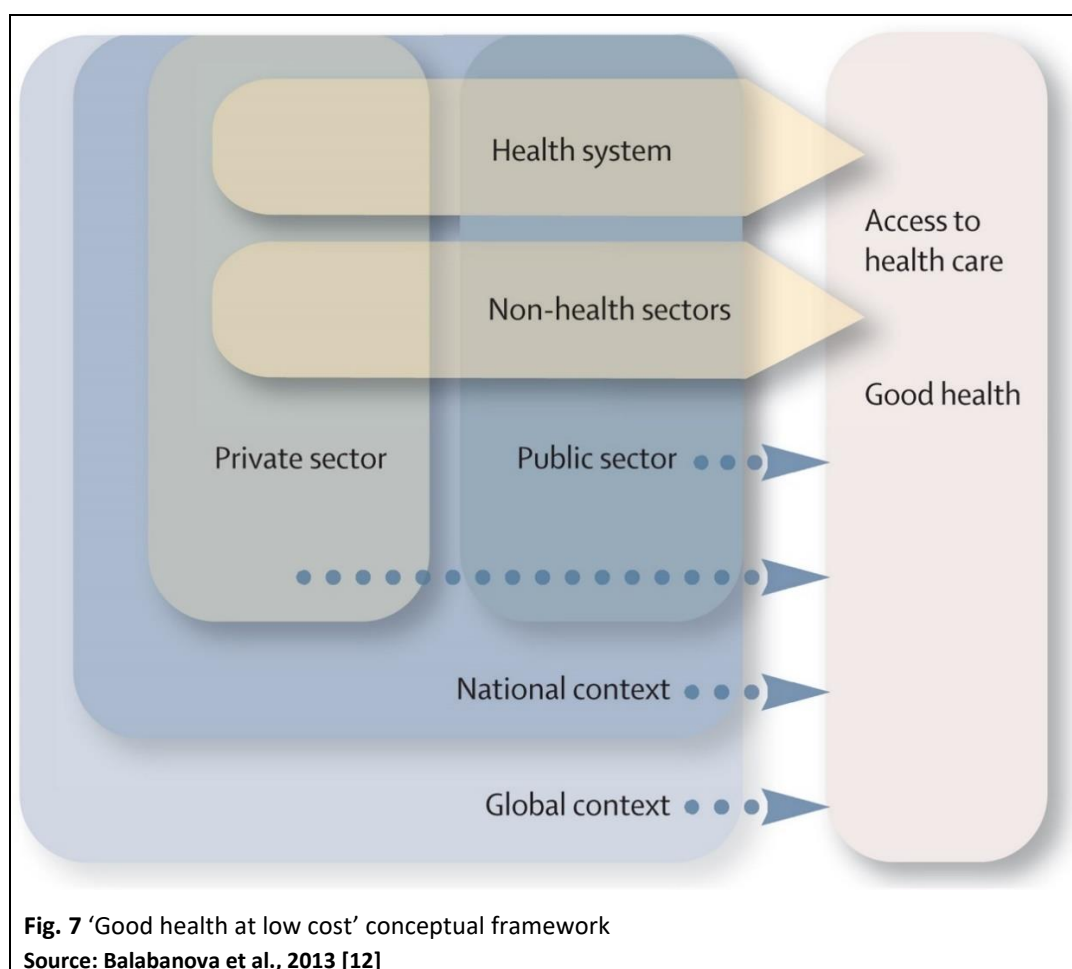
Historical institutionalism is characterised by “its historical orientation and its attention to the ways in which institutions structure and shape behaviour and outcomes” [120]. Hall and Taylor, in distinguishing between the three ‘new institutionalist’ approaches, describe the historical institutionalist perspective as follows:

First, historical institutionalists tend to conceptualise the relationship between institutions and individual behaviour in relatively broad terms. Second, they emphasise the asymmetries of power associated with the operation and development of institutions. Third, they tend to have a view of

institutional development that emphasises path dependence and unintended consequences. Fourth, they are especially concerned to integrate institutional analysis with the contribution that other kinds of factors, such as ideas, can make to political outcomes [121].

While traditionally used in political and social science contexts [120], the historical institutionalist approach may be applied to HPSR [16, 28]. According to Grundy et al., with historical knowledge, policymakers are better informed of the boundaries of realistic health policy reform [29]. Underlying this assertion is the concept of path dependency—the idea that early events in a sequence determine the nature of later events [29, 122]; or, as relates to HSD, the scope for future development [12, 123]. Some argue that path dependency is too deterministic: “there is one fork in the road, and after that, the path only narrows” [124–126]. Others contend that path dependency lacks explanatory power—it does not identify the mechanisms that produce change and it cannot be applied to the future [124, 127].

To account for these drawbacks, some HSD studies apply a combination of CAS and historical institutionalist approaches [16]. The 2014 study conducted by Grundy et al. is a good example of this, whereby the authors support a “closer alignment” of historical thinking and systems thinking [29]. The study adopts an ecological model of analysis, where health systems are considered “dynamic social constructs shaped by changing political and social conditions” [16, 29]. Similarly, the 2013 GHLC study defines health systems as path-dependent CAS shaped by “multiple historical, institutional and political processes” [12]. The authors formulate a conceptual framework for this approach, expanding on the WHO building blocks by exploring contextual factors relevant within historical institutionalism, as shown in Figure 7. This study will be framed by a combined CAS and historical institutionalist perspective, based on these models.



Phase 1: Scoping review

Scoping reviews map the existing literature on a given topic, identifying key concepts, research gaps, and significant sources of evidence [128, 129]. Data for this scoping review was collected from multiple electronic databases, including EBSCOhost, PubMed, and Google Scholar. The WHO Regional Office for Europe website was also consulted [130]. Only relevant English-language studies were included for review. No publication date restrictions were applied. Key search terms are identified in Table 1, and focus on several main topic areas.

Table 1 Key search terms on main topic areas within the scoping review

Topic Area	Search Term
History	"histor*"; "past"; "development"; "path dependency"; "institutionalism"; "historical institutionalism"
Region	"Central and Eastern Europe"; "CEE"; "eastern Europe"; "post-Communist"; "former Soviet Union"; "FSU"; "former Soviet"; "former USSR"; "USSR"; "post Semashko"; "post-Soviet"; "Soviet bloc"; "socialist bloc"; "former communist"; "former Semashko"; "post-transition"; "transition"; "post-socialist"; "former socialist"; "Commonwealth of Independent States"; "CIS"; "Baltic"; "Baltic states"; "New Independent States"; "NIS"; "newly independent states"; "European neighbo*"; "EU border states"; "former socialist economies"; "FSE"; "CIS-7"; "Eastern European and Central Asia*"; "ECA"
Health System	"health system*"; "health service*"; "hospital"; "health financing"; "health service delivery"; "service delivery"; "health workforce"; "health information system*"; "public health"; "health systems strengthening"; "HSS"; "health system performance"; "medical system"; "primary health care"; "PHC"; "health sector"; "health sector reform"; "health reform"; "family medicine"; "health organization"; "health policy"; "health law"; "health legislation"; "universal health coverage"; "UHC"; "universal coverage"; "health system development"; "systems thinking"; "complex adaptive systems"; "CAS"; "health system performance assessment"
Population Health	"population health"; "mortality"; "mortality trend*"; "lifestyle factor*"; "health outcome*"; "life expectancy"; "communicable disease"; "noncommunicable disease"; "infectious disease"; "chronic disease";

Source: Author

Phase 2a: Context analysis

Qualitative data collection will occur in stages, via two techniques: conventional subject searching and reference list checking. Given the limited post-Soviet HPSR evidence base, using multiple search techniques to find relevant studies is important. In the first stage, multiple portals and databases will be consulted for peer-reviewed literature, including PubMed, EBSCOhost, MEDLINE, Google Scholar, JSTOR, EconLit, Hinari, and Scopus. Google will be used to find relevant grey literature, including material from the WHO Regional Office for Europe. The search will be conducted using key search terms relevant to the three topics for analysis: the Soviet health system model, post-Soviet health sector reforms, and the post-Soviet reform context. Multiple search term combinations, synonyms, and spellings will be used to improve search effectiveness [131]. Reference list checking will be applied as a supplementary search technique in the second stage of the collection process, bolstering the overall search strategy [132].

The inclusion criteria for each topic will be as follows:

- Soviet health system: Only relevant English-language literature will be included. No publication date restrictions will be applied. Peer-reviewed research, articles, books, and relevant grey literature,

including government documents, reports, and dissertations, are appropriate for inclusion.

Qualitative or mixed methods research of any study design will be included. Full texts must be available via the University of Cape Town (UCT) or University of Virginia (UVA) online libraries.

- Post-Soviet health sector reforms: Only relevant English-language literature will be included. Literature with a publication date of 1989 onwards will be included for review (while post-Soviet countries only gained independence in 1991, some health reform processes began prior to independence). Peer-reviewed research, articles, books, and relevant grey literature, including government documents, reports, and dissertations, are appropriate for inclusion. Qualitative or mixed methods research of any study design will be included. Full texts must be available via the UCT or UVA online libraries.
- Post-Soviet reform context: Only relevant English-language literature with a publication date of 1990 onwards will be included for review, to establish a pre-independence baseline. Peer-reviewed research, articles, books, and relevant grey literature, including government documents, reports, and dissertations, are appropriate for inclusion. Both qualitative and quantitative research of any study design will be included. Full texts must be available via the UCT or UVA online libraries.

Quantitative data collection is focused on a single indicator: GDP per capita (current US\$), based on the relationship between GDP and health system outcomes in the post-Soviet region [57]. GDP data will be collected for all fifteen post-Soviet countries from 1991 to the latest available year. Data will be obtained online from the World Bank Open Data website [133], and subsequently tabulated in a data extraction form on Microsoft Excel (see Appendix B for template and Appendix C for completed data extraction form). All variables will be recorded as continuous numerical variables in preparation for TSA in the data analysis stage.

A qualitative approach to data analysis will be used for the Soviet health system and general post-Soviet HSD topics, organised into a narrative summary. Narrative summaries are a flexible approach to data synthesis in qualitative studies, able to incorporate different types of evidence, including both qualitative and quantitative, and research and non-research [134]. The approach is useful in the “selection, chronicling, and ordering of evidence to produce an account” [135], which is appropriate to the descriptive purpose of the study. Thematic analysis is a frequently used method of structured data analysis within narrative summaries [134, 135]. Thematic analysis seeks to identify and collate the “main, recurrent or most important” patterns and themes in the literature, as determined by the specific research question [134, 135]. For this phase, an inductive approach to thematic analysis will be applied, in which themes emerge from the data [136].

A mixed methods approach to data analysis will be used for the post-Soviet reform context topic, incorporating both thematic analysis and TSA. Time series analysis—a quantitative method—is a statistical methodology that involves the measurement of specific research units at regular intervals over a defined period of time, appropriate to longitudinal and historical study designs [137]. Time series analysis can help visualise patterns of change over time, as relates to a specific variable or multiple variables [137].

Phase 2b: Individual case studies

Case selection in this study will employ a purposive sampling approach, based on four criteria. First, the selected cases should involve largescale health reform, following a similar framework to those presented in the Davis and Kutzin et al. studies, i.e., reformers that set clear policy objectives and implemented a realistic strategy to transition to systems that aligned with those objectives [19]. Second, selected cases should differ on a variety of contextual dimensions of interest. For the post-Soviet region, such dimensions include geopolitical grouping (i.e., Baltic and CIS), EU membership status, and income status. Third, selected cases should demonstrate sustained improvement in population health. And fourth, reliable economic,

demographic, and population health data should be available—at least, relative to other post-Soviet countries.

Based on these criteria, the two selected cases will be the post-Soviet HSD experiences in Estonia and Moldova. Since gaining independence in 1991, both countries succeeded in developing a post-Soviet health system framework, established through macro-level health reform [19, 138, 139]. Estonia is a Baltic state, a member of the EU, and a high-income country, as categorised by the World Bank [140]. Conversely, Moldova is a CIS country, a non-member of the EU, and an LMIC [141]. Thus, the two countries differ in terms of geographic grouping, EU membership status, and income status—important political and economic factors in the post-Soviet region. Both countries saw improved population health over the post-Soviet period [138, 139]. Further, Estonia and Moldova offer high quality mortality data—according to Mathers et al., the two countries are the only post-Soviet states to achieve this classification [142].

Both individual case studies will follow the same data collection procedure. As in phase 2a, qualitative data collection will use two techniques: conventional subject searching and reference list checking. An electronic search for relevant literature on post-Soviet HSD in Estonia and Moldova will be performed, with multiple electronic databases consulted for peer-reviewed literature, including PubMed, EBSCOhost, MEDLINE, Google Scholar, JSTOR, EconLit, Hinari, and Scopus. Google will be used to find relevant grey literature, including material from the WHO Regional Office for Europe, and the governments of Estonia and Moldova. The reference lists of all relevant literature will be checked for references identified during the conventional subject search.

In terms of inclusion criteria, literature focused on HSD and national-level health policy will be included. Literature must provide relevant data on either Estonia or Moldova, though may include one or several other countries. Only English-language literature will be included. An exception will be made for Estonian and Moldovan government documents only if English-language versions of the documents cannot be found. Google Translate will be used to translate these documents from Estonian or Romanian to English. Literature with a publication date of 1989 onwards will be included (while Estonia and Moldova only gained independence in 1991, some health reform processes began prior to independence). The earlier date also allows for contextualisation of early post-Soviet HSD in Estonia and Moldova. Peer-reviewed research, articles, books, and relevant grey literature—including government documents, reports, and dissertations—are appropriate for inclusion. Qualitative, quantitative, and mixed methods research of any study design will be included. Full texts must be available via the UCT or UVA online libraries.

Quantitative data will be obtained from several online sources, shown in Table 2. All sources are publicly accessible. Data will be collected from as few reputable sources as possible (e.g., EU, UN, World Bank, etc.), to ensure maximum validity and reliability. Secondary datasets from the listed sources are likely to be “fully documented, with online files for the data collection forms, research protocols, and essential information about data integrity” [137] (see Appendix A for World Bank example [77]). While the possibility of error cannot be ruled out, data collection instruments for such datasets are designed to limit errors [137]. Sources and dates of collection for all recorded values will be noted down for later reference and reproducibility (see Appendix F).

Table 2 Online quantitative data sources

General
• CIS (http://www.cisstat.com/eng/cis.htm) • EU (https://europa.eu/european-union/index_en) ◦ Eurostat (https://ec.europa.eu/eurostat/home?) • Human Mortality Database (https://www.mortality.org/) • International Monetary Fund (https://www.imf.org/external/index.htm) • OECD (http://www.oecd.org/) • Our World in Data (https://ourworldindata.org/) • UN (https://www.un.org/en/) ◦ WHO (https://www.who.int/) ▪ WHO Regional Office for Europe (https://www.euro.who.int/en/home) ▪ WHO Health Accounts (https://www.who.int/health-topics/health-accounts/) ◦ UN Development Programme (https://www.undp.org/) ◦ UN Statistics Division (https://unstats.un.org/home/) • World Bank (https://www.worldbank.org/) ◦ World Development Indicators (https://databank.worldbank.org/source/world-development-indicators)
Estonia
• National Institute for Health Development (https://www.tai.ee/en/about-us/national-institute-for-health-development) ◦ Health Statistics and Health Research Database (https://statistika.tai.ee/index_en.html) • PRAXIS Centre for Policy Studies (http://www.praxis.ee/vana/index.php-id=96&L=1.html) • Republic of Estonia Agency of Medicines (https://ravimiamet.ee/en) • Republic of Estonia Health Board (https://www.terviseamet.ee/en) • Republic of Estonia Ministry of Social Affairs (https://www.sm.ee/en) • Statistics Estonia (https://www.stat.ee/en)
Moldova
• Ministry of Health, Labour and Social Protection (https://msmps.gov.md/en/) • National Bureau of Statistics of the Republic of Moldova (https://statistica.gov.md/index.php?l=en)

Source: Author

Three categories of statistical indicator data will be collected: demographic, macroeconomic, and HSPA measures. In accordance with the HiT review template [110], yearly country-level data from 1991 to the latest available year will be collected for the following demographic and macroeconomic indicators:

- Demographic: Total population; population aged 0-14 (% of total); population aged 65 and above (% of total); population density (people per km²); population growth (average annual growth rate); fertility rate, total (births per woman); rural population (% of total population); and urban population (% of total population)
- Macroeconomic: GDP per capita (current US\$); GDP per capita, purchasing power parity (current international US\$); GDP annual growth rate; public expenditure (government expenditure as % of GDP); government deficit/surplus (% of GDP); general government gross debt (% of GDP); unemployment, total (% of labour force); poverty headcount ratio at national poverty lines (% of total population); and income inequality (Gini coefficient of disposable income)

Health system performance will be assessed using three sets of population health measures:

- GHLC indicators: Births attended by skilled health personnel (%); infant mortality (per 1,000 live births); maternal mortality (per 100,000 live births); life expectancy (years, at birth); and under-5 mortality (per 1,000 live births)

- Amenable mortality: Cerebrovascular diseases mortality (per 100,000 population); diseases of circulatory system mortality (per 100,000 population); HIV/AIDS mortality (per 100,000 population); malignant neoplasm of breast mortality (per 100,000 population); malignant neoplasm of cervix uteri mortality (per 100,000 population); malignant neoplasm of colon, rectum, and anus mortality (per 100,000 population); and malignant neoplasm of prostate mortality (per 100,000 population)
- Contextual factors: TB mortality (per 100,000 population); alcohol consumption (litres of pure alcohol consumed by adults aged ≥ 15 years per capita); prevalence of current tobacco use (% adults aged ≥ 15 years per capita); and diabetes mortality (per 100,000 population)

Quantitative data from the three categories described above (demographic, macroeconomic, and population health measures) will be recorded in country-specific data extraction forms (see Appendix B for templates and Appendices D and E for completed data extraction forms). All variables will be recorded as continuous numerical variables to support TSA in the subsequent data analysis stage.

Phase 2b will use a mixed methods approach to data analysis, applying both thematic analysis and TSA techniques in each individual case report. This phase will use a deductive approach to thematic analysis, coding the qualitative data through a predetermined coding frame [143]. Data will be assigned a code based on health system area; namely, organisation and governance, financing, physical and human resources, and provision of services (public health, PHC, and specialised and inpatient services), in line with the HiT review structure [110]. HSD timelines will be developed, outlining health system legislation, and key political and economic events (see Appendices G and H for coded timelines).

Before TSA is conducted, the recorded quantitative data must be cleaned. Data cleaning addresses missing data and errors in data entry that may limit study reliability and/or validity [137]. Missing values will be flagged in the data extraction forms. To avoid errors in data entry, all inputted values will be rechecked relative to their respective sources. Any outliers will be checked against alternative datasets. If values are the same or similar, the outlier value will be kept; if values are reasonably different, further investigation and/or value deletion may be warranted. This will be assessed on a case-by-case basis, with decisions justified and recorded to ensure reproducibility. Archived versions of the data extraction forms prior to and after cleaning, as well as any specific notes on the data cleaning process, will be saved as electronic copies in Dropbox and Google Drive.

TSA will track the demographic and macroeconomic indicators, providing important contextual background to the HSD discussion. For the population health indicators, an interrupted TSA approach will be used (see Appendices I and J for individual indicator TSAs). This involves “constructing a time series of population-level rates for a particular quality improvement focus” (i.e. population health indicators) and assessing for “a change in the outcome rate in the time period before and time period after implementation of a policy/programme designed to change the outcome” [144]. The HSD timelines will be compared to population health TSAs to assess for change relative to specific health reforms. Contextual knowledge will be applied in interpreting the TSAs.

The thematic analysis and TSA results will be collated into descriptive accounts using a narrative summary approach, based on Critical Interpretive Synthesis (CIS). CIS is a qualitative approach to data synthesis, allowing for the “integration of qualitative and quantitative evidence through an interpretive process” [145]. Hypotheses regarding the impact of health reforms on population health will be generated using a CIS approach.

Phase 2c: Cross-case comparative analysis

Phase 2c is a cross-case comparative analysis of the individual case reports produced in phase 2b. As such, the qualitative and quantitative data collected in phase 2b will be used in this phase. Data analysis in this phase is based on the principle of replication:

Data are not pooled across cases and then analysed by issue; instead each case is treated as a unitary whole and comparison and contrast across these cases supports the development of general insights and conclusions...The process of analysis is undertaken iteratively, to see if the analysis of the first case is replicated as expected in the second [27].

The descriptive accounts and hypotheses generated in phase 2b will be compared and contrasted using the CIS approach. The aim of this phase is to develop insights applicable to the general post-Soviet setting. Multi-case study designs support analytic generalisation: “the development of general conclusions that, although derived from a limited number of particular experiences, provide theoretical insights that can be put forward for consideration, and testing, in other, similar situations” [136, 146]. Hypotheses will be discussed in a summative conclusion offering health policy recommendations for high-income and low- and middle-income post-Soviet countries, and areas for future research within post-Soviet HSD.

Rigour

Rigour in case study work is dependent on four key criteria: confirmability, dependability, credibility, and transferability [113]. To ensure confirmability, a scoping review is prepared, detailing key concepts, with multiple sources of evidence used in data collection. The methodology is developed to support dependability. Additionally, data extraction forms are compiled and supplied as appendices. Credibility will be enhanced via thematic analysis, as well as the triangulation of qualitative and quantitative data in the cross-case comparison. Lastly, multiple frameworks are combined using the HiT template to allow for transferability.

Ethical Considerations

The study will only use publicly available and published secondary population-level data. According to the 2019 UCT Human Research Ethics Committee (HREC) guidelines, no ethical considerations or confidentiality procedures are required [147]. The study does not qualify as human research according to the HREC definition [147].

Study Limitations

The study has several limitations to consider. First—and of most significance—the study will exclude literature published in languages other than English, with the exception of government documents. The researcher has some knowledge of the Russian language, so some literature and materials will be checked, however, will not be included as part of a formalised literature searching approach. It is also possible that there are locally published materials of relevance that are simply not accessible to a global audience. Given the geographic focus on a non-Anglophone region, key relevant studies are likely to be missed—an important consideration in a topic area with an already limited evidence base. However, time and budget constraints prevent the inclusion of other languages.

Relatedly, the narrow evidence base is another limitation, which may affect the internal validity of the study. To address this, multiple databases and literature types will be used. Another limitation relates to the demographic, macroeconomic, and population health country data, which may be inaccurate or missing [64]—1990s population health data is of particular concern [148]. This limitation was considered during case

selection—both Estonia and Moldova offer good quality national health data relative to other post-Soviet countries [142, 149]. With regards to data analysis, TSAs may be difficult to interpret: “just because an indicator changes does not mean that this change was caused by a specific reform, nor does it imply...that performance has improved or deteriorated” [150]. To address this, interpretations of the TSAs will be explicitly framed as hypotheses to be tested—first in the cross-case analysis phase and then through further research—rather than proven lessons. Finally, history in HPSR is a novel field, and no single tested conceptual framework for HSD analysis exists as yet. As such, the study is based on an untested combination of frameworks and approaches, which may limit rigour [146].

Communication of Findings

The findings of the study will be communicated through a mini-thesis and journal-style article. The article will be submitted for publication in a relevant journal, as a means of disseminating study findings to a larger audience.

Timeline

The case study is expected to take approximately 24 months to complete, from the preliminary research stage to final thesis submission in February 2022. Over the course of the 24 months, preliminary research will be conducted, and Part A (Protocol: Scoping Review and Methods) and Part B (Journal Article) will be developed, in addition to any appendices. Below is the estimated duration of each stage of the study:

- Preliminary Research: January 2020 - March 2020
- Part A: Scoping Review: March 2020 - October 2020
- Part A: Methods: November 2020 - January 2021
- Data Collection: February 2021 - March 2021
- Data Extraction and Analysis: March 2021 - May 2021
- Part B: Journal Article: May 2021 - November 2021
- Thesis Review/Completion: November 2021 - February 2022

Estimated Budget

The study is prepared in partial fulfilment of the requirements for the UCT Master of Public Health degree, health systems specialisation. The study is self-funded. As the study is desk-based, the research process involves no direct costs. Below is a cost estimate for the study:

Table 3 Estimated costs of the study

Item	Cost
Internet	R 1,000.00
Pens/Pencils/Notebooks	R 300.00
Printing	R 1,000.00
Incidentals	R 500.00
Total	R 2,800.00

Source: Author

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PART B: JOURNAL ARTICLE

The Development of Post-Soviet Health Systems: A Mixed Methods Historical Case Study

Rebecca Hotchner Blaser¹

Target Journal: BMC Health Services Research²⁻³

Abstract

Background: Post-Soviet countries embarked on various trajectories of health system development after the Soviet Union collapsed in 1991. While the countries began with near-identical foundational health system frameworks, as derived from the Soviet model, only some managed to engage in health systems strengthening over the past three decades. Studying the post-Soviet health system development experiences in these countries offers opportunities for lesson-drawing, particularly for those countries further behind in their development processes; however, research on this topic, and in the post-Soviet region in general, is scarce. To support health policymaking in the broader region, reforms and development processes effective in a post-Soviet context should be identified.

Methods: A mixed-methods historical multi-case study was conducted, comparing the post-Soviet health system development experiences in Estonia and Moldova. For both cases, quantitative and qualitative data were collected, including select demographic, macroeconomic, and population health indicators, and research materials. Times series and thematic analyses were performed using this data. The study applied a combined complex adaptive systems and historical institutionalist frame, organising the analysis according to the European Observatory on Health Systems and Policies' Health Systems in Transition framework, which focuses on four health system areas: organisation and governance, financing, physical and human resources, and provision of services.

Results: The country case studies reflect two development pathways, within the main subregions—the Baltics and the Commonwealth of Independent States. Across both cases, factors associated with health systems strengthening include a political commitment to health system development, thoughtful policies around revenue collection and pooling mechanisms, a strategic approach to privatisation, engagement with external organisations on issues of financial and technical assistance, an attentiveness to health worker supply issues, and a holistic strategy around service provision—balancing hospital, primary health care, and public health reform.

Conclusions: The historical legacy of the Soviet era continues to influence the scope for future health system development in the post-Soviet region. Trends across the two cases—including common policies and reform processes—help to identify these areas of influence, and offer important lessons for regional policymaking. As countries seek to adapt the former Soviet health system model to current contexts and needs, knowing how to leverage this history and how to push back on related points of friction is critical to ensuring optimal management of health system development in the post-Soviet setting.

Keywords: Post-Soviet, Health system development, Health systems strengthening, Health reform, History, Population health

¹ For the purposes of thesis examination, the student is the first and sole author.

² See Appendix M for instructions for authors.

³ Note for examination purposes: This journal does not have a word-count limit and longer articles are considered if merited (up to 13,000 words). This manuscript is currently 12,510 words (minus table text and references).

Background

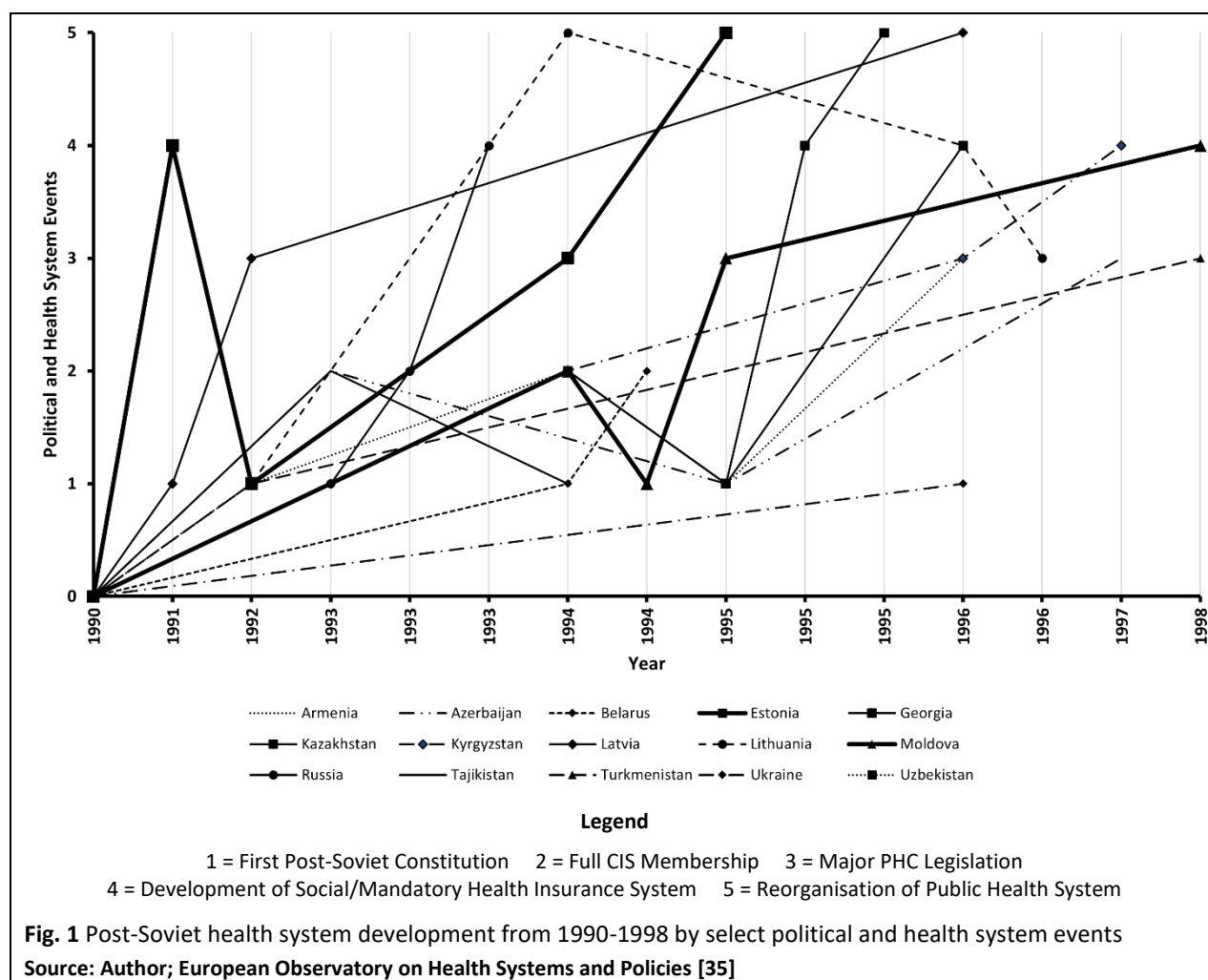
The post-Soviet region is unique—with countries starting from similar points and branching off in a fascinating array of directions—offering potential insights into a breadth of health policy and systems research topics, including health system development (HSD). Health systems are all organisations, institutions, and resources involved in the promotion, improvement, or maintenance of health [1]. Health system development refers to the process of health system change [2] and is understood to be a context-specific process, informed by historical events [3]. As such, there is a growing recognition that history is an important part of HSD, both in terms of understanding the pathway of development thus far and the scope and potential trajectories for future development [2-4]. A number of recent studies take a historical approach to HSD research, both country-specific [5-12] and cross-country comparative [4, 13, 14]. The historical lens provides a long-term perspective on development [15], which can be used to identify successful HSD strategies [16]—especially those resulting in delayed achievement [17, 18]. Learning from these strategies supports future health policy- and decision-making in other countries [19, 20], especially those with similar contextual characteristics [21, 22] and similar problems to solve [23].

Health policy and systems research is limited in some geographic regions, and even more in the areas of HSD and historical research [24]. The research gap is largest in four major regions, including the former Soviet Union (FSU) [25-27]. The post-Soviet countries share the legacy of Soviet governance, an imprint of the Soviet health system design, and rapid economic, political, and social transition from the 1990s [26, 28, 29]. Based on this history, the countries continue to face comparable health system challenges [30], indicating scope for intraregional lesson-drawing.

Russia's recent invasion of Ukraine is a stark reminder of the significance of the region's Soviet history and its relevance to the present day. The Soviet Union was founded in 1922, after the Russian Civil War, and from 1922 to 1940, annexed several central Asian and eastern European territories, establishing fifteen constituent republics by 1956. When the Soviet Union collapsed in 1991, the fifteen Soviet republics became independent countries. All of the newly independent countries inherited health systems modelled on the Soviet health system—a centrally planned, hospital-centric system with formally free universal access [31]. However, due to funding and human resource constraints, the new governments were largely unable to sustain the model [26]. Thus, the countries embarked on varied trajectories of health system reform. Figure 1 intends to illustrate this chaotic array of regional HSD processes.

Reform in the region is focused on similar key areas, including health system organisation, decentralisation and recentralisation, privatisation, health financing, public health, primary health care (PHC), and the hospital sector [31-33] (see more below). However, despite comparable reform approaches, HSD outcomes are varied. Some countries may be defined as 'successful' reformers, having implemented structural reforms towards a new health system framework [28, 34]. Others are thought to be further behind in their development trajectories. The countries in the Commonwealth of Independent States (CIS),⁴ in particular, continue to suffer from low wages, large informal sectors,

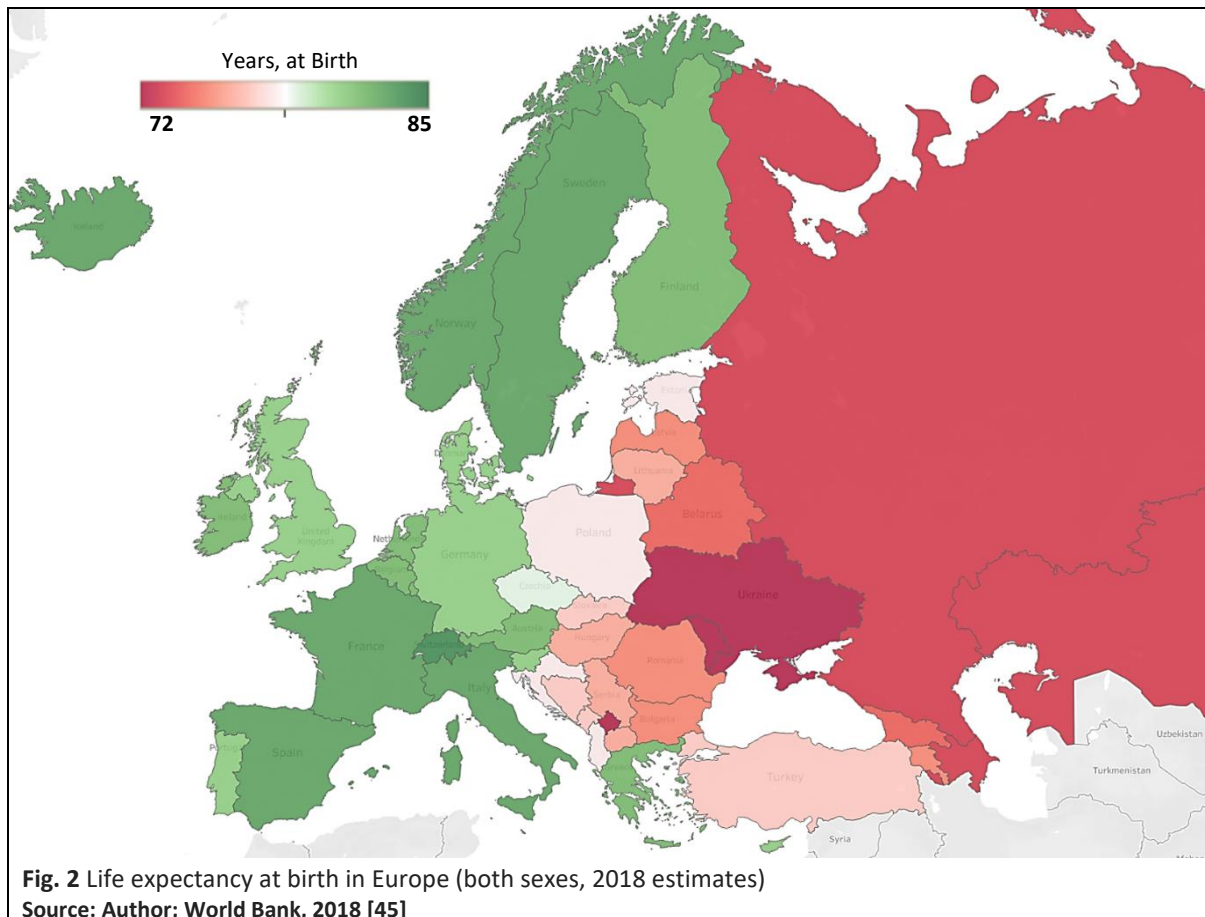
⁴ The CIS is an international organisation officially established on December 21, 1991. CIS member countries include Armenia, Azerbaijan, Belarus, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, and Uzbekistan. Turkmenistan has been an associate state since 2005. Georgia, a former member, withdrew following the 2008 Russo-Georgian War. Ukraine formally withdrew all CIS involvement in 2018, after the Russian annexation of the Crimea. The Baltic countries—Estonia, Latvia, and Lithuania—declined to join the CIS. For the purposes of this study, CIS is a shorthand for the post-Soviet countries outside of the Baltics, although CIS affiliation is only notional in some of these countries.



and corruption, among other challenges, inhibiting progress toward positive HSD, or health systems strengthening (HSS) [32].

Bloom asserts that the management of health system change is more important than the specific policy design [2]. On this basis, the analysis of post-Soviet HSD experiences can yield important lessons for the whole region [31, 36]. A few country-specific and comparative post-Soviet HSD studies are available in the global literature [26, 28-30, 32, 37, 38], including the European Observatory on Health Systems and Policies' Health Systems in Transition series [35]. However, more historical HSD research is needed to guide post-Soviet health reform [37] and identify reform processes that lead to 'good health' [32, 38]. This is important in the post-Soviet region, where population health is poor, particularly as compared to Western Europe (as shown in Fig. 2) [39]. According to Mackenbach, the East-West divide is an "alarming phenomenon" that should be a priority of European policymaking [40].

Mortality trends in the region are generally attributed to Soviet and post-Soviet eras' unstable political and economic conditions [40-42]. Social and lifestyle factors, including alcohol and tobacco consumption, illicit drug use, poor nutrition, unemployment, poverty, and psychosocial stress all contribute to high rates of chronic and infectious disease in the region [33, 40]. Health care also plays an important role, with weak health systems negatively impacting mortality trends [34, 43, 44].



Soviet health system model

Health system development is context-dependent, determined by starting conditions and previous policies [14]. To understand the pathways of post-Soviet HSD, and the trajectories for further reform, knowledge of the preceding Soviet health system is necessary. The architect of the foundational Soviet health system was Nikolai Semashko, the first People's Commissar of Health, who implemented a model in the 1920s focused on disease prevention (see [46-50] for more details).⁵ The first five-year plan was launched in 1928, and thereafter, the model shifted to a focus on curative services, shaped by Stalinist era collectivisation, industrialisation, and militarisation [48, 49]. The Soviet polity preserved the Stalinist model until the Soviet Union dissolved in 1991; as per Herlemann and Murphy, Stalin's successors "have not altered the blueprint; they have only expanded the size of the enterprise" [51].

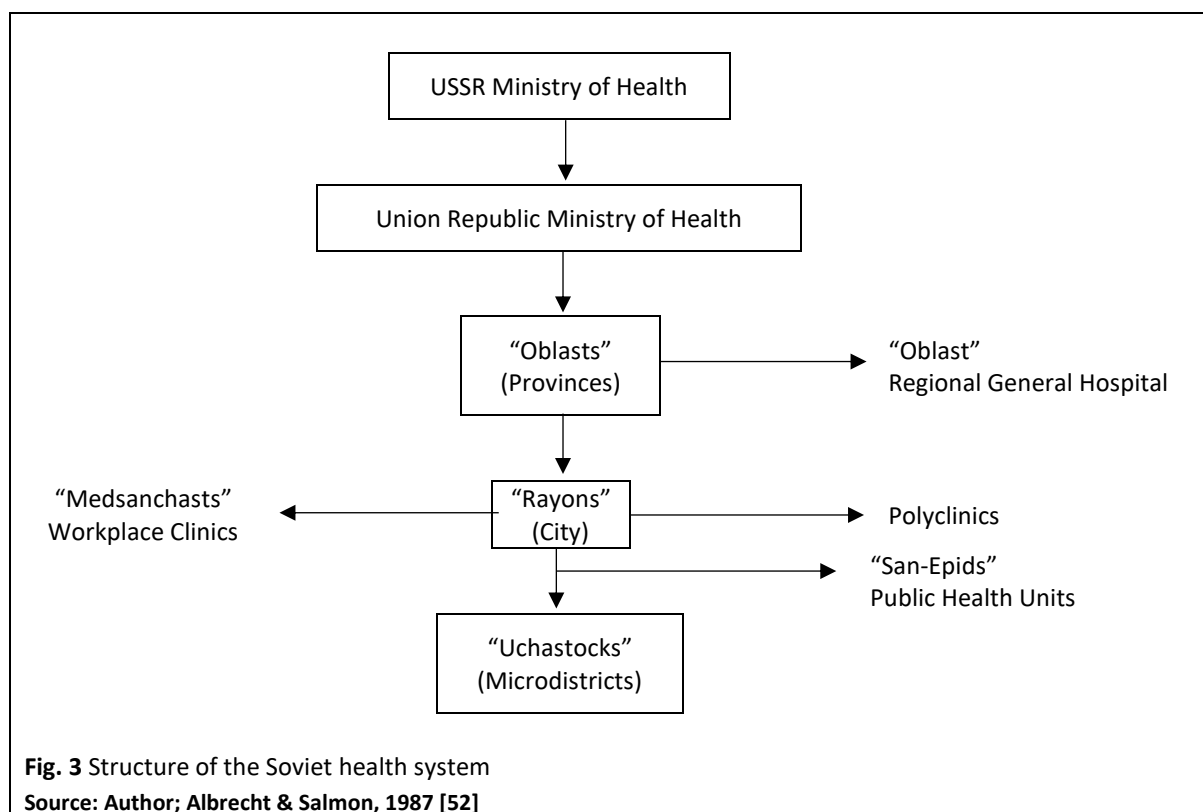
The 'Soviet health system' model—as established over the Stalin era⁶—was highly centralised, with a vertical hierarchical structure (see Fig. 3) [52]. The system was hospital-based, leading to a high

⁵ The pre-existing tsarist 'zemstvo' system provided the "partial organisational blueprint" for the Semashko model [46]. The 'zemstvo' system was established in mid-nineteenth century Russia, and "pioneered the system of city and rural medical 'districts'...designed to provide complete and comprehensive medical coverage for the district population" [46, 47]. British, French and German approaches to health care also shaped the design of the model [48, 49]. The Semashko model was preventive, developed at a time when epidemics were widespread in the region—in 1919, during the Bolshevik Revolution, Lenin purportedly declared "either the louse defeats socialism or socialism defeats the louse" [50].

⁶ The original Semashko model of the Soviet health system underwent considerable change over the Stalinist period; forced to adapt to conditions of collectivisation, industrialisation, and militarisation—policies that defined the Soviet Union from the late 1920s to the mid-1940s. During this time, the system grew in scale, and shifted from preventive to clinical in focus. For the purposes of this study, references to the Soviet health system or Soviet model are intended to reflect the post-World War II Stalinist model, with the Semashko model representing a precursor approach.

degree of labour specialisation and no general practitioners (GPs) [49, 53, 54]. Provider budgets were based on quantitative indices (e.g., number of hospital beds against population size estimates), rather than actual demand [53]. As such, the Soviet Union had the largest number of hospitals and hospital beds per capita of any European country [48]. The smaller sanitary-epidemiological (san-epid⁷) service—the system’s public health branch, responsible for upstream prevention—received 10 percent of the overall health budget, reflecting the traditional Semashko focus on communicable diseases [55-57].

The socialist model provided universal coverage, funded by general taxation [53, 58]. However, health was generally a low priority for the Soviet government, amounting to only three to four percent of the country’s gross domestic product (GDP) [34, 47, 49]. The “financial starving” [59] of the health system resulted in low wages, a chronic undersupply of infrastructure, medical equipment, and pharmaceuticals, and a culture of informal payments [34, 49, 53, 59]. For all of the Soviet model’s weaknesses, adherence to the principle of universal coverage was popular throughout the socialist state. The Soviet citizenry considered health a right of citizenship, faulting the implementation of the model rather than the design [49, 59]. Indeed, Field characterises the Soviet model as possessing a “noble purpose, grand design, flawed execution, [and] mixed results” [49], where McKee notes that the model’s main achievements were highlighted by “what happened when the system fell apart” [60] (see below).



⁷ 'San-epid' is a commonly used shorthand for the sanitary-epidemiological system – the Soviet public health service. Several key studies on Soviet and post-Soviet health systems, and indeed the san-epid system, make use of this abbreviation [29, 36, 57].

Post-Soviet health sector reforms

When the Soviet Union dissolved in 1991, the already flawed Soviet health system collapsed across the (now post-Soviet) region, with catastrophic results for public and population health [34]. The post-Soviet countries each launched into an array of health system reform processes, largely abandoning the Soviet model [31, 32]. While specific reforms differed by country, several common trends emerged, including initial decentralisation followed by recentralisation, privatisation, the implementation of social health insurance systems, public health care reform, expansion of PHC services, and hospital sector downsizing [31-33] (unpacked more below).

Decentralisation was a popular approach to health system organisation in the early to mid-1990s [29]. The shift was largely driven by declining national budgets and represented an “anti-model” to the centralised Soviet design [49]. Post-Soviet decentralisation mainly took the form of devolution (the transfer of administrative and financial responsibilities to regional governments), although some countries used deconcentration and delegation approaches [29]. In several countries, regional and municipal administrations took charge of health facilities and strategic planning, while local governments and facilities handled revenue collection and budgeting [29]. Despite the initial popularity of decentralisation, systemic inefficiencies—including overlapping responsibilities, limitations in local capacity, and regional funding inequities [29, 30]—drove many post-Soviet countries to recentralise their health systems from the late 1990s to early 2000s [29].

Privatisation, both external to and within the health systems, was also a popular policy reform from the early 1990s. Note, reforms involving privatisation (i.e., any transfer of ownership or control from the public to private sector) often differ drastically in impact and intent; that said, for the purposes of this study, these reforms will be analysed as part of the same broad trend. As countries changed over from the Soviet-planned economy, external privatisation bloomed [29, 49]. This put additional strain on health system budgets as GDP sharply decreased. As Stuckler et al. note, countries that engaged in mass privatisation of industry early in their transition periods saw acute increases in mortality rates as a result [61]. Within health systems, privatisation centred around support for private practice—a departure from the Soviet model, in which all health workers were public employees; and the transfer of ownership of state-owned medical facilities to private investors (principally dental, pharmaceutical, and medical equipment manufacturing facilities) [29].

Health financing arrangements changed across the FSU, as the Soviet general taxation model became unsustainable [53, 62, 63]. Social health insurance was widely implemented, though several countries continue to struggle with revenue collection [32]. Voluntary health insurance is generally absent from post-Soviet health financing structures [29]. Rather, the majority of private expenditure consists of out-of-pocket payments, either as direct payments, informal payments, or formal co-payments [29]. Informal payments are a cultural legacy of the Soviet era, and such corrupt tendencies remain particularly entrenched in underfunded health systems [29, 64]. Today, many of these countries still rely on input-based provider payment mechanisms, as well as line-item budgeting. Though some countries instituted alternative payment structures, including global budgets, capitation payments, case-based payments, and fee-for-service payments [29]. Risk pooling arrangements are varied, ranging from local to regional to national level management [29].

Public health reform in the FSU aims to address the growing burden of non-communicable diseases (NCDs) [56]. Post-Soviet countries took one of three approaches: preserving the san-epid structure, while broadening responsibilities to include NCDs; creating additional substructures, often directed

at health promotion and education; or discarding the san-epid system, and replacing it with a new public health service [29]. While such reforms are still in progress across the region, in general, FSU public health services continue to prioritise infectious diseases [29, 57].

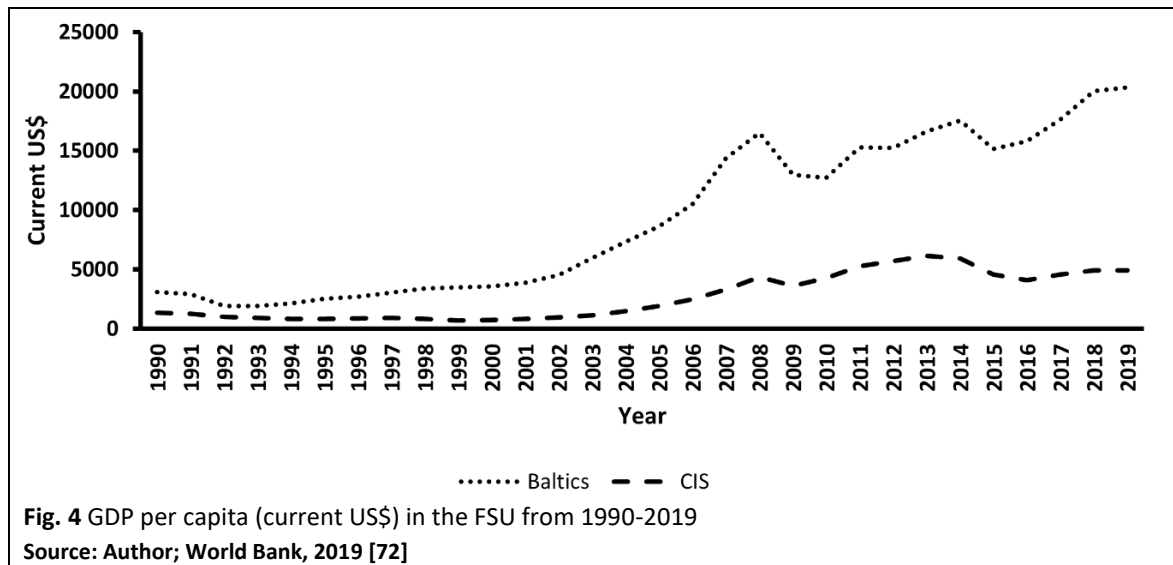
Primary health care reform is focused on developing family medicine, designing and effecting clinical guidelines and quality standards, improving gatekeeping and referral functions, and modifying provider payment mechanisms [62]. Multiple post-Soviet countries are moving towards implementing a family medicine model, although an incremental approach in some countries slowed progress [65, 66]. In the FSU, PHC reform is often accompanied by contraction of the hospital sector [29], due to both epidemiological (the shift from infectious to chronic diseases) and cost factors. Indeed, budgetary pressures in the 1990s made the inherited hospital-based system difficult to maintain, encouraging reforms aimed at “right-siz[ing]” [67] the hospital sector [26]. Such reforms include reducing excess hospital capacity, increasing hospital managerial and financial autonomy, and, in some cases, privatising hospitals [29]. Importantly, while some countries engaged in strategic policymaking on this front—downsizing to improve efficiency and access—others achieved this reduction by default, through—for example—underfunding rural hospitals [29].

Post-Soviet reform context

Although general reform trends are evident, there is no one-size-fits-all HSD strategy for the region. Over the past three decades, political and economic developments impacted the feasibility, suitability, and relative success of reforms in the post-Soviet sphere [68]. The Baltic states and current and former members of the CIS experienced two different paths, as illustrated by GDP per capita disparities in Figure 4.

The Baltics democratised and established market economies shortly after independence [69]. In the 1990s, large-scale health reforms were implemented across the subregion, including social health insurance and family medicine [69, 70]. The Baltic states engaged increasingly with Western markets and political institutions, as the Nordic states and other international donors provided financial and technical assistance [71]. This led to a period of stable economic growth in the 1990s, enabling the Baltic governments to progressively strengthen their health systems [68]. In 2004, the three Baltic states joined the European Union (EU). With EU membership, regional GDP per capita rose significantly, more than doubling from 2004 to 2008 [72]. However, the Baltic economies suffered a deep recession from 2007, with the onset of the global financial crisis. As unemployment rates increased, revenue from insurance contributions and taxes fell, resulting in reduced government health expenditure [70]. In response to the crisis, the Baltics worked to streamline their health systems—improving efficiency, quality, and equality [70].

In the CIS region, most economies began to recover in 1993-94, following the initial collapse [73]. However, while the Baltics entered Western markets, the CIS countries remained dependent on the Russian economy [73]. As such, when the 1998 Russian financial crisis hit, the CIS countries suffered another period of economic tumult which only ended in the early 2000s [73]. Over the period of economic instability, government health expenditure was low. The CIS countries faced high rates of out-of-pocket payments for low quality health services. This led to a decline in health care utilisation, as poor socioeconomic conditions hampered access and affordability. Consequently, population health in the CIS worsened [53]. The 2007 global financial crisis put further strain on health systems, as demand for health services rose, triggering another increase in out-of-pocket payments and limited government capacity for reform [74].



In addition to economic difficulties, the CIS region witnessed the “proliferation of so-called ‘hybrid regimes’ in several...western and southern [European] republics, and authoritarian backsliding in Central Asia” [75]. The political instability affected relationships with external donors, many of whom played a vital role in post-Soviet health reform. According to Ulikpan et al., the success of international aid partnerships in the post-Soviet context is correlated with the strength of democratic institutions—those CIS countries less willing to reject the Soviet model cooperated less with Western aid organisations; this often delayed health reform [76].

Studying health system development in the FSU presents a learning opportunity towards HSS. As mentioned earlier, however, the topic remains poorly researched—both within the region, and within global health system research and decision-making circles.

Methods

The study aims to answer the initial question: ‘How have post-Soviet health systems developed since 1991—and what lessons can be drawn from these experiences to support health systems strengthening in other post-Soviet countries?’ To address this, a descriptive historical multi-case study was conducted, involving the collection, synthesis, and analysis of existing literature and data. The research involved two phases (see Fig. 5).

The first phase consisted of a scoping review, mapping the existing literature on four main topics: health system development, post-Soviet HSD, post-Soviet population health, and health system performance assessment. Data was collected from peer-reviewed research and grey literature, sourced from multiple online databases and organisation websites; only English-language content was scoped⁸ and no publication date restrictions were applied (reported in Part A protocol literature review section).

The second phase involved a desk-based historical multi-case study, conducted over three subphases: context analysis (phase 2a), individual case studies (phase 2b), and cross-case comparative analysis (phase 2c). Case studies investigate a specific phenomenon in a real-world context [77]. The post-Soviet HSD experiences in selected countries were investigated as cases, with the countries representing case sites. The study was limited to two cases to allow for more in-depth

⁸ See ‘Limitations’ section below for more on the reliance on English-language materials.

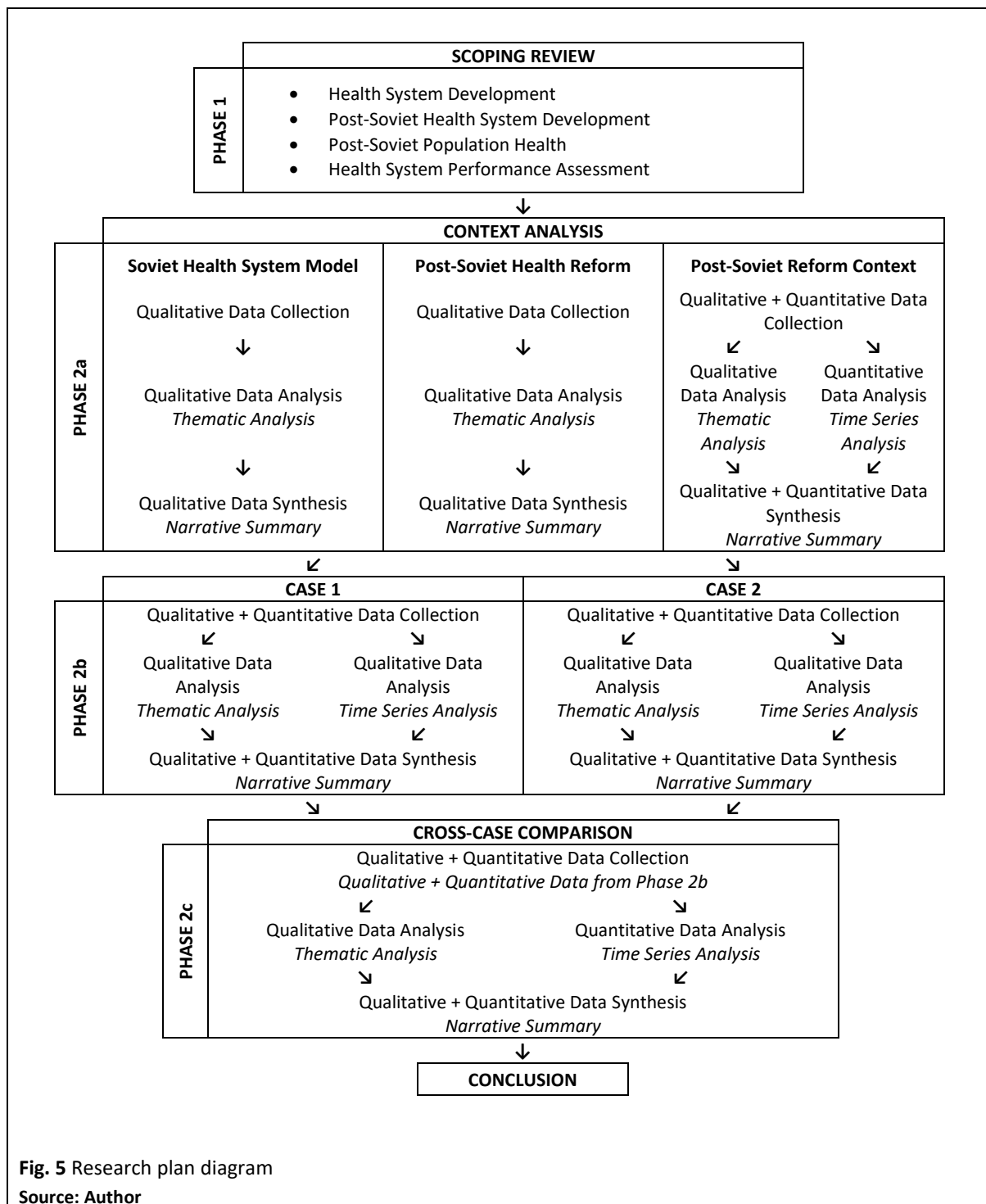


Fig. 5 Research plan diagram

Source: Author

comparative analysis [22]. A flexible mixed methods strategy was used, integrating qualitative and quantitative data to develop a comprehensive understanding of selected cases. For few-country comparisons, a mixed methods, case-oriented approach is common [78].

Phase 2a explored three main topics: the Soviet health system model, post-Soviet health reform, and the post-Soviet reform context (described above). For qualitative data collection, multiple online databases were consulted for peer-reviewed and grey literature, and there were no publication date restrictions; that said, due to the post-Soviet focus, publications from 1989-onwards were given precedence. For this phase, while English-language literature was prioritised, efforts were made to

source non-English materials (as far as the primary researcher's Russian-language literacy would allow, and as far as translation programs could assist with), resulting in the inclusion of some non-English materials such as Estonian and Moldovan government documents. Quantitative GDP per capita (current US\$) data was collected for the third topic, based on the relationship between GDP and health system outcomes in the post-Soviet region [38]. Data was obtained from World Bank Open Data for all fifteen post-Soviet countries, from 1990 to the latest available year, usually 2018 [72]. For all three topics, inductive analysis was used to generate descriptive themes from the qualitative data [79]. A mixed methods approach was applied to the third topic, incorporating secondary time series analysis for the quantitative data. After analysis, the data was collated into a narrative summary for each topic—a flexible approach to data synthesis, allowing for a range of evidence types to be reviewed [80].

The individual case studies were performed in phase 2b. Case-oriented comparative research tends to utilise a multi-case study design, where each selected case is analysed as a single unit prior to cross-case comparative analysis [77, 78]. Case selection used a purposive sampling approach, where each case needed to satisfy four criteria. First, engagement in largescale health reform, similar to the frameworks presented in studies by Davis and Kutzin et al. (i.e., reformers set clear policy objectives, and implemented a realistic strategy to transition to systems aligned with those objectives) [28, 34]. Second, variance on contextual dimensions of interest—specifically, geopolitical grouping (i.e., Baltics and CIS), EU membership status, and income status. Third, consistent improvements in population health. And fourth, availability of reliable demographic, economic, and population health data, relative to other post-Soviet countries.

The post-Soviet HSD experiences in Estonia and the Republic of Moldova (henceforth, Moldova) were selected based on these criteria. Since gaining independence in 1991, both countries succeeded in developing a post-Soviet health system framework, established through deliberate, system-level reform processes [28, 81, 82]. Estonia is a Baltic state, a member of the EU, and a high-income country [83]; whereas, Moldova is a CIS country, a non-member of the EU, and is designated a low- and middle-income country [84]. Both countries saw sustained progress in population health over the post-Soviet period [81, 82]. Further, both Estonia and Moldova offer high quality mortality data—the only post-Soviet states to achieve this classification [85].

For qualitative data collection, selected online databases were consulted for peer-reviewed and grey literature relating to post-Soviet HSD in each country. Quantitative data was collected from several online sources, per three categories: demographic, macroeconomic, and population health measures (including 'good health at low cost' indicators [14], amenable mortality rates, and indicators related to contextual factors). For each indicator within these categories, yearly country-level data was collected from 1991 to the latest available year, where possible.

A deductive approach to thematic analysis was used, coding qualitative data through a predetermined coding frame [86]. Data was coded by health system area, in accordance with the European Observatory on Health Systems and Policies' Health Systems in Transition template—namely, organisation and governance (decentralisation and recentralisation, and privatisation), financing, physical and human resources (physical resources and human resources), and provision of services (public health, PHC, and specialised and inpatient services) [87]. Time series analysis was applied to the demographic, macroeconomic, and population health indicators. The results from the

analysis stage were then collated into descriptive accounts using a narrative summary approach, based on critical interpretive synthesis [88].

Cross-case comparative analysis was conducted in phase 2c, using the individual case reports generated in the previous subphase. The individual case reports were compared and contrasted using critical interpretive synthesis, with the aim of developing insights applicable to the general post-Soviet setting. Data analysis was based on the principle of replication, whereby an iterative analytical process is undertaken to determine to what extent the analysis of the first case is replicated in the second, with each case treated as a unitary whole [89].

Theoretical framing

The study uses a combined complex adaptive systems and historical institutionalist frame. Complex adaptive systems are self-organising, constantly changing, tightly linked, governed by feedback, non-linear, history-dependent, counter-intuitive, and resistant to change [90, 91]. Through this perspective, a ‘whole system’ lens is applied to health reform analysis, recognising the key role played by key actors, institutions, and other system elements [92]. According to Paina and Peters, systems thinking in HSD research is useful in identifying pathways for change, particularly in low- and middle-income contexts [93]. Systems thinking is important to understanding complex causality—the idea that an effect is not the result of a single, linear cause but rather, multiple, interacting causes with unpredictable consequences [89].

The historical institutionalist framework also incorporates complex causality, understanding its role—alongside path dependency—in institutional development [94]. Historical institutionalism is characterised by its historical orientation and related emphasis on how institutions shape behaviour and outcomes. Although traditionally used in political and social science contexts [95], the approach holds relevance for HSD research [2, 3]. Per Grundy et al., historical knowledge informs policymakers on the scope for health reform [4]. This assertion is based on the concept of path dependency, which states that earlier events necessarily impact the nature and range of later events [4, 96]. Applied to HSD, this indicates that previous health system architecture and policies may constrain the scope for future HSD [14, 97]. Some argue that path dependency is too deterministic [98–100]. Others contend that the concept lacks explanatory power, in that it does not identify the mechanisms that produce change and cannot be applied to the future [98, 101].

To account for these drawbacks, some HSD studies practise a combination of complex adaptive systems and historical institutionalist approaches—for example, a 2014 study conducted by Grundy et al., which supports a closer alignment of historical and systems thinking [4]. The study adopts an ecological model of analysis, conceptualising health systems as complex adaptive systems shaped by historical institutions, and political and social factors [2, 4]. The 2013 ‘good health at low cost’ studies are also good examples, defining health systems as path-dependent, complex adaptive systems moulded by “multiple historical, institutional, and political processes” [14]. The authors formulate a conceptual framework for this approach, expanding on the World Health Organisation’s (WHO) building blocks framework [102] by exploring contextual factors relevant within historical institutionalism. The combined approach applied in this case study draws from these frameworks.

Limitations

The primary limitation of this study is the prioritisation of English-language literature and source materials.⁹ Given the geographic focus on a non-Anglophone region, key relevant materials were likely missed—an important consideration when studying a topic and region with an already scant evidence base. That said, in a 2021 study, Hernández-Torrano et al. mapped the development of education research in post-Soviet countries over the past 15 years [103], finding that over 70% of regional research materials were published in English, almost 25% in Russian, and less than 3% in Ukrainian [103]. If health research is analogous, then the English-language orientation of this study—which focuses on an under-researched issue of substantive relevance—represents an important initial phase of research in the FSU.

Further, it is likely that some relevant locally published and held research was not included, with such literature inaccessible to a global audience. Similarly, the narrow evidence base itself presented another limitation, potentially affecting the internal validity of the study. Lastly, history in health policy and systems research is a novel field, and no single tested conceptual framework for historical HSD analysis exists, as yet. As such, the study was based on an untested combination of frameworks and approaches, which may limit rigour.

Results

The two post-Soviet health systems under study followed very different development pathways, influenced by both political and economic context, and the nature and timing of health policymaking. A chronological narrative of HSD was developed for each country case study, along with time series charts for key demographic, macroeconomic, and population health indicators. The two countries' HSD timelines are summarised in Table 1, with the events divided by health system category. Cross-case comparison follows below.

To give a brief overview, Estonia's health system is organised under the Ministry of Social Affairs (MoSA), and is financed via social health insurance and private health expenditure. The Estonian Health Insurance Fund functions as the central pooling and purchasing agency for the social health insurance system [81]. The Moldovan health system is overseen by the Ministry of Health, Labour and Social Protection (MoH). Health financing involves mandatory social health insurance and private expenditure, with the National Health Insurance Company operating as the central pooling and purchasing agency [82].

Estonia

Estonia regained its sovereignty in 1991, following the dissolution of the Soviet Union. The country joined the United Nations shortly after, ratifying a number of international conventions, and drafted a new constitution in 1992, establishing itself as a democratic parliamentary republic [104]. The constitution conferred the right to health protection, urging a new approach to universal health coverage (UHC) through PHC and financial protection [69, 105].

The first wave of health reforms—from 1989 to 1995—sought to address these priorities [106] (see Table 2 for summary of key legislation). A negative GDP trend post-independence encouraged an

⁹ As noted earlier, the primary researcher holds a conversational-level knowledge of the Russian language and conducted basic searches of literature and materials, also applying translation software where possible. However, this cannot be said to be comprehensive in nature, and it is likely some source materials were not identified or located.

Table 1 Timeline of post-Soviet health system development events by category in Estonia and Moldova

	Estonia	Moldova
Organisation and Governance	1992: Adoption of new constitution establishes the right to health protection. 1994: Health Services Organisation Act is passed, decentralising some responsibilities to municipalities. Mid to late 1990s: Estonian government begins to recentralise activities. 2001: Health Services Organisation Act is updated, requiring hospitals to incorporate under company/foundation law. 2002: All health care providers obtain legal status as private entities.	Early 1990s: Government engages in private sector development, aiming to reduce costs. 1994: First constitution is adopted, declaring the right to health protection and free minimum health insurance. 1999: Law on Local Public Administration establishes legal basis for decentralisation-based health regionalisation plan. 1999: Law on Privatisation designates almost all pharmacies and dental clinics as private. 2003: New Public Administration Law is approved, abolishing the county structure and freezing the trend towards decentralisation. 2009: Amendments to national legislation open the health sector to private investment.
Financing	1991: Health Insurance Act establishes universal system of wage-based social health insurance, creating 22 regional sickness funds. 1994: Regional inequalities in funding lead to introduction of the Central Sickness Fund—central collection and pooling entity. 2000: Estonian Health Insurance Fund is created, merging the Central Sickness Fund and remaining regional funds, and taking on central pooling and purchasing functions. 2002: Health Insurance Act is renewed, updating various health financing regulations in line with the new Estonian Health Insurance Fund. 2009: Government and WHO conduct an analysis on health financing sustainability, concluding that the revenue base should be expanded. 2017: Estonian government passes reform broadening the social health insurance revenue base—state contributions funded from general tax revenue are introduced.	1992: Law on Health Assistance through Health Insurance is adopted—the first step towards an insurance-based system. 1994: A Government Decision sets up voluntary health insurance funds in four pilot districts. 1998: Law on Mandatory Health Insurance is approved. Implementation is delayed by economic crisis. 1999: Law on the Minimum Package of Free-of-Charge Health Care Guaranteed by the State is passed, defining the benefits package covered by the state. 2001: The National Health Insurance Company is created, responsible for administering mandatory health insurance. 2004: Mandatory health insurance system is implemented. 2009: Amendment expands mandatory health insurance coverage to all families living below the poverty line. 2010: Amendment to Law on Mandatory Health Insurance grants universal access to PHC services.
Physical and Human Resources	1995: Medicinal Products Act is introduced, establishing regulations for medicinal products. 1999: State Agency for Medicines opens the Medical Devices Department, responsible for ensuring quality control of medical devices. 2001: Law of Obligations Act is approved, defining the legal parameters of the provider-patient relationship. 2002: Health Care Board given authority over medical licensing, requiring all health practitioners to register with the entity. 2004: Medicinal Products Act is updated to comply with European Commission directives. 2004: Estonia launches National Development Plan, which includes provisions for hospital renovations. 2005: MoSA launches the Estonian eHealth Foundation. 2008: Estonian Health Information System becomes operational.	Mid 1990s: Capital stock investment targets development of new PHC centres, neglecting existing infrastructure. 2005: Law on the Exercise of Medical Profession is approved, requiring every physician to engage in continuous education. 2007/2009: Government issues two decisions on the procurement of medical equipment. 2009: OpenMEDIS, a health technology management system, is launched; MEDEX 2.0 is launched shortly after—an automated PHC information system. Early 2010s: World Bank and EU pledge money towards capital investment in the Republican Clinical Hospital in Chisinau. 2012: Law on Medical Devices is passed, in line with international/EU standards.
Provision of Services	Early 1990s: Various hospital reforms introduced to address overcapacity. 1991: Re-specialisation training for GPs is introduced, with re-specialisation courses beginning at University of Tartu the next year. 1993: Family medicine becomes an official medical specialty. 1994: Health Services Organisation Act establishes the basic framework for PHC. 1995: Public Health Act is passed, reorganising the san-epid system. 1997/1998: New ministerial regulations establish GP legal status, remuneration, and service provision roles. 1998: Hospital Master Plan 1999-2000 is developed, leading to a reduction in acute care facilities. 2000: Hospital Master Plan 2015 is approved, aiming to improve specialised and inpatient services. 2001: New Health Services Organisation Act defines GPs as private practitioners and primary gatekeepers of the health system; requires hospitals to incorporate as foundations/joint-stock companies. 2003: Hospital Network Development Plan is approved—an update to the Hospital Master Plan.	1994: National immunisation programme is introduced, targeting eight diseases. 1995: Basic Law on Health Care is passed, establishing the basis for the family medicine model. 1995: 'Healthy Lifestyles' Centre is created. 1997: Government Decree on PHC is issued, introducing the family medicine specialty and various updates to the PHC sector. 1998: 'Healthy Lifestyles' Centre launches several health education programmes. 2004: With the introduction of the mandatory health insurance system, all hospitals become state enterprises. 2007: National Centre for Health Management is created. 2009: Law on State Surveillance of Public Health is approved, restructuring the san-epid service to the State Surveillance of Public Health Service, shifting focus towards noncommunicable diseases. 2010: Order on PHC is approved, allowing both public and private providers to offer PHC services. 2010: Programme for the Development of Hospital Health Care for 2010-2012 is approved, aiming to modernise hospital care and improve efficiency. 2012: Non-Communicable Diseases Prevention and Control Strategy 2012-2020 is approved. 2018: Government Decree on PHC is updated.

Source: Author; Fidler et al., 2009 [31]; Fidler et al., 2007 [67]; Habicht et al., 2018 [81]; Constituteproject.org, 2015 [104]; Jesse et al., 2004 [106]; Koppel et al., 2008 [107]; Polluste & Lember, 2016 [108]; Koppel et al., 2003 [109]; Turcanu et al., 2012 [82]; Vian et al., 2018 [110]; Goroshenko et al., 1996 [111]; Atun et al., 2008 [112]; Constituteproject.org, 2016 [113]; Maclehose et al., 2002 [114]; Sécula et al., 2020 [115]; Government of the Republic of Moldova, 2018 [116]

early prioritisation of health financing and broader economic reforms. The 1991 Health Insurance Act was the first major health reform of the post-Soviet era, establishing a universal system of wage-based social health insurance. The Act created 22 regional sickness funds, devolving responsibility to counties and large cities [106, 108]. Regarding macroeconomics, the government adopted a radical fiscal strategy in 1992, cutting spending and taxes. The Estonian kroon became the national currency, replacing the Soviet ruble [117]. And in 1993, the government launched a large-scale privatisation programme, ramping up efforts to encourage trade and foreign investment [117]. This led to a steady rise in GDP from the early 1990s.

On the PHC front, re-specialisation training for GPs was introduced at the University of Tartu in 1991, with family medicine becoming an official specialty in 1993 [81, 109]. The Health Services Organisation Act adopted in 1994 created a basic framework for PHC [107], decentralising responsibility for primary and secondary care planning to municipalities and initiating a similar

Table 2 Key Legislation in the development of the post-Soviet Estonian health system [81, 106, 107]

	Year	Key Legislation	Description
First Wave (1989-1995)	1991	Health Insurance Act	The Act established a universal system of social health insurance administered by 22 regional non-competing sickness funds, with a mandatory contribution rate of 13% of salary/earnings. A 1994 amendment to the Act created the Central Sickness Fund, under the MoSA, to coordinate and supervise the regional funds [106, 107].
	1994	Health Services Organisation Act	The Act decentralised responsibilities to the municipal level, including planning and organisation of primary and secondary care; and began the process of transferring ownership of health facilities from the central government to municipalities [106]. The Act also established the basic framework for PHC [107].
	1995	Public Health Act	The Act reorganised the inherited san-epid service to a modern public health system, representing a shift in focus to health promotion, health protection, and disease prevention [107]. The Act provided public health infrastructure, sustainable funding, and a legislative framework [81]. Several amendments were made in the years following the Act's adoption, including the launching of programmes targeting specific public health threats (e.g., TB, HIV/AIDS, alcohol, and drug abuse) [107].
	1995	Medicinal Products Act	The Act established regulations for the pharmaceutical sector, covering all medicinal products and pharmaceutical activities. In conjunction with the Act, the national government developed the first essential drug list and introduced a reimbursement system for prescription pharmaceuticals [81].
Second Wave (1996-2004)	2001	Health Services Organisation Act (Renewed)	The Act recentralised planning to the national level, and allocated funding responsibilities to multiple national ministries. The Act also established a new licensing system for doctors and health providers, and defined providers as private entities [106].
	2001	Law of Obligations Act	The Act established the legal parameters of the relationship between health providers and patients, defining the contractual obligations of each. On the provider side, the Act outlines the requirements of informed consent, privacy, and provider accountability; while on the patient side, the Act regulates conditions of payment [106, 107].
	2002	Health Insurance Act (Renewed)	The Act formed clearer regulations within the health insurance system, following the establishment of the Estonian Health Insurance Fund as an independent public legal body and active purchasing agency [81, 106].
	2004	Medicinal Products Act (Renewed)	The Act updated regulations for the pharmaceutical sector, in line with EU and international guidelines [81].

Source: Author; Habicht et al., 2018 [81]; Jesse et al., 2004 [106]; Koppel et al., 2008 [107]

transfer of health facility ownership [106]. The shift towards PHC was accompanied by a huge reduction in hospital capacity. Funding incentives under the Soviet model and the expectations that Estonia would be on the front lines of a Soviet military confrontation with the West led to an extreme excess of hospitals in the country [118]. From the early 1990s, reforms sought to address this overcapacity: hospitals were accorded semiautonomous status, giving management full control over personnel decisions; new licensing requirements were adopted, leading to the closure of many small rural hospitals; and various financial incentives to downsize were introduced [31, 67]. By 1996, the number of hospitals in Estonia had declined from 120 to 78 [31].

Another key development, in 1994, was the introduction of the Central Sickness Fund—a national collection and pooling entity subordinate to MoSA. The entity allocated funds to the 22 regional pools, aiming resolve inequalities that had developed from a prior lack of central pooling or interfund transfer mechanisms [70, 81].

The 1995 Medicinal Products and Public Health Acts were the last of the first-wave reforms. The Medicinal Products Act established regulations for all medicinal products, including medical devices and pharmaceuticals, and assigned regulatory power to the State Agency for Medicines [106]. The Public Health Act reorganised the inherited san-epid public health service, shifting focus towards health promotion, health protection, and disease prevention—in recognition of the epidemiological transition from infectious diseases to NCDs. The Act created a legislative framework for the new public health system and provided public health infrastructure and sustainable funding [81, 107].

The second wave of reforms—from 1996 to 2004—focused largely on strengthening the post-Soviet health system framework instituted during the first wave [106] (see Table 2 for summary of key legislation). The reforms centred on corrective legislation, recentralising planning, improving service delivery, and defining funding responsibilities [106]. In 1997 and 1998, ministerial regulations were issued establishing the legal status of GPs, the remuneration system for GPs, and the package of services to be provided by GPs, building on the basic framework for PHC outlined in the 1994 Health Services Organisation Act [108, 109]. Medical and dental training standards were set in 1997, in accordance with European Commission directives [106]. Human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) began to emerge in the mid-1990s, as tuberculosis (TB) mortality rates were peaking. To address these issues, Estonia adopted the National Programme on the Prevention of HIV/AIDS and Other Sexually Transmitted Diseases, and the National TB Programme in 1997 [81], operationalising the new public health system.

The series of first wave hospital reforms alleviated some pressure on the health system; however, issues with overcapacity and mismanagement persisted [31]. The 1998 Russian financial crisis—which led to an economic downturn in Estonia—exacerbated these inefficiencies [31]. The Hospital Master Plan 1999-2000 was developed in response. The Plan resulted in a further decrease in the number of acute care facilities, with aims of improving cost efficiency [67, 118]. To this end, major health financing legislation was passed in the early 2000s. The Estonian Health Insurance Fund was established in 2000, as an independent public legal body. The Fund was formed by merging the Central Sickness Fund with the remaining 17 regional funds, and received both pooling and purchasing responsibilities [81]. To account for the new Fund, the 2002 Health Insurance Act was introduced, updating several of the health financing regulations delineated in the 1991 Act [106].

Another Act renewed in the early 2000s was the Health Services Organisation Act, updated in 2001. Under the new Act, planning was recentralised to the national level, with funding responsibilities

allocated to different national ministries [106]. Decentralisation was an important feature of early post-Soviet health reform, rooted in the legacy of decentralisation in pre-Soviet Estonia, and as a reaction against the centralised Soviet model; however, by the mid-1990s, the government began to recentralise activities, culminating in the 2001 Act [81, 106, 108]. The Act also included several clauses related to privatisation—a trend prevalent in Estonia’s economic policies from the early 1990s. According to the Act, hospitals were required to incorporate as foundations or joint-stock companies [31, 67]. Further, all health care providers obtained the legal status of private entities operating under private law, to be contracted by the Estonian Health Insurance Fund [81]. As private practitioners, independent GPs became the primary gatekeepers of the health system, as defined by the Act—each responsible for an assigned service area [69, 81]. The Health Care Board was established in 2002 as Estonia’s medical licensing authority. All health professionals were required to register with the Health Care Board, though health worker accreditation was voluntary [107].

After defining the legal status of health professionals, Estonia shifted focus to human resource management. The number of doctors in the country had declined over the previous decade [81]. In 2002, MoSA launched an Advisory Committee on the training of health professionals, aimed at improving human resources for health planning and collaboration [107]. The medical student quota at the University of Tartu was subsequently increased from 70 to 100. Medical and dental training standards, initially set in 1997, were officially approved by the European Commission [81, 119].

Estonia formalised its geopolitical preference for the West in 2004, joining the EU and the North Atlantic Treaty Organisation—with European Commission approval a partial lead-up to this. As a member of the EU, Estonia began to receive considerable financial support towards development. To manage these funds, in 2004, the Estonian government launched the National Development Plan for the Implementation of EU Structural Funds [107]. The Plan included provisions for hospital renovations, in line with the Hospital Network Development Plan—an update to the Hospital Master Plan approved in 2003 [107]. To meet EU and international guidelines, Estonia passed a renewed Medicinal Products Act in 2004, updating pharmaceutical regulations [107]. In 2005, MoSA established the Estonian eHealth Foundation, launching four major eHealth projects, with the support of EU structural funds: electronic health records, digital images, digital registration, and digital prescription [107, 120]. The Foundation also developed the Estonian Health Information System, operational since 2008 [120].

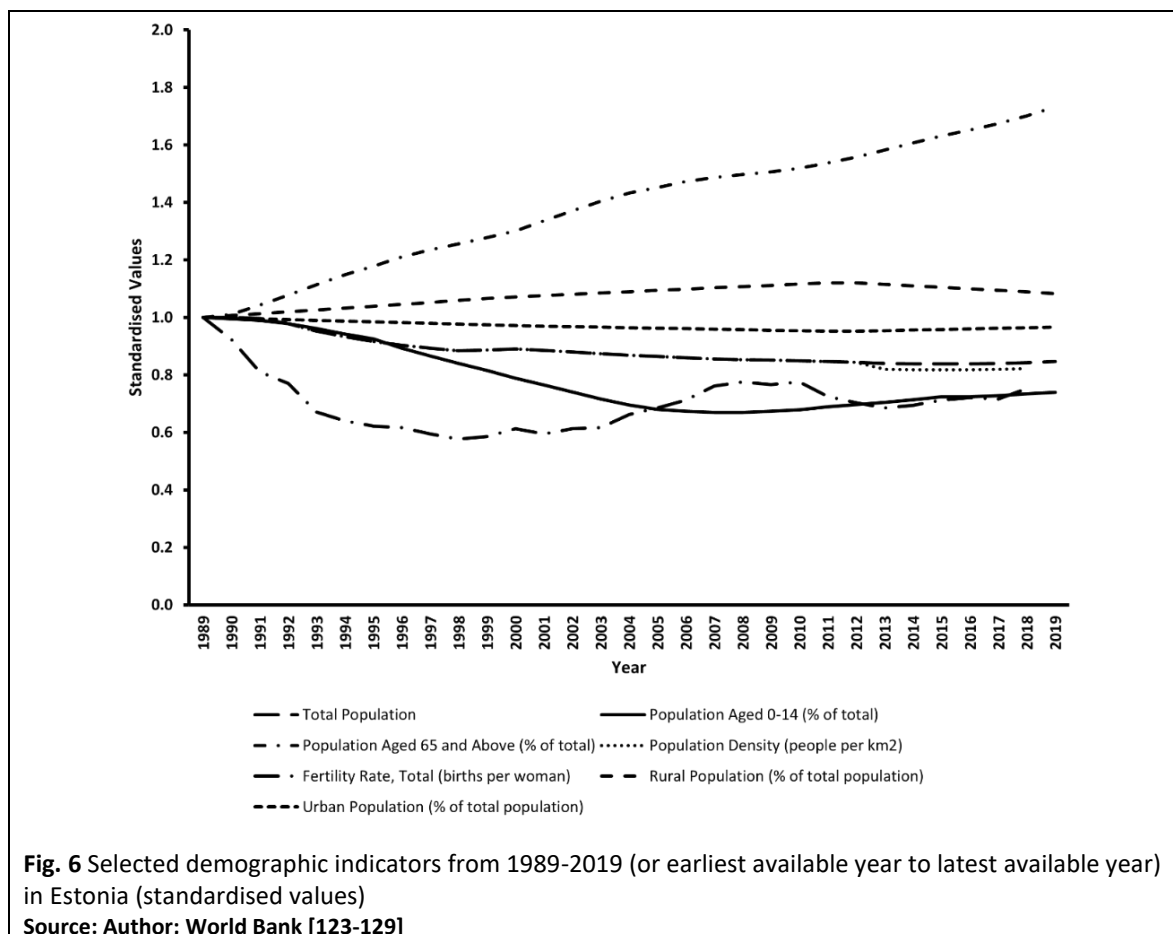
While EU membership had its benefits, it also exacerbated the health worker supply issue. After accession, a substantial number of physicians and other health professionals applied to work in other EU countries [107]. To address this, in 2005, the government’s Human Resources for Health Advisory Committee developed a new health workforce planning model to determine annual admissions quotas [107], with the medical student quota increasing to 140 in 2006 [81, 119].

The new health financing system and revitalised economy faced its first major hurdle in 2007 when the global financial crisis hit. As the country entered an economic recession, wages decreased and unemployment rose—from 3.9% in 2007 to 19.8% in 2010 [70]. The social health insurance system relied exclusively on wage-based contributions for revenue; as such, public funding for health declined [68, 70]. This was somewhat alleviated by the use of Estonian Health Insurance Fund reserve funds, accrued in case of economic downturn [74], but austerity measures still needed to be implemented. The government cut benefits and prices, expanded cost-sharing, and increased tax on medications [70]. Estonia also utilised EU structural funds during the crisis, lessening pressure on

health spending. The government primarily invested these funds in health infrastructure and public health [70].

Estonia joined the Organisation for Economic Cooperation and Development in 2010, and entered the Eurozone in 2011, forgoing its national currency in favour of the euro. Around this time, the economy began to recover, and by 2016, the country attained high-income status, per the World Bank [81]. As the nation emerged from the crisis in 2009, the Estonian Health Insurance Fund, MoSA, and the WHO Regional Office for Europe conducted an analysis of the medium- to long-term sustainability of the country's health financing system, concluding that the public revenue base must be diversified [81]. A structural deficit in the 2013 Estonian Health Insurance Fund budget further emphasised this point [121], as did the country's high rate of catastrophic expenditure relative to other EU states [122].

In 2017, the Estonian government passed a landmark reform to address this gap, broadening the Fund's revenue base to include general tax revenue. The reform, adopted in 2018, introduced state contributions to the Estonian Health Insurance Fund for non-working pensioners, through earmarked budget transfers [121]. The figures that follow show the time series for key demographic (Fig. 6), macroeconomic (Fig. 7), and population health indicators (Fig. 8-10); these were developed by the author, drawing on data collected from online databanks, reports, and government documents.



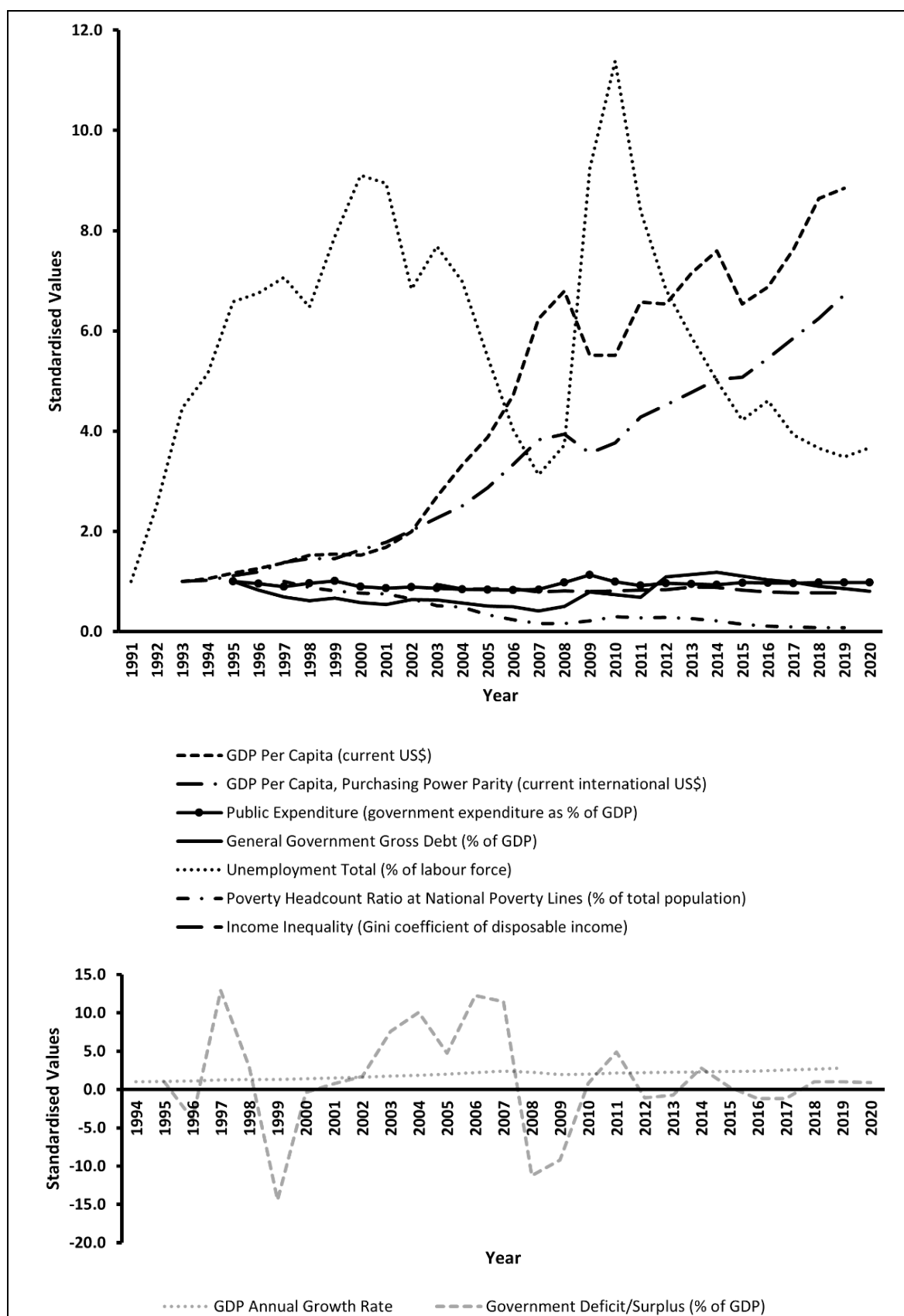
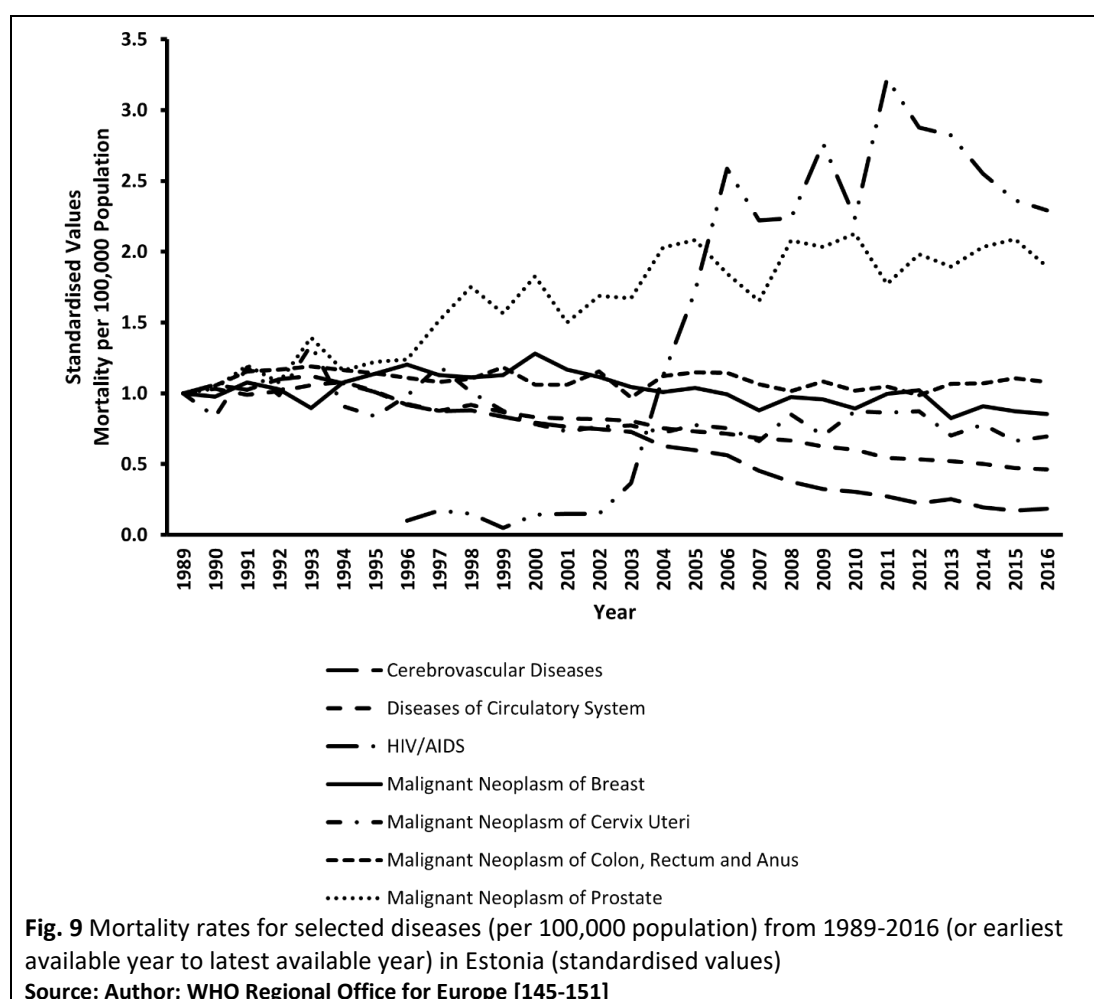
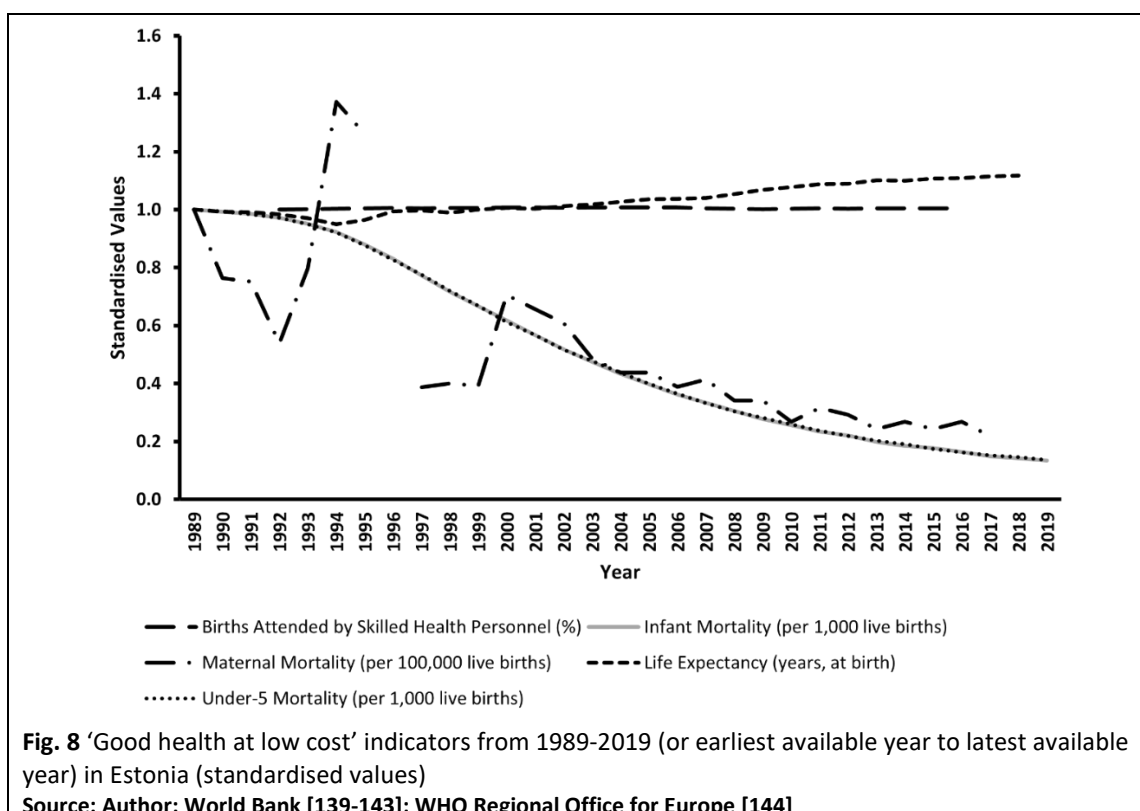
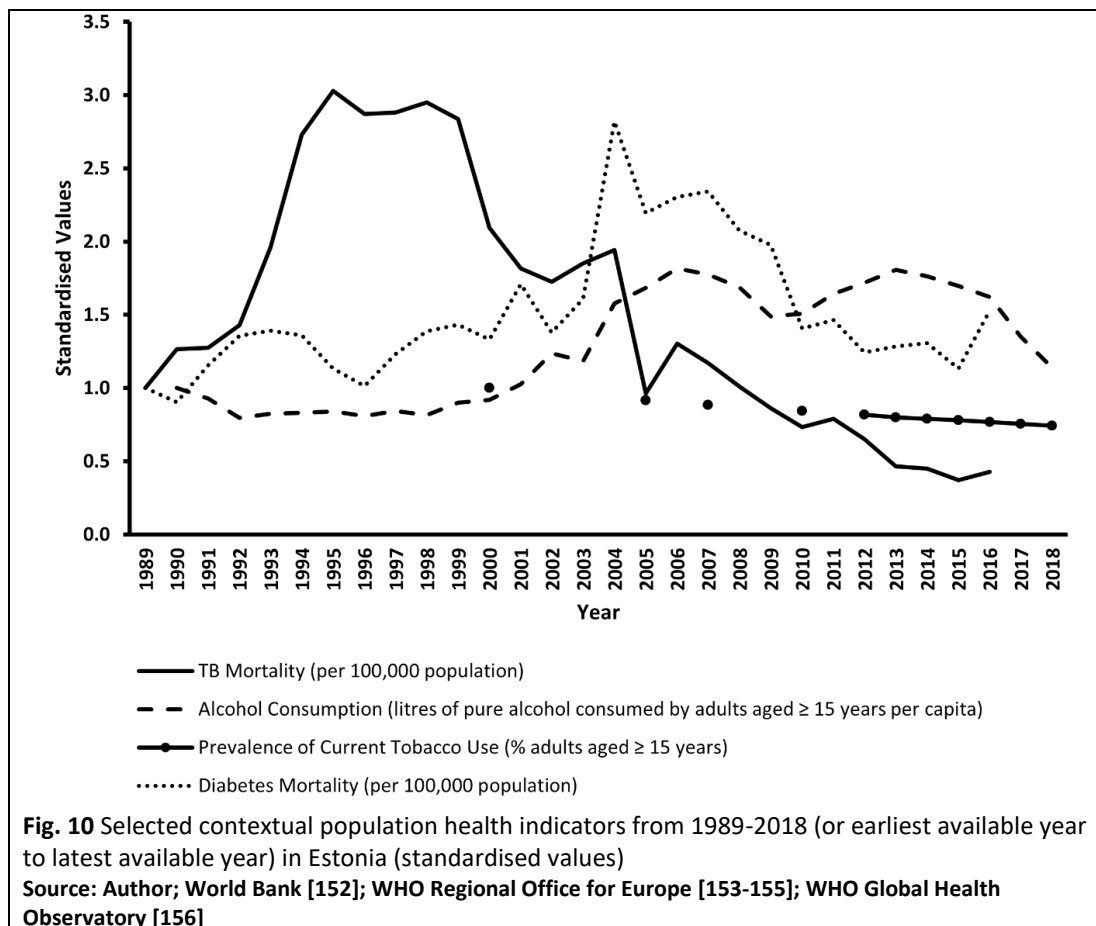


Fig. 7 Selected macroeconomic indicators from 1991-2020 (or earliest available year to latest available year) in Estonia (standardised values)

Source: Author; Habicht et al., 2018 [81]; Our World in Data [130]; Statistics Estonia [131, 132]; World Bank [72, 133-135]; World Bank TCdata360 [136-138]





Moldova

The Soviet Union annexed the Bessarabian region of Romania in 1940. Upon Soviet collapse in 1991, the region became the independent country of Moldova. Shortly after independence, Moldova entered the CIS—a Moscow-oriented conglomerate of post-Soviet states—and in 1992, Moldova joined the UN, signing onto several international treaties [82]. From the outset, Moldova experienced financial struggles, exacerbated by the 1990-1992 Transnistria War [157] and the subsequent “frozen conflict” [158]. To address this, the country instituted an array of economic reforms intended to liberalise and stabilise the market. Towards this aim, the government introduced the Moldova lei as the national currency in 1993, replacing the Russian ruble.

Early economic difficulties limited health system funding, motivating health financing reform [159]. As a first step towards an insurance-based system, Moldova adopted the Law on Health Assistance through Health Insurance in 1992 [111]. This was followed by the 1994 Government Decision on the Organisation of the Health Insurance Experiment, which set up voluntary health insurance funds in four pilot districts [111]. To further alleviate the financial burden, the government engaged in private sector development [111]. By the mid-1990s, private pharmacies and medical consultancies were widespread [111, 114]; though, the expensive, oversized state-owned hospital system underwent minimal reform [114].

Moldova adopted its first constitution in 1994, establishing the country as a parliamentary democracy. The constitution guaranteed the right to health protection and state-funded minimum health insurance—principles inherited from the Soviet model [111, 113]. From 1995 to 2010, the government introduced various pieces of legislation to establish the health system framework, in

line with constitutional objectives (see Table 3 for summary of key legislation). The 1995 Basic Law on Health Care—the first major piece of post-Soviet era health legislation—defined the minimum level of free health care and regulated the organisational structure of the health system [111, 112, 114]. The Law also contained provisions for the privatisation of some specialised and inpatient facilities [114], and established the basis for the family medicine model [160].

PHC reforms began in 1993, when the State University of Medicine introduced family physician training [112]. Through the early 1990s, however, the government maintained a Soviet approach to PHC [111]. Moldova only began to pursue a different strategy from 1995, when the Basic Law went into effect [115, 160]. This was followed by the 1997 Government Decree Regarding the Development of Primary Medical Assistance, which introduced the family medicine specialty and requisite training programmes, budgetary increases, changes to the GP payment mechanism, and patient choice in GP selection [112, 114].

A gradual reform of the public health system accompanied the shift to a family medicine model. From independence, the National Centre of Preventive Medicine held responsibility for public health. Similar to the Soviet san-epid service, the Centre prioritised environmental health and infectious diseases; though from the mid-1990s, the Centre engaged in health promotion and education [111, 114]. The 'Health Lifestyles' centre was established in 1995, launching programmes targeting HIV/AIDS prevention, smoking cessation, and mental health in 1998 [114].

In 1995, Moldova was the first non-Baltic post-Soviet state to join the Council of Europe—an early sign of a tentative reorientation towards the West. The 1998 Russian financial crisis further encouraged this transition, as Moldova suffered severe impacts from its deep economic ties with Russia, including high unemployment rates and a fall in GDP; these delayed the implementation of important reforms [82, 161]. Indeed, the Law on Mandatory Health Insurance—which established a mandatory social health insurance system funded by a combination of payroll contributions, payments from the self-employed, and general tax revenue [112]—was approved in 1998, but could not be implemented until 2004 [82].

Health sector funding constraints worsened in the late 1990s as public expenditure decreased. This triggered a more concentrated reform effort aimed at improving cost efficiency [114]. From 1998, the government instituted hospital rationalisation and restructuring policies, reducing surplus capacity at existing hospitals and closing many rural hospitals [82, 114].

The government passed the Law on the Minimum Package of Free-of-Charge Health Care Guaranteed in 1999. The Law specified the health services benefits package that must be funded by the state. This replaced the blanket coverage inherited from the Soviet model [82, 114]. The new Law defined PHC providers as the main purveyors of basic services [114]. To account for this, the PHC system was reorganised, substituting the previous polyclinic model with four categories of PHC provider, based on area and population size [65, 112]. Further, in 1998, the government and World Bank designed the Health Investment Fund Project. The project redistributed resources from higher levels of care, shoring up the PHC system ahead of the 1999 benefits package law [112].

PHC restructuring was part of a broader reorganisation plan, culminating in the 1999 Law on Local Public Administration. This marked the beginning of system-wide decentralisation. The Law divided Moldova into 11 regional administrative units (10 counties, or judets, and one major city—Chisinau), providing the legal basis for the health regionalisation plan [112, 114]. The plan set up a regional

health administration in each unit, subordinate to the MoH and responsible for managing funds and contracting health services [114]. The 1999 Law on Privatisation further devolved state power, as almost all dental clinics and pharmacies were privatised; though, the state remained a shareholder in some pharmacies [114].

In 2003, parliament approved a new Law on Local Public Administration, which reorganised the country into 32 local districts (rayons), three municipalities, and two autonomous regions—Gagauz-Yeri and Transnistria [112]. In each district, health services were restructured into a single legal entity, headed by the rayon chief doctor [112]. From the 2003 Law, the government assigned increasingly limited responsibility to local authorities, reversing the decentralisation trend [65]. While local autonomy and devolution had appealed to Moldovan officials; in practice, resource constraints made large-scale decentralisation difficult.

Table 3 Key legislation in the development of the post-Soviet Moldovan health system [82, 110-112, 114, 160, 162]

Year	Key Legislation	Description
1995	Basic Law on Health Care	The Law defined the minimum level of free health services the state is required to provide, based on Article 36 of the 1994 Constitution of Moldova [112]. The Law also regulated the organisational structure of the Moldovan health system, allowing for some privatisation [111, 114].
1997	Government Decree No. 1134, Regarding the Development of the Primary Medical Assistance	The Decree introduced the family medicine model, beginning the process of strengthening the PHC system [112, 160]. More specifically, the Decree established the family medicine specialty, the GP payment mechanism, and the principle of patient choice in GP selection [112].
1998	Law on Mandatory Health Insurance	The Law established a system of mandatory social health insurance, funded by a combination of prepaid employer and employee payroll contributions, contributions from the self-employed, and general tax revenue [112]. Although the Law was approved in 1998, an economic downturn caused by the Russian financial crisis delayed implementation to 2004 [82].
1999	Law on the Minimum Package of Free-of-Charge Health Care Guaranteed by the State	The Law established the minimum package of specific health services the state is required to provide free-of-charge to the population, to include PHC and public health services [82, 114].
2001-2002	Government Resolution No. 156, Statute of the National Health Insurance Company	The National Health Insurance Company was created by the Moldovan government as the state institution responsible for central pooling and purchasing functions [82]. The 2002 resolution established 11 territorial branches of the National Health Insurance Company, and defined contracting arrangements between the National Health Insurance Company and providers based on the benefits package under mandatory health insurance [112].
2005	Law on Patients' Rights and Responsibilities	The Law established regulations on patient rights and responsibilities within the health system. The Law outlined the formal complaint process in case of violations [112].
2009	Law on State Surveillance of Public Health	The Law reorganised the public health system from the previous State Sanitary and Epidemiologic Service to the State Surveillance of Public Health Service, headed by the Chief Sanitary Doctor/Deputy Minister of Health [82]. The Law included new functions in the areas of disease prevention, NCD control, and health promotion [82, 162].
2009-2010	Amendments to the Law on Mandatory Health Insurance	Amendments to the Mandatory Health Insurance Law in 2009 and 2010 expanded access to health services. The 2009 Amendment guaranteed fully subsidized health insurance to families living below the poverty line, regardless of employment status [110]. The 2010 Amendments provided universal access to PHC services for Moldovan citizens [110].

Source: Author; Turcanu et al., 2012 [82]; Vian et al., 2015 [110]; Goroshenko et al., 1996 [111]; Atun et al., 2008 [112]; Macleahose et al., 2002 [114]; Bivol et al., 2012 [160]; Rechel, 2018 [162]

From the early 2000s, Moldova began to recover from the economic downturn, and health financing reform was again underway. The government created the National Health Insurance Company in 2001, charged with central pooling and purchasing functions [82]. A 2002 Government Resolution established National Health Insurance Company territorial branches, and outlined contracting arrangements between the Company and health providers [112].

Finally, in 2004, the government implemented the 1998 Law on Mandatory Health Insurance. The National Health Insurance Company was responsible for administering the new system, collecting revenue from payroll tax contributions and government budget transfers. The latter provided coverage for non-employed groups, including pensioners, student, registered disabled, and registered unemployed [163]. Mandatory health insurance did not automatically cover the self-employed, who were expected to purchase into the scheme [163]. With the introduction of mandatory health insurance, all public hospitals converted to state enterprises. The new status gave hospitals increased autonomy and the ability to generate income [112, 114].

Over the mid-2000s, the economy and health system continued to progress. After 10 new countries acceded to the EU in 2004, the EU created the European Neighbourhood Policy—an alternative to further expansion. Moldova signed onto the European Neighbourhood Policy Action Plan later that year, for manifold reasons—to improve bilateral relations, resolve domestic crises, promote economic growth, and reduce poverty, among others [82].

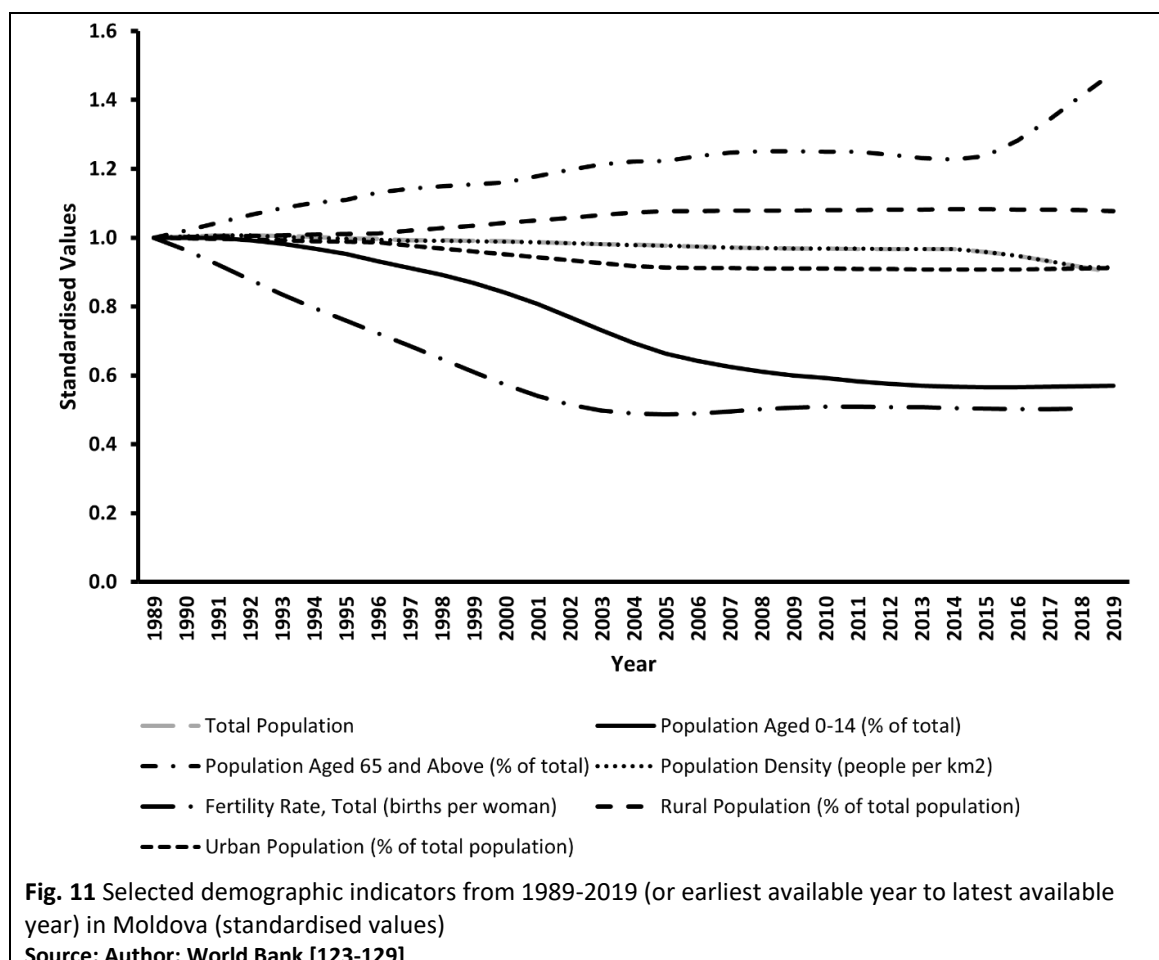
In 2005, parliament approved the Law on Patients' Rights and Responsibilities. This established regulations on patients' rights within the health system, including outlining the formal complaint process in case of violations [112]. The Law on the Exercise of the Medical Profession, also adopted in 2005, required every physician to undergo continuous medical education. This law mandated that practitioners pass an examination every five years, either to confirm a previous qualification or advance towards a new qualification [82, 112]. In 2007, the government created the National Centre for Health Management, which formed part of the public health system. The Centre was allocated responsibility for strategic planning, and the collection and analysis of national health data [57, 114].

The 2007-2008 global financial crisis led to a sudden reduction in health system funding. However, while overall health expenditure decreased, the government managed to minimise the crisis' negative impacts [82]. From 2004, the Moldovan government accumulated reserves through the Reserve Fund. This enabled a 7% increase in budget transfers to the National Health Insurance Company during the crisis, commensurate with the reduced revenues from payroll tax [74, 82]. In 2009 and 2010, the government approved two major amendments to the Law on Mandatory Health Insurance, expanding access to health services. The 2009 amendment provided insurance coverage to families living below the poverty line, irrespective of employment status [110]. The 2010 amendment granted universal access to PHC services, regardless of employment status or income level [110]. Such reforms improved access to health services, but also threatened financial protection, as those interacting with the system met with coverage gaps that required out-of-pocket payments [164].

From the late 2000s, national public health policy began to shift focus from infectious diseases to NCDs. The 2009 Law on State Surveillance of Public Health reorganised the san-epid service to the State Surveillance of Public Health Service and introduced new disease prevention, NCD control, and health promotion functions [82, 162]. In 2012—to bolster these efforts—parliament approved the NCD Prevention and Control Strategy 2012-2020 [115].

Moldova achieved positive GDP growth from 2010 [72]. As occurred in reaction to the 1998 economic downturn, the recession motivated a turn towards cost efficiency [82]. To drive down spending, the MoH began exploring public-private partnership opportunities [112], while amendments to national legislation in 2009 opened the health sector to private investment [82]. In 2010, the government approved the Order on PHC, revising the organisation of primary care. Under the Order, both public and private providers could offer PHC services, divided into basic primary care services and additional medical services [82]. The country also adopted the Programme for the Development of Hospital Health Care for 2010-2012, seeking to increase the efficiency of hospital care [82]. Further, the government approved two strategic documents towards modernising medical education, in line with EU standards and practices [82].

As part of this agenda, Moldova launched its eHealth initiative in 2009, with the introduction of OpenMEDIS—a health technology management system [82]. Shortly after, the MoH and the EU developed MEDEX 2.0—an automated PHC information system—as part of the ‘Support to Health Reform: Strengthening PHC in Moldova’ project; it was implemented later that year [82]. In 2011, the Republican Diagnostic Centre in Chisinau introduced online appointments for consultations; and in 2012, the government announced plans to develop an integrated medical information system for hospitals [82]. Parliament approved the MoH-developed Law on Medical Devices in 2012, creating a health technologies regulatory unit [82]. The subsequent figures illustrate the time series for key demographic (Fig. 11), macroeconomic (Fig. 12), and population health indicators (Fig. 13-15). The figures were developed by the author, using data sourced from online databanks, government documents, and reports.



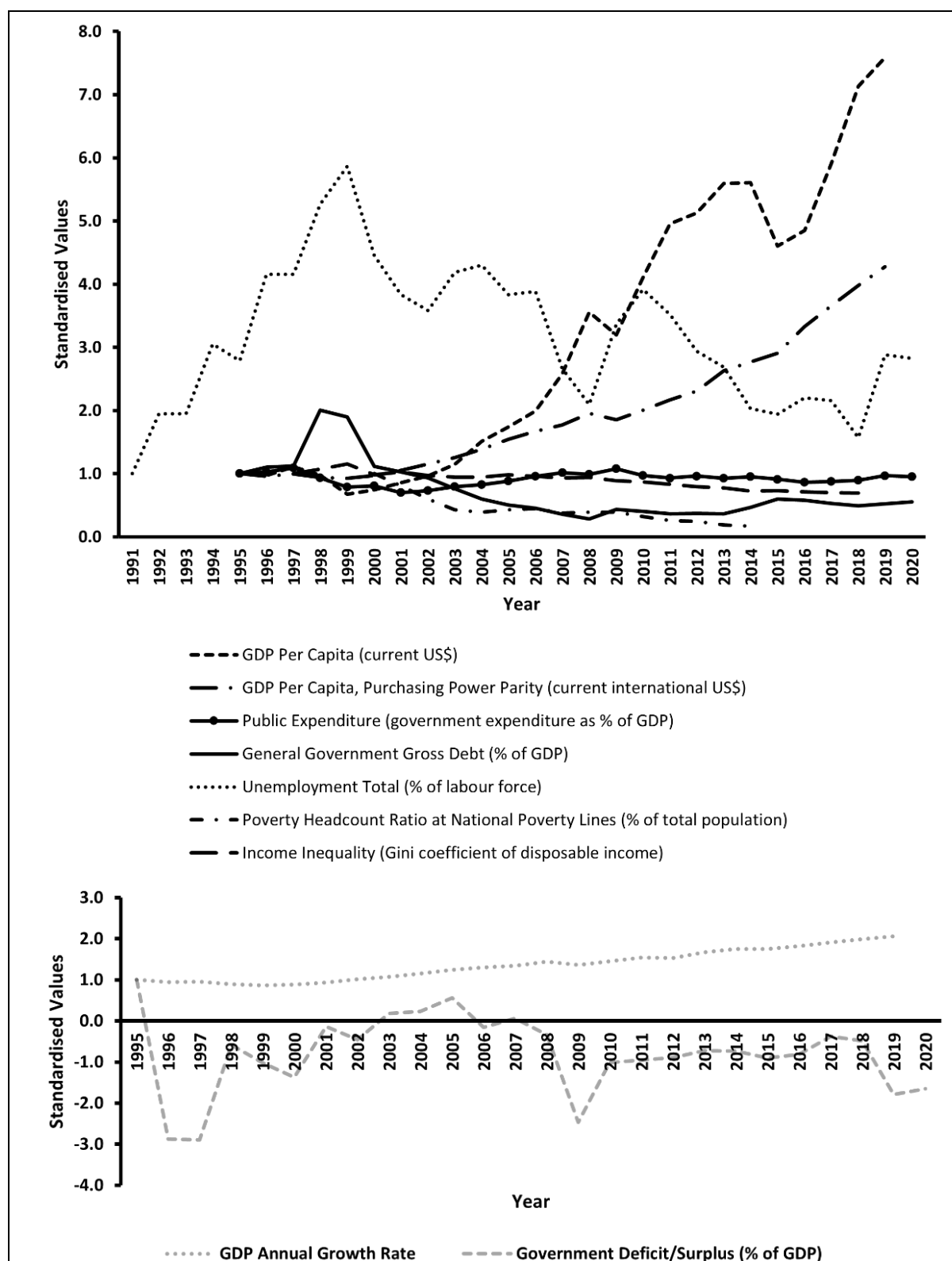


Fig. 12 Selected macroeconomic indicators from 1991-2020 (or earliest available year to latest available year) in Moldova (standardised values)

Source: Author; National Bureau of Statistics of the Republic of Moldova, 2015 [165]; Turcanu et al., 2012 [82]; World Bank [72, 133-135]; World Bank TCdata360 [136-138]

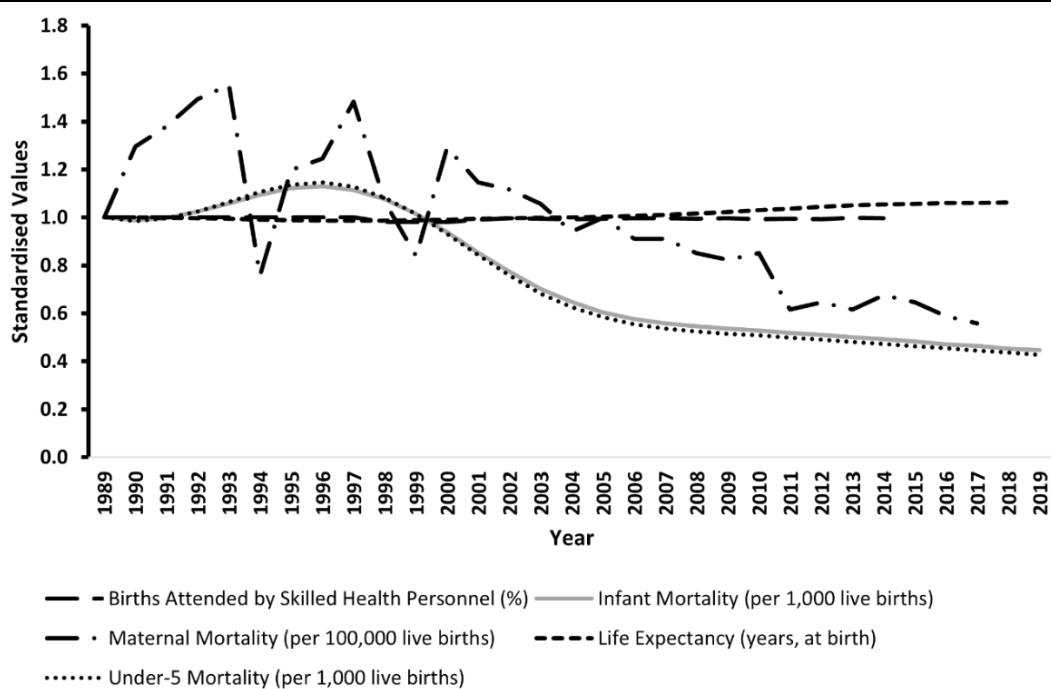


Fig. 13 'Good health at low cost' indicators from 1989-2019 (or earliest available year to latest available year) in Moldova (standardised values)

Source: Author; World Bank [139-143]; WHO Regional Office for Europe [144]

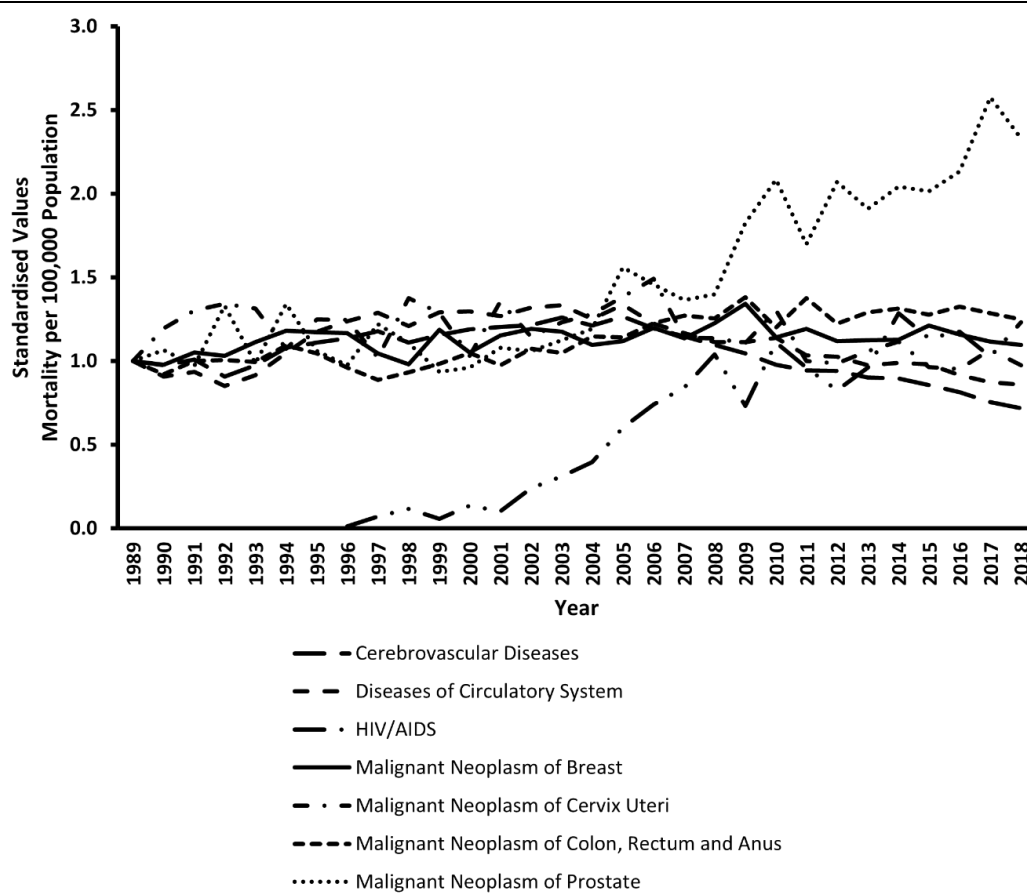
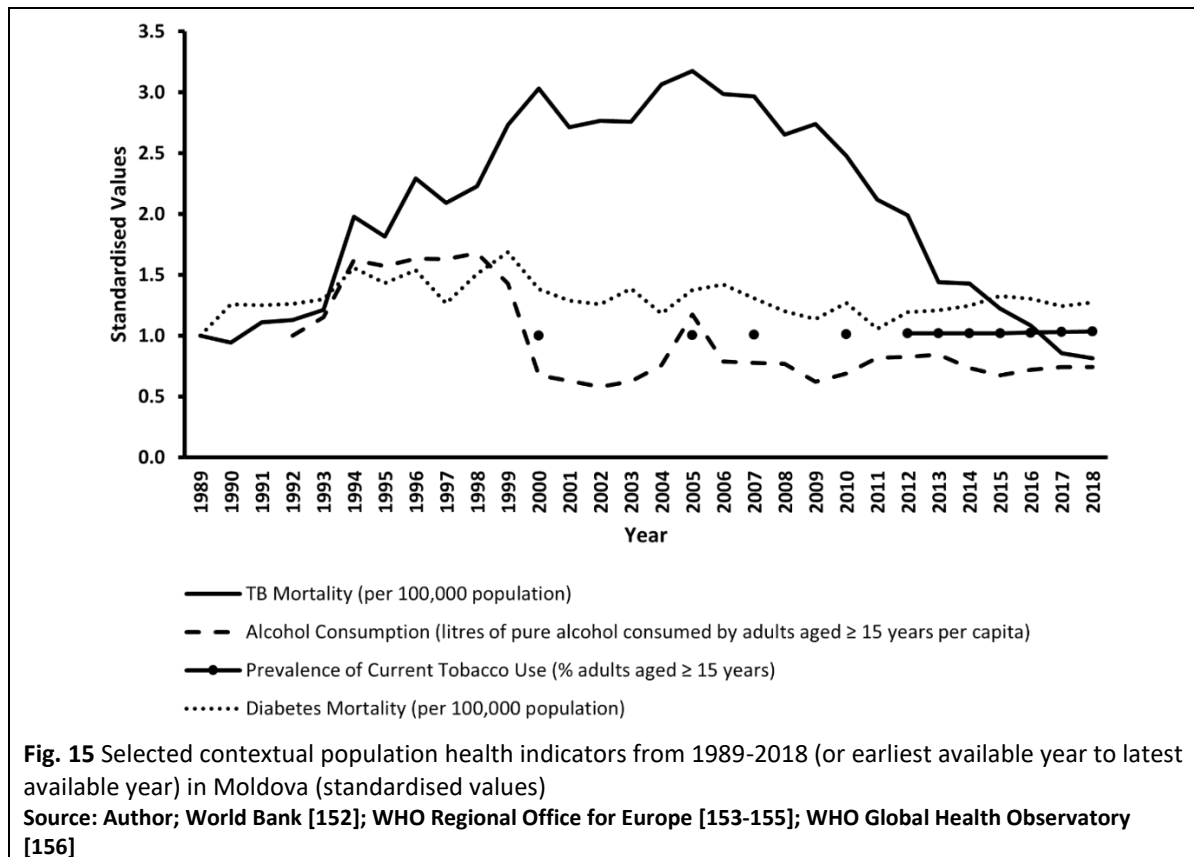


Fig. 14 Mortality rates for selected diseases (per 100,000 population) from 1989-2016 (or earliest available year to latest available year) in Moldova (standardised values)

Source: Author; WHO Regional Office for Europe [145-151]



Cross-case comparison

The Estonian and Moldovan post-Soviet health systems were established on the same principle—the right to health protection. This principle, enshrined in both countries’ constitutions [104, 113], derived from the Soviet health system, which guaranteed universal access to health coverage [31]. Post-Soviet citizenries expected this to continue [26]; however, early post-Soviet era financial constraints limited both governments’ abilities to finance the principle’s implementation [26]. To meet expectations, the two countries established new health system frameworks, adopting major legislation that prioritised improved effectiveness and cost efficiency—albeit on differing timelines. As shown in Table 4, Estonia’s foundational health reforms were implemented in the early to mid-1990s, while Moldova’s were concentrated in the mid-1990s to early-2000s period.

The contrast reflects different political and economic contexts (also represented in Table 4, alongside GDP and life expectancy data). After an initial decline in GDP, both Estonia [81, 117] and Moldova [82] implemented fiscal reforms; however, with disparate results. Indeed, from the outset, the two countries were in very different places economically. Where Moldova’s GDP per capita was \$594 in 1995 (the earliest available year), Estonia’s stood at \$2,682 in 1993—up to \$3,131 by 1995 [72]. Further, Estonia—aligned as it was with the West [117]—benefitted from outside assistance and economic ties with burgeoning Western markets [71]. In contrast, Moldova maintained deep ties to the unstable Russian economy, struggled with economic growth in the 1990s [157], and was particularly hard hit by the 1998 Russian financial crisis [82]. Meanwhile, Estonia was buffered by the distance placed between them and Moscow. As such, Moldova’s reform process stalled until the economy stabilised in the early 2000s, where Estonia’s was actively underway throughout the 1990s.

Table 4 Key legislation and political & economic events in Estonian and Moldovan health system development from 1991-2012

ESTONIA				YEAR	MOLDOVA			
Life Expectancy (years, at birth)	GDP Per Capita (US\$)	Political & Economic Event(s)	Key Legislation		Key Legislation	Political & Economic Event(s)	GDP Per Capita (US\$)	Life Expectancy (years, at birth)
69.4	–	Independence from the Soviet Union Estonia joins UN Estonia adopts a new constitution	Health Insurance Act [§]	1991		Independence from the Soviet Union Moldova joins the CIS	–	67.6
68.9	–	Estonian kroon is reintroduced as national currency, amid radical fiscal strategy		1992		Moldova joins the UN	–	67.4
67.9	2682	Estonia embarks on mass privatisation programme		1993		Moldovan lei introduced as national currency, as part of market liberalisation reforms	–	67.2
66.5	2815		Health Services Organisation Act [#]	1994		Moldova adopts a new constitution	–	67.0
67.5	3131		Public Health Act ^{&}	1995	Basic Law on Health Care [#]	Moldova joins Council of Europe	594	66.9
69.6	3377		Medicinal Products Act [%]	1996			575	66.8
69.8	3678			1997	Government Decree Regarding the Development of Primary Medical Assistance ^{&}		657	66.7
69.4	4088	Russian financial crisis begins		1998	Law on Mandatory Health Insurance [§]	Russian financial crisis begins	579	66.8
70.1	4145	Estonia joins World Trade Organisation		1999	Law on the Minimum Package of Free-of-Charge Health Care Guaranteed by the State [§]		400	66.9
70.4	4076			2000	Law on Privatisation [#]		441	67.0
70.3	4509		Health Services Organisation Act (Renewed) [#]	2001	Government Resolution Statute of the National Health Insurance Company [§]	Moldova joins World Trade Organisation	508	67.2
70.9	5345		Law of Obligations Act [%]					
71.3	7206		Health Insurance Act (Renewed) [§]	2002			571	67.4
71.9	8913	Estonia joins North Atlantic Treaty Organisation		2003			683	67.5
		Estonia joins EU	Medicinal Products Act (Renewed) [%]	2004		Moldova signs onto European Neighbourhood Policy Action Plan	897	67.7
72.6	10406			2005	Law on Patients' Rights and Responsibilities [#]		1035	67.8
72.7	12632			2006			1183	68.0
72.8	16742	Onset of global financial crisis		2007		Onset of global financial crisis	1532	68.3
73.8	18227			2008			2111	68.7
74.8	14795			2009	Law on State Surveillance of Public Health ^{&}		1899	69.1
75.4	14791	Estonia joins the Organisation for Economic Cooperation and Development		2010	Amendments to the Law on Mandatory Health Insurance [§]		2438	69.6
76.2	17622	Estonia joins the Eurozone and adopts EU currency		2011			2942	70.1
76.3	17534			2012	Law on Medical Devices [%]		3046	70.6

Legend

Organisation and Governance[#] Financing[§] Physical and Human Resources[%] Provision of Services[&]

Source: Author; Habicht et al., 2018 [81]; Jesse et al., 2004 [106]; Koppel et al., 2008 [107]; Turcanu et al., 2012 [82]; Vian et al., 2015 [110]; Goroshenko et al., 1996 [111]; Atun et al., 2008 [112]; Macleahose et al., 2002 [114]; Bivol et al., 2012 [160]; Rechel, 2018 [162]; World Bank, 2018 [45]; World Bank, 2019 [72]

In both Estonia and Moldova, post-independence economic difficulties led to an early prioritisation of health financing reform [106, 111]. Both countries transitioned to an insurance-based system, replacing the Soviet general taxation model. Estonia opted for wage-based social health insurance [106, 108], while Moldova instituted mandatory health insurance [82]. Moldova's model relied on both payroll tax contributions and government budget transfers [163]—until recently, a key difference between the Estonian and Moldovan systems. The 2007-2008 global financial crisis led to high unemployment and thus reduced wage-based revenues in both countries. To account for this, Estonia and Moldova both accrued reserve funds in the preceding years [74, 82]; however, Estonia—without a mechanism for government budget transfers—was forced to rely solely on its reserves [74], where Moldova had access to an additional avenue of health sector funding. This prompted Estonia to expand its revenue base in the late 2010s, introducing government budget transfers, similar to Moldova [121].

Pooling and purchasing mechanisms also underwent development, amid fluctuating trends in privatisation, and decentralisation and recentralisation. After several decades of highly centralised Soviet governance, decentralisation was an appealing anti-model [29, 49]; and both countries engaged in the trend, to varying degrees. Estonia embraced the project, readily devolving pooling functions and other health sector responsibilities to regional entities [106]. Moldova, in contrast, was more standoffish, passing vague laws towards enhancing local autonomy [112, 114]—but, all the while, keeping its main health system apparatuses centralised [82]. To the extent that the countries decentralised, both experienced similar challenges, largely the result of resource constraints at the local level [81, 82]. Both countries, in response, moved to recentralise activities—establishing central pooling funds [70, 81] and reallocating responsibilities for health services to the national government [82].

On the other hand, even today, the two countries continue to practice privatisation. While the Estonian and Moldovan health systems are publicly funded, both governments strategically integrated privatised elements, aiming to improve cost efficiency through market-related incentives. Estonia took a more paternalistic approach, designating all health care providers as private entities [81]; Moldova, conversely, framed privatisation as a choice for outpatient providers, though did declare almost all pharmacies and dental clinics private [111, 114]. Further, while Estonia requires hospitals to incorporate under corporate law [67], privatisation is limited in specialised and inpatient care settings in Moldova [114].

Health financing reform was focused on covering health system costs; its central aim was to improve financial protection, while maintaining broad access to high quality health services [28]. The other key facet of post-Soviet health reform involved reducing costs, without deleterious effects on population health [28]. Both countries engaged in significant health system restructuring towards this end. The Soviet health system was hospital-based [49, 53]. As such, both Estonia and Moldova inherited expansive hospital networks with a huge overcapacity of hospital beds, and an underdeveloped PHC system. The existing structure was expensive to maintain, due to both infrastructure requirements and the inherent cost of inpatient versus outpatient care.

To address this, both countries expanded their PHC systems, and concurrently downscaled their sizeable hospital networks. Estonia's transition to a PHC-based system was natural and rapid, facilitated by a pre-Soviet partiality to family medicine [106, 166]. Moldova, lacking this background, took longer to progress to a family medicine model [112, 114, 160], further stymied by economic

instability. This latter fact made a thoughtful approach to hospital downsizing difficult, as the 1998 financial crisis—specifically—forced the closure of several hospitals [82, 114]. Estonia, meanwhile, had the economic leeway to be more deliberate in its decision-making and planning—specially selecting hospitals to remain in-service [67, 118] and repurposing shuttered hospitals into other specialised health facilities [31, 118].

Relatedly, optimal restructuring—involving PHC expansion and hospital sector contraction—was often limited, in both countries, by physical and human resource constraints. From the outset, Estonia and Moldova struggled with dilapidated Soviet-era infrastructure and outdated medical equipment [107, 112]. Both countries were slow to address this and did not engage in broadscale activity in this area until the 2000s. Estonia benefitted from dependable EU structural funds towards this effort, which resulted in considerable improvements [119]; whereas Moldova, such as it lacked EU membership, was forced to rely on more haphazard external financial assistance—such as partnerships on individual projects, and medical equipment donations [82, 112]—making long-term planning challenging and progress slower [82].

On top of health infrastructure deficiencies, Estonia and Moldova faced human resource constraints. One major issue was that of overspecialisation—a remnant of the Soviet era [49, 53, 54]. For both countries, transition to a PHC-based system necessitated a substantial increase in the number of GPs. To support this, the two countries created a family medicine specialty and introduced re-specialisation training for specialists wanting to switch to PHC [81, 109, 112, 114]. However, both countries saw a decline in health worker supply in the 1990s [107, 112]. Estonia contributed to its own problem, reducing the number of admissions in its medical programmes [107]; while, in both Estonia and Moldova, health worker migration played a significant role—an issue exacerbated in Estonia by EU membership [81]. To address this, Estonia increased its admissions quotas for doctors and nurses from the early 2000s [81, 119]. For both countries, higher remuneration packages had some positive effects, but ‘brain drain’ remained an issue [81, 82].

The shift to a PHC-based system required a robust public health structure, to support the more preventive and holistic model of care. The Soviet san-epid service focused on control of infectious diseases [49, 54]; as such, in the post-Soviet era, public health reform targeted the growing burden of NCDs [56]. The two countries took different approaches to this effort, at least initially. Estonia discarded its san-epid service in 1995, creating a new public health structure centred around health promotion and disease prevention, in its stead [81, 107]. Moldova, in contrast, preserved the structure and function of the san-epid service for two decades, post-independence [57, 114], adding substructures to account for NCDs; before following in Estonia’s footsteps in 2009 and reorganising to a new structure focused around NCDs [82, 162]. Over the years, both Estonia [81, 107] and Moldova [112, 114, 162] launched several national public health programmes targeting specific threats—including TB, HIV/AIDS, and alcohol and drug abuse, among others.

The two countries’ population health indicators reflect the extent to which each engaged in HSS. Table 5 shows the initial and final population health indicator values for Estonia and Moldova, along with their associated changes. Estonia improved on almost all metrics, only seeing increases in HIV/AIDS, prostate cancer, and diabetes mortalities, and alcohol consumption rates. Moldova saw a minor decrease in the percentage of births attended by skilled health personnel, and increases in HIV/AIDS, breast cancer, colorectal cancer, prostate cancer, and diabetes mortalities, along with a slight increase in tobacco use.

Table 5 Comparison of population health indicator values in post-Soviet Estonia and Moldova (note: ↑ indicates a positive change, ↓ indicates a negative change)

Indicator		Estonia			Moldova		
		Initial	Final	Change	Initial	Final	Change
Category 1: Good Health at Low Cost	Births Attended by Skilled Health Personnel (%)	99.0 (1992)	99.4 (2016)	+0.4 ↑	100.0 (1991)	99.7 (2014)	-0.3 ↓
	Infant Mortality (per 1,000 live births)	13.9 (1991)	1.9 (2019)	-12 ↑	27.7 (1991)	12.4 (2019)	-15.3 ↑
	Maternal Mortality (per 100,000 live births)	30.9 (1991)	9.0 (2017)	-21.9 ↑	47.0 (1991)	19.0 (2017)	-28.0 ↑
	Life Expectancy (years, at birth)	69.4 (1991)	78.2 (2018)	+8.8 ↑	67.6 (1991)	71.8 (2018)	+4.2 ↑
	Under-5 Mortality (per 1,000 live births)	17.5 (1991)	2.4 (2019)	-15.1 ↑	33.6 (1991)	14.4 (2019)	-19.2 ↑
Category 2: Amenable Mortality	Cerebrovascular Disease Mortality (per 100,000 population)	208.0 (1991)	37.7 (2016)	-170.3 ↑	188.6 (1991)	134.0 (2018)	-54.6 ↑
	Diseases of Circulatory System Mortality (per 100,000 population)	665.4 (1991)	310.5 (2016)	-354.9 ↑	601.5 (1991)	551.7 (2018)	-49.8 ↑
	HIV/AIDS Mortality (per 100,000 population)	0.1 (1996)	3.2 (2016)	+3.1 ↓	0.02 (1996)	2.5 (2018)	+2.48 ↓
	Malignant Neoplasm of Breast Mortality (per 100,000 population)	14.9 (1991)	11.8 (2016)	-3.1 ↑	12.7 (1991)	13.2 (2018)	+0.5 ↓
	Malignant Neoplasm of Cervix Uteri Mortality (per 100,000 population)	10.2 (1991)	6.0 (2016)	-4.2 ↑	9.9 (1991)	7.4 (2018)	-2.5 ↑
	Malignant Neoplasm of Colon, Rectum and Anus Mortality (per 100,000 population)	22.1 (1991)	20.7 (2016)	-1.4 ↑	17.7 (1991)	22.2 (2018)	+4.5 ↓
	Malignant Neoplasm of Prostate Mortality (per 100,000 population)	21.4 (1991)	34.0 (2016)	+12.6 ↓	7.2 (1991)	17.3 (2018)	+10.1 ↓
Category 3: Contextual Factors	TB Mortality (per 100,000 population)	4.4 (1991)	1.5 (2016)	-2.9 ↑	6.6 (1991)	4.8 (2018)	-1.8 ↑
	Alcohol Consumption (litres of pure alcohol consumed by adults aged ≥ 15 years per capita)	9.1 (1991)	11.2 (2018)	+2.1 ↓	10.1 (1992)	7.5 (2018)	-2.6 ↑
	Prevalence of Current Tobacco Use (% adults aged ≥ 15 years)	41.1 (2000)	30.5 (2018)	-10.6 ↑	24.5 (2000)	25.3 (2018)	+0.8 ↓
	Diabetes Mortality (per 100,000 population)	6.3 (1991)	8.4 (2016)	+2.1 ↓	10.6 (1991)	10.7 (2018)	+0.1 ↓

Source: Author; World Bank [139-143, 152]; WHO Regional Office for Europe [144-151, 153-155]; WHO Global Health Observatory [156]

Discussion

Post-Soviet HSD was driven by the collapse of the inherited Soviet model [32]. From the early 1990s, funding and human resource constraints crippled health systems across the FSU [28, 53], with adverse consequences for population health [34, 167]. To improve the situation, some newly independent governments began to transition towards a ‘good health at low cost’ model—preserving the UHC feature of the Soviet health system, while reducing the associated financial burden [26]. Estonia and Moldova are two of those countries; and though they followed similar reform trajectories, their HSD experiences differ in several key areas. Both the similarities and differences offer opportunities for lesson-drawing towards regional HSS as the two countries sought to address the main issues rooted in Soviet health system design, within a post-Soviet context. In summary, these include an expensive UHC arrangement based on general taxation, high out-of-pocket payments and limited financial protection, infrastructure and human resource constraints, a hospital-based system and rudimentary PHC structure, and a public health service designed to prioritise infectious diseases [31, 32].

The Estonian and Moldovan cases represent two development pathways, within the political and economic contexts of the two post-Soviet subregions—the Baltics and the CIS. As outlined previously, the Baltics and the CIS differ on multiple points, including income status, access to external financing and technical assistance, and geopolitical affiliations. Over the past three decades, these differences impacted regional reform efforts in important ways; as the Estonia and Moldova cases demonstrate, either limiting or broadening the scope for HSS. Given these differences, any overlapping trends may be indicative of regional specificities. For future research on the post-Soviet region, this knowledge should help guide analysis.

Post-Soviet citizenries' expectation of UHC is an important regional specificity. It was derived from decades under the Soviet model, which offered universal access to free-of-charge health care [49]. UHC values are present in many post-Soviet constitutions, which enshrine the right to health protection, and post-Soviet health systems developed on this premise [26]. This, as a central framework, is vital to understanding other regional trends. The region suffered an economic collapse in the early 1990s and health system funding declined [28, 53]. To sustain UHC, post-Soviet countries needed to improve both cost efficiency and effectiveness, leading to the initial prioritisation of health financing [53, 62, 63] and PHC reform [65, 66]. Privatisation was another major trend in this area, intended to relieve some of the organisational and financial burden from the state, and increase overall health system funding [29]. However, the Soviet health system was far from perfect; beyond financial constraints, issues emerged from the design itself, including hospital overcapacity [67], high specialisation among physicians [49, 53, 54], and an excessive focus on infectious disease [49, 54]. Such trends continue to affect post-Soviet health systems, and emphasise the most fundamental regional specificity: the region's Soviet history. Just as the expectation for UHC is entrenched, so too are the problems inherent to the Soviet approach to health.

Several decades of Soviet rule gave rise to certain institutions, norms, values, and expectations, establishing a regional culture that outlived the Soviet Union [42, 168]. Within this culture, the shared legacy of the Soviet health system continues to affect the nature and direction of reform efforts, despite different pathways [29, 37]. This highlights the importance of analysing health system cultures, especially within and across regions. The case study also challenges the notion that health systems are necessarily bound by national borders, suggesting that—in some cases—understanding health systems from a regional standpoint may provide insights inaccessible to a national lens.

The study utilises a historical approach to analysis. Per the historical institutionalist frame, this is central to understanding the historically defined scope for post-Soviet HSD—knowledge of which can aid future regional policymaking. According to Nunn, historical events will have permanent effects “if they cause a movement from one equilibrium to another [or if they] affect culture or norms of behaviour” [169]. Thus, following Nunn's definition, post-Soviet health reform is ‘bounded’ by the historical influence of the Soviet era and Soviet health system model. This is not necessarily a negative—as the two cases show (more below), some important reforms were likely more implementable because of this background. Rather, this indicates the value of identifying areas of influence and how these impact post-Soviet HSD; taking advantage of where it leads in the ‘right’ direction, learning how to push back on points of friction, and adapting the model to current political, economic, and social contexts, in line with modern epidemiological needs.

Within the two cases, several areas of influence are evident. First is the expectation of UHC (discussed above)—founded on socialist principles [170] and arguably a positive effect of the Soviet era, which in both countries defined the range of implementable health system frameworks. On this basis, a United States-style health system, for example, dominated by private health insurance and for-profit entities, was unlikely to succeed in these cases, and in the post-Soviet setting in general. Second, in both cases, the countries reverted to a centralised health system design, shortly after decentralising [65, 81, 82]. This suggests that the centralisation inherent to the Soviet model is—to some extent—entrenched, and only a certain degree of decentralisation is feasible (although resource constraints played a role [81, 82, 171]). Third is the orientation towards infectious disease, characterised by the san-epid structure. Estonia traded public health systems early on [81, 107]; however, Moldova opted to preserve the san-epid system and add on NCD-related substructures. This proved unsuccessful, motivating the reorganisation of the public health system [82, 162]. Even so, the focus on infectious disease continues to linger [115], indicating an obvious point of friction. The hospital-centric approach [67] and high labour specialisation [49, 53, 54] are similarly limiting factors. How to push back on these Soviet-imposed ‘bounds’?

The longitudinal view, enabled by historical study, is helpful for identifying successful HSS strategies [16-18]. Applying this lens, the population health indicators—viewed alongside the demographic and macroeconomic data—may be used to generate hypotheses on this issue. For cross-country comparative studies, these policies and trends may be confirmed across cases—particularly valuable in regions with high specificity, such as the post-Soviet region. Referring to Table 5, both countries showed considerable improvement across the ‘good health at low cost’ indicators, with the trivial exception of Moldova’s births attended by skilled health personnel value decreasing from 100.0 to 99.7 [139]. These indicators reflect an inter-reliant series of health system processes. Per Balabanova et al., for example, “effective maternal health care...requires the presence of a skilled birth attendant and access to emergency care in case of complications” [14]. For both countries, indicators did not see consistent improvement until after the new health system frameworks were implemented, suggesting a possible causal link.

The amenable mortality indicators, as more direct measures of health system effectiveness [172], allow for further assessment on this point. Notably, mortality rates for the more lifestyle-related diseases (cerebrovascular and cardiovascular disease) improved in both Estonia and Moldova [173]; again, largely after the post-Soviet health system architecture was established. The major split involves cancer rates, with Estonia experiencing a general decrease in three of the four cancer types (breast, cervical, and colorectal) from around the early 2000s. Moldova, on the other hand, showed steady increases in breast, colorectal, and prostate cancers, with only minor fluctuations over the three-decade period [173]—this despite having a lower proportion of people aged 65 and above (12.0% in 2019, compared to 20.0% in Estonia) [125], with age a risk factor for cancer [174]. The lower cancer rates in Estonia indicate likely superior early detection/screening processes and higher quality specialised care [175, 176], as compared to Moldova. Indeed, Estonia reoriented its public health service around NCDs much earlier than Moldova and launched a National Cancer Strategy in 2007 [81]. The HIV/AIDS figures are somewhat misleading, in that the first cases of the disease did not arise in Estonia and Moldova until 1988 [177] and 1987 [178], respectively; taking some time to spread to a statistically meaningful level, and thus unsurprisingly increasing from the first recorded rate.

The final set of indicators show mixed results. Both countries managed to reduce TB mortality, but were unable to prevent a rise in diabetes mortality. In Estonia, alcohol consumption increased, while tobacco use decreased; in Moldova, the inverse was true. That said, except for tobacco use in Moldova, all negative rates peaked in previous years, since decreasing—just not to pre-independence levels, as yet.

Overall, these results suggest both countries engaged in HSS, Estonia more than Moldova. However, it is difficult to determine how much these improvements are due to health system advances versus general economic growth, in addition to a host of other potential confounding variables (e.g., age, employment status, poverty level, diet, etc.). Health outcomes are shaped by various interacting determinants [14], so attributing an improvement in health outcomes solely to health care is flawed. For instance, in both cases, several of the population health indicators were in general alignment with GDP per capita values; indeed, the 1998 and 2007-2008 financial crises are evident in a number of population health indicator time series graphs. That said, the health system can influence determinants beyond health care, including social, behavioural, and physical environmental [179]. This is particularly true where a health system provides UHC—a framework with multisectoral impacts on population health [180].

Within the health system, ascribing success to specific reforms is even more complex, for two main reasons. First, the effects of some reforms will be more delayed than others, and could trigger impacts (not necessarily negative) that are unintended and/or challenging to track. Second, many of the key reforms adopted in Estonia and Moldova were implemented in waves, building on and/or complementing one another. Thus, singling out a particular reform as the direct cause behind a certain indicator improvement is likely impractical. This relates directly to Bloom's assertion (referred to in the 'Background' section) that change management is more important than specific policies [2]. In both cases, the nature and timing of reforms were strategic, taking into consideration the content and presumed impact of earlier reforms, and the wider socioeconomic context. For example, Moldova suspended the reorganisation of its health financing system until the economy recovered from the 1998 Russian financial crisis [82]. Further, as a relatively late reformer, Moldova could learn from the experiences of early adopters of the post-Soviet model, such as Estonia—with transnational learning, as well as knowledge transfer from international organisations, playing a prominent role in regional policy reform [181, 182]. Overall, historical HSD studies track the entire reform process, allowing for an understanding of change management, amid the design and adoption of specific health reforms.

Conclusion

To support post-Soviet health HSD, it is important to consider both the design of policies, and the management around the implementation and operation of those policies. Here, Estonia and Moldova offer important lessons, illustrating how to move towards HSS within a 'good health at low cost' framework [14]—notably, in a post-Soviet context.

First, political commitment is fundamental to the project. Both Estonia and Moldova implemented largescale structural reforms, transitioning to new health system frameworks [28]. The two countries approached the reorganisation methodically, managing the speed of change as appropriate, in deference to financial and human resource constraints. Throughout the process, strong governance allowed the countries to continue along the development pathway.

Second, the success of health financing reform is dependent on specific policies around revenue collection and pooling mechanisms. Estonia and Moldova both implemented social health insurance systems; however, Estonia's was solely wage-based, initially [106, 108], where Moldova depended on payroll tax contributions and government budget transfers [163]. The late 2000s financial crisis demonstrated the importance of a diverse revenue base like Moldova's, as unemployment in Estonia soared and wage-based contributions, consequently, declined [68, 70]. To allay this, Estonia changed its policy in 2017, introducing government budget transfers to cover specific groups [121]. With regards to pooling, centralised pooling mechanisms appear more effective. Estonia started out with separate regional sickness funds; however, inequalities between funds led to the development of a single pooling entity—the Estonian Health Insurance Fund [70, 81]. Moldova instituted a single centralised pool—the National Health Insurance Company—and is yet to transition away from this model [82].

Third, privatisation is a useful approach to reducing public spending and enhancing autonomy, but it should be applied in considered moderation. The Estonian and Moldovan health systems remain publicly funded, though both integrated some privatised elements. The two countries' pharmaceutical sectors are largely privatised, as well as their dental clinics [81, 114]. In Estonia, hospitals are required to incorporate under company law [67], while some hospitals in Moldova offer private health services [112]. Further, in Estonia, all health providers operate as private entities [81], where over half of all outpatient providers are private in Moldova [115]. Yet, countries should be mindful around privatisation—especially if there are no or minimal quality assurance mechanisms [29]—and seek to explore public-private partnership opportunities where possible [183, 184]. Mass privatisation could threaten service quality and financial risk protection. The latter is a particular concern, given the persistent issue of informal payments, and out-of-pocket payment, more broadly [29, 64].

Fourth, a holistic strategy that balances hospital, PHC, and public health reform is central to the restructuring of service provision. Estonia and Moldova transitioned away from the expensive and outdated Soviet hospital-based system. To do this, both countries closed numerous hospitals, while concurrently expanding PHC, and implementing NCD coverage on the public health side—Estonia more than Moldova. The integrated approach maintained, or even improved, quality of and access to health services, while shifting to a more preventive, family medicine-oriented health system better suited to addressing chronic conditions. Specific policies stand out within this process. For example, Estonia converted excess hospital infrastructure to nursing homes and long-term care facilities [31, 118]. Further, Estonia applied strategic thinking to decisions around which hospitals to close down, ensuring that every citizen was within reasonable distance from a hospital, and issuing strict licensing requirements relating to quality of care [67].

Both Estonia and Moldova engaged in PHC strengthening towards a family medicine model, establishing family medicine and re-specialisation education programmes, and assigning PHC providers gatekeeping responsibilities [81, 82]. Finally, Estonia reorganised its san-epid service early on, to reflect the epidemiological transition to NCDs [81, 107]; where Moldova initially preserved its san-epid structure, adding NCD-related substructures before reorganising the service in 2009 [82, 162]. Reorganisation appears to be the superior approach. The san-epid service was designed around infectious disease [49, 54]; and, as such, it is difficult to address NCDs within the same structure (as addressed in the 'Discussion' section).

Fifthly, post-Soviet governments should attempt to engage external actors, and take advantage of financial and technical assistance. This is particularly true in the area of health infrastructure development. Soviet infrastructure is largely dilapidated, and a combined lack of medical equipment threatens access to and quality of health services. Estonia and Moldova worked with the EU, World Bank, and other organisations to expand and improve their physical resources [82, 107, 112, 119], though Moldova continues to struggle in this area [82, 112].

Lastly, policies around health worker supply are important to address. Without health workers, the health system framework, however well-designed, is difficult to support [185]. In Estonia, increasing the admissions quotas for doctors and nurses held a positive effect [81, 119]. The remuneration package is also an important tool, particularly in mitigating health worker migration; however, the development of such policies should involve the relevant stakeholders [81].

The FSU is one of the least-studied geographic regions in health policy and systems research [25]. Given the persistent East-West population health gap [39], and the pervasive health system issues in most post-Soviet countries [32], more research on the region should be conducted, towards supporting health policymaking and HSD. Notably, the broader, more macro-level approach of this study resulted in some methodological gaps, including a more descriptive than analytical focus, a lack of primary data, and a limited discussion around key actors and their roles in the reform processes. That said, the study—as an initial institutionalist overview of post-Soviet HSD—is an important initial step in understanding the drivers of HSS in the FSU, setting up more in-depth research on the topic. Follow-up studies may take a number of forms.

The quantitative data collected in this study formed the basis of various hypotheses, but at times was difficult to integrate into the analysis due to complexities around correlation and causation. On this basis, historical and longitudinal studies aimed at impact assessment of particular health policies and development trajectories are likely to prove useful. Further, historical work that more closely considers the roles and ideas of key health system decision-makers and relevant actors would better elucidate policy processes—this would probably necessitate primary data collection, including in local languages.

Beyond this, more historical studies comparing different sets of countries should be performed, using a similar or improved framework. McKee describes the FSU, particularly over the transition period, as a “massive natural experiment with enormous implications for health” [60], with research in the area benefitting from “clear temporal and spatial boundaries” and a veritable menu of comparator countries [29]. Such studies would test whether the overlapping trends and possible boundaries identified in this article correspond to other post-Soviet experiences, as is hypothesised. Lessons derived from this initial study can be further assessed, expanding the evidence base towards post-Soviet HSS. Finally, the centrality of health financing and PHC reforms to UHC, in a post-Soviet setting, suggests regional research should focus on these areas. Health financing and PHC strengthening can aid those post-Soviet countries struggling in their reform efforts, motivating a more efficient transition to an effective post-Soviet health system.

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PART C: APPENDICES

Appendix A

Example of Documented Data Collection Process

Life expectancy at birth, total (years)

Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

ID: [SP.DYN.LE00.IN](#) 

Source: (1) United Nations Population Division. World Population Prospects: 2019 Revision, or derived from male and female life expectancy at birth from sources such as: (2) Census reports and other statistical publications from national statistical offices, (3) Eurostat: Demographic Statistics, (4) United Nations Statistical Division. Population and Vital Statistics Reprot (various years), (5) U.S. Census Bureau: International Database, and (6) Secretariat of the Pacific Community: Statistics and Demography Programme.

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Aggregation Method: Weighted average

Development Relevance: Mortality rates for different age groups (infants, children, and adults) and overall mortality indicators (life expectancy at birth or survival to a given age) are important indicators of health status in a country. Because data on the incidence and prevalence of diseases are frequently unavailable, mortality rates are often used to identify vulnerable populations. And they are among the indicators most frequently used to compare socioeconomic development across countries.

Limitations and Exceptions: Annual data series from United Nations Population Division's World Population Prospects are interpolated data from 5-year period data. Therefore they may not reflect real events as much as observed data.

Long Definition: Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

Periodicity: Annual

Statistical Concept and Methodology: Life expectancy at birth used here is the average number of years a newborn is expected to live if mortality patterns at the time of its birth remain constant in the future. It reflects the overall mortality level of a population, and summarizes the mortality pattern that prevails across all age groups in a given year. It is calculated in a period life table which provides a snapshot of a population's mortality pattern at a given time. It therefore does not reflect the mortality pattern that a person actually experiences during his/her life, which can be calculated in a cohort life table. High mortality in young age groups significantly lowers the life expectancy at birth. But if a person survives his/her childhood of high mortality, he/she may live much longer. For example, in a population with a life expectancy at birth of 50, there may be few people dying at age 50. The life expectancy at birth may be low due to the high childhood mortality so that once a person survives his/her childhood, he/she may live much longer than 50 years.

Appendix B

Data Extraction Forms

Phase 2a:

GDP Per Capita (Current US\$)

YEAR	COUNTRY/REGION																	
	POST-SOVIET COUNTRY															REGION		
	Armenia	Azerbaijan	Belarus	Estonia	Georgia	Kazakhstan	Kyrgyzstan	Latvia	Lithuania	Moldova	Russia	Tajikistan	Turkmenistan	Ukraine	Uzbekistan	Baltics	CIS	EU
1991																		
1992																		
1993																		
1994																		
1995																		
1996																		
1997																		
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2014																		
2015																		
2016																		
2017																		
2018																		
2019																		
2020																		
2021																		

Phase 2b:*Demographic*

YEAR	INDICATOR							
	Total Population	Population Aged 0-14 (% of total)	Population Aged 65 and Above (% of total)	Population Density (people per km ²)	Population Growth (average annual growth rate)	Fertility Rate, Total (births per woman)	Rural Population (% of total population)	Urban Population (% of total population)
1991								
1992								
1993								
1994								
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2018								
2019								
2020								
2021								

Macroeconomic

YEAR	INDICATOR								
	GDP Per Capita (current US\$)	GDP Per Capita, Purchasing Power Parity (current international US\$)	GDP Annual Growth Rate	Public Expenditure (government expenditure as % of GDP)	Government Deficit/Surplus (% of GDP)	General Government Gross Debt (% of GDP)	Unemployment Total (% of labour force)	Poverty Rate (people at risk of poverty or social exclusion as % total population)	Income Inequality (Gini coefficient of disposable income)
1991									
1992									
1993									
1994									
1995									
1996									
1997									
1998									
1999									
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2016									
2017									
2018									
2019									
2020									
2021									

Population Health

Category 1: GHLC

YEAR	INDICATOR				
	Births Attended by Skilled Health Personnel (%)	Infant Mortality (per 1,000 live births)	Maternal Mortality (per 100,000 live births)	Life Expectancy (years, at birth)	Under-5 Mortality (per 1,000 live births)
1991					
1992					
1993					
1994					
1995					
1996					
1997					
1998					
1999					
2000					
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2014					
2015					
2016					
2017					
2018					
2019					
2020					
2021					

Category 2: Amenable Mortality

YEAR	INDICATOR (Mortality Per 100,000 Population)						
	Cerebrovascular Diseases	Diseases of Circulatory System	HIV/AIDS	Malignant Neoplasm of Breast	Malignant Neoplasm of Cervix Uteri	Malignant Neoplasm of Colon, Rectum and Anus	Malignant Neoplasm of Prostate
1991							
1992							
1993							
1994							
1995							
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003							
2004							
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2012							
2013							
2014							
2015							
2016							
2017							
2018							
2019							
2020							
2021							

Category 3: Contextual Factors

YEAR	INDICATOR			
	TB Mortality (per 100,000 population)	Alcohol Consumption (litres of pure alcohol consumed by adults aged ≥ 15 years per capita)	Prevalence of Current Tobacco Use (% of adults aged ≥ 15 years)	Diabetes Mortality (per 100,000 population)
1991				
1992				
1993				
1994				
1995				
1996				
1997				
1998				
1999				
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2002				
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2013				
2014				
2015				
2016				
2017				
2018				
2019				
2020				
2021				

Appendix C
Phase 2a: Quantitative Data

GDP per Capita (Current US\$)

YEAR	POST-SOVIET COUNTRY															REGION		
	Armenia	Azerbaijan	Belarus	Estonia	Georgia	Kazakhstan	Kyrgyzstan	Latvia	Lithuania	Moldova	Russia	Tajikistan	Turkmenistan	Ukraine	Uzbekistan	Baltics	CIS	EU
1990	638	1237	2125	–	1615	1647	609	–	–	–	3493	498	866	1570	651	3075	1347	15459
1991	590	1209	1766	–	1315	1512	576	–	–	–	3490	469	847	1490	653	2922	1246	15964
1992	370	676	1668	–	757	1515	513	–	–	–	3099	347	821	1418	603	1933	1006	17497
1993	357	530	1590	2682	550	1433	449	–	–	–	2931	294	793	1258	597	1909	929	15924
1994	401	436	1460	2815	520	1320	372	–	–	–	2662	268	622	1012	576	2150	836	16829
1995	456	397	1371	3131	578	1288	364	2322	2169	594	2666	214	590	936	586	2541	837	19464
1996	504	409	1452	3377	689	1350	395	2422	2328	575	2644	178	555	873	601	2709	852	19750
1997	523	506	1397	3678	807	1446	376	2675	2831	657	2738	155	563	991	623	3061	898	18087
1998	609	562	1512	4088	852	1469	345	2965	3167	579	1835	219	590	835	623	3406	836	18614
1999	597	574	1211	4145	674	1130	258	3145	3114	400	1331	178	549	636	702	3468	687	18476
2000	623	655	1276	4076	750	1229	280	3351	3297	441	1772	138	643	636	558	3575	750	16909
2001	694	704	1244	4509	802	1491	308	3566	3530	508	2100	171	774	780	457	3868	836	17184
2002	783	763	1479	5345	854	1658	322	4125	4147	571	2378	190	968	879	383	4539	936	18681
2003	930	884	1820	7206	1010	2068	381	5128	5506	683	2975	238	1284	1048	396	5946	1143	22921
2004	1192	1045	2379	8913	1305	2874	433	6343	6707	897	4102	312	1454	1366	465	7321	1485	26262
2005	1644	1578	3126	10406	1643	3771	477	7553	7863	1035	5323	341	1704	1827	547	8607	1918	27331
2006	2158	2473	3847	12632	1996	5292	543	9663	9241	1183	6920	409	2136	2301	654	10512	2493	29069
2007	3139	3851	4736	16742	2635	6771	722	14042	12298	1532	9101	527	2600	3066	830	14361	3293	33550
2008	4011	5575	6377	18227	3325	8514	966	16377	14962	2111	11635	716	3904	3887	1082	16522	4342	36912
2009	2994	4950	5351	14795	2823	7165	871	12257	11837	1899	8563	676	4036	2543	1213	12963	3590	33360
2010	3218	5843	6029	14791	3233	9070	880	11348	11957	2438	10675	750	4439	2965	1634	12699	4265	32932
2011	3526	7190	6519	17622	4022	11634	1124	13832	14354	2942	14311	847	5650	3570	1926	15269	5272	35716
2012	3682	7496	6940	17534	4422	12387	1178	13851	14339	3046	15421	969	6675	3855	2137	15241	5684	33159
2013	3838	7876	7979	19174	4624	13891	1282	15041	15702	3322	15975	1048	7304	4030	2281	16639	6121	34564
2014	3986	7891	8319	20367	4739	12807	1280	15740	16548	3329	14096	1104	7962	3105	2492	17552	5926	35243
2015	3607	5500	5949	17522	4014	10511	1121	13699	14249	2732	9313	929	6433	2125	2615	15157	4571	30474
2016	3592	3881	5023	18237	4062	7715	1121	14153	14999	2880	8705	803	6390	2188	2568	15797	4077	31163
2017	3915	4147	5762	20388	4357	9248	1243	15587	16883	3510	10720	806	6587	2641	1827	17619	4563	33030
2018	4220	4740	6330	23258	4723	9813	1308	17805	19081	4234	11371	827	6967	3097	1529	20048	4930	35660
2019	4623	4794	6663	23660	4769	9731	1309	17836	19455	4499	11585	871	–	3659	1725	20317	4930	34843

Appendix D
Phase 2b: Quantitative Data – Estonia

Demographic

YEAR	INDICATOR							
	Total Population	Population Aged 0-14 (% of total)	Population Aged 65 and Above (% of total)	Population Density (people per km ²)	Population Growth (average annual growth rate)	Fertility Rate, Total (births per woman)	Rural Population (% of total population)	Urban Population (% of total population)
1989	1568131	22.3	11.5	37.0	0.4	2.2	28.6	71.4
1990	1569174	22.2	11.7	37.0	0.1	2.1	28.8	71.2
1991	1561314	22.1	12.0	36.8	-0.5	1.8	29.0	71.0
1992	1533091	21.8	12.4	36.2	-1.8	1.7	29.1	70.9
1993	1494128	21.4	12.9	35.2	-2.6	1.5	29.3	70.7
1994	1462514	21.0	13.3	34.5	-2.1	1.4	29.5	70.5
1995	1436634	20.6	13.6	33.9	-1.8	1.4	29.7	70.3
1996	1415594	19.9	14.0	33.4	-1.5	1.4	29.9	70.1
1997	1399535	19.3	14.3	33.0	-1.1	1.3	30.1	69.9
1998	1386156	18.7	14.5	32.7	-1.0	1.3	30.3	69.7
1999	1390244	18.2	14.7	32.8	0.3	1.3	30.5	69.5
2000	1396985	17.6	15.0	33.0	0.5	1.4	30.6	69.4
2001	1388115	17.0	15.4	32.7	-0.6	1.3	30.8	69.2
2002	1379350	16.5	15.8	32.5	-0.6	1.4	30.9	69.1
2003	1370720	16.0	16.2	32.3	-0.6	1.4	31.0	69.0
2004	1362550	15.5	16.5	32.1	-0.6	1.5	31.1	68.9
2005	1354775	15.2	16.8	32.0	-0.6	1.5	31.3	68.7
2006	1346810	15.0	17.0	31.8	-0.6	1.6	31.4	68.6
2007	1340680	14.9	17.2	31.6	-0.5	1.7	31.5	68.5
2008	1337090	14.9	17.3	31.5	-0.3	1.7	31.6	68.4
2009	1334515	15.0	17.4	31.5	-0.2	1.7	31.8	68.2
2010	1331475	15.1	17.5	31.4	-0.2	1.7	31.9	68.1
2011	1327439	15.3	17.7	31.3	-0.3	1.6	32.0	68.0
2012	1322696	15.5	18.0	31.2	-0.4	1.6	32.0	68.0
2013	1317997	15.7	18.3	30.3	-0.4	1.5	31.9	68.1
2014	1314545	15.9	18.5	30.2	-0.3	1.5	31.7	68.3
2015	1315407	16.1	18.8	30.3	0.1	1.6	31.6	68.4
2016	1315790	16.1	19.1	30.3	0.0	1.6	31.4	68.6
2017	1317384	16.2	19.3	30.3	0.1	1.6	31.3	68.7
2018	1321977	16.4	19.6	30.4	0.3	1.7	31.1	68.9
2019	1326590	16.5	20.0	–	0.3	–	30.9	69.1

Macroeconomic

YEAR	INDICATOR								
	GDP Per Capita (current US\$)	GDP Per Capita, Purchasing Power Parity (current international US\$)	GDP Annual Growth Rate	Public Expenditure (government expenditure as % of GDP)	Government Deficit/Surplus (% of GDP)	General Government Gross Debt (% of GDP)	Unemployment Total (% of labour force)	Poverty Rate (people at risk of poverty or social exclusion as % total population)	Income Inequality (Gini coefficient of disposable income)
1991	–	–	–	–	–	–	1.5	–	–
1992	–	–	–	–	–	–	3.7	–	–
1993	2682	5794	–	–	–	–	6.5	–	39.5
1994	2815	5947	-1.6	–	–	–	7.6	–	–
1995	3131	6460	4.5	40.7	-0.2	8.9	9.7	–	30.1
1996	3377	6871	4.9	39.0	-0.9	7.4	9.9	–	–
1997	3678	7966	13.0	36.4	3.1	6.1	10.4	29.7	–
1998	4088	8438	4.3	39.3	0.7	5.5	9.5	26.2	–
1999	4145	8420	-0.4	40.9	-3.4	6.0	11.6	24.0	–
2000	4076	9437	10.1	36.4	-0.1	5.1	13.4	22.8	37.0
2001	4509	10326	6.0	35.0	0.2	4.8	13.1	22.2	–
2002	5345	11670	6.8	36.1	0.4	5.7	10.0	19.3	–
2003	7206	13123	7.6	35.2	1.8	5.6	11.3	15.3	37.2
2004	8913	14521	6.8	34.3	2.4	5.1	10.2	14.3	33.6
2005	10406	16625	9.5	34.0	1.1	4.5	8.0	9.8	33.4
2006	12632	19310	9.7	33.6	2.9	4.4	5.9	7.0	33.7
2007	16742	22169	7.6	34.1	2.7	3.7	4.6	4.8	31.2
2008	18227	22830	-5.1	39.7	-2.7	4.5	5.5	4.7	31.9
2009	14795	20614	-14.4	46.1	-2.2	7.0	13.5	6.3	31.4
2010	14791	21809	2.7	40.5	0.2	6.6	16.7	8.7	32.0
2011	17622	24777	7.4	37.4	1.2	6.1	12.3	8.1	32.5
2012	17534	26191	3.1	39.3	-0.3	9.7	10.0	8.4	32.9
2013	19174	27643	1.3	38.5	-0.2	10.2	8.6	7.6	35.1
2014	20367	29136	3.0	37.9	0.7	10.5	7.4	6.3	34.6
2015	17522	29397	1.8	39.6	0.1	9.9	6.2	4.3	32.7
2016	18437	31574	3.2	39.5	-0.3	9.2	6.8	3.2	31.2
2017	20458	33937	5.5	39.2	-0.3	8.7	5.8	2.7	30.4
2018	23171	36221	4.4	39.8	0.2	8.1	5.4	2.2	30.5
2019	23723	38915	5.0	39.9	0.2	7.6	5.1	2.3	30.5
2020	–	–	–	39.9	0.2	7.2	5.4	–	–

Population Health

Category 1: GHLC

YEAR	INDICATOR				
	Births Attended by Skilled Health Personnel (%)	Infant Mortality (per 1,000 live births)	Maternal Mortality (per 100,000 live births)	Life Expectancy (years, at birth)	Under-5 Mortality (per 1,000 live births)
1989	99.0	14.1	41.1	70.0	17.8
1990	–	14.0	31.4	69.5	17.7
1991	–	13.9	30.9	69.4	17.5
1992	99.0	13.7	22.2	68.9	17.3
1993	99.1	13.4	32.8	67.9	16.9
1994	99.3	13.0	56.4	66.5	16.4
1995	99.5	12.4	51.8	67.5	15.6
1996	99.6	11.7	0.0	69.6	14.7
1997	99.5	10.9	15.9	69.8	13.8
1998	99.6	10.1	16.4	69.4	12.8
1999	99.6	9.4	16.1	70.1	11.9
2000	99.7	8.7	29.0	70.4	10.9
2001	99.7	8.0	27.0	70.3	10.1
2002	99.6	7.3	25.0	70.9	9.2
2003	99.7	6.7	20.0	71.3	8.5
2004	99.8	6.1	18.0	71.9	7.8
2005	99.8	5.6	18.0	72.6	7.1
2006	99.8	5.1	16.0	72.7	6.5
2007	99.4	4.7	17.0	72.8	5.9
2008	99.3	4.3	14.0	73.8	5.4
2009	99.2	3.9	14.0	74.8	5.0
2010	99.3	3.6	11.0	75.4	4.6
2011	99.4	3.3	13.0	76.2	4.2
2012	99.3	3.1	12.0	76.3	3.9
2013	99.4	2.8	10.0	77.1	3.6
2014	99.4	2.6	11.0	77.0	3.4
2015	99.5	2.5	10.0	77.6	3.1
2016	99.4	2.3	11.0	77.6	2.9
2017	–	2.1	9.0	78.1	2.7
2018	–	2.0	–	78.2	2.6
2019	–	1.9	–	–	2.4

Category 2: Amenable Mortality

YEAR	INDICATOR (Mortality Per 100,000 Population)						
	Cerebrovascular Diseases	Diseases of Circulatory System	HIV/AIDS	Malignant Neoplasm of Breast	Malignant Neoplasm of Cervix Uteri	Malignant Neoplasm of Colon, Rectum and Anus	Malignant Neoplasm of Prostate
1989	202.6	673.2	–	13.8	8.6	19.2	17.9
1990	214.9	693.8	–	13.5	7.2	20.2	18.6
1991	208.0	665.4	–	14.9	10.2	22.1	21.4
1992	222.8	682.9	–	14.2	8.5	22.4	19.3
1993	227.2	711.6	–	12.4	11.6	22.8	25.0
1994	216.7	727.9	–	14.9	7.8	22.3	20.8
1995	204.4	682.9	–	15.8	7.2	21.9	21.9
1996	186.2	623.0	0.1	16.6	8.5	21.3	22.2
1997	177.2	590.5	0.2	15.6	10.3	20.7	27.1
1998	178.5	619.2	0.2	15.4	8.7	21.1	31.4
1999	169.3	583.5	0.1	15.6	7.6	22.7	28.1
2000	160.5	558.5	0.2	17.7	6.7	20.3	32.8
2001	154.5	552.7	0.2	16.1	6.3	20.4	26.9
2002	151.6	550.3	0.2	15.4	6.6	22.1	30.3
2003	147.2	542.9	0.5	14.4	6.7	18.6	29.9
2004	127.2	508.3	1.6	14.0	6.2	21.5	36.4
2005	121.5	492.2	2.4	14.4	6.7	22.0	37.3
2006	113.9	480.3	3.6	13.7	6.5	22.0	33.1
2007	91.9	460.0	3.1	12.2	5.7	20.4	29.6
2008	76.1	448.2	3.1	13.5	7.4	19.5	37.3
2009	65.8	421.0	3.9	13.3	6.1	20.8	36.4
2010	61.7	405.2	3.1	12.4	7.5	19.5	38.2
2011	55.4	366.0	4.5	13.8	7.5	20.1	31.8
2012	45.6	360.2	4.0	14.1	7.5	18.9	35.5
2013	51.4	349.7	4.0	11.4	6.1	20.4	34.0
2014	39.2	338.2	3.6	12.6	6.7	20.5	36.5
2015	34.5	318.7	3.3	12.1	5.7	21.2	37.4
2016	37.7	310.5	3.2	11.8	6.0	20.7	34.0

Category 3: Contextual Factors

YEAR	INDICATOR			
	TB Mortality (per 100,000 population)	Alcohol Consumption (litres of pure alcohol consumed by adults aged ≥ 15 years per capita)	Prevalence of Current Tobacco Use (% of adults aged ≥ 15 years)	Diabetes Mortality (per 100,000 population)
1989	3.5	–	–	5.5
1990	4.4	9.8	–	5.0
1991	4.4	9.1	–	6.3
1992	4.9	7.8	–	7.4
1993	6.8	8.1	–	7.6
1994	9.4	8.2	–	7.5
1995	10.5	8.3	–	6.2
1996	9.9	8.0	–	5.6
1997	9.9	8.3	–	6.8
1998	10.2	8.0	–	7.6
1999	9.8	8.9	–	7.9
2000	7.2	9.0	41.1	7.3
2001	6.3	10.1	–	9.4
2002	6.0	12.2	–	7.6
2003	6.4	11.6	–	8.8
2004	6.7	15.5	–	15.5
2005	3.3	16.6	37.7	12.0
2006	4.5	17.9	–	12.6
2007	4.0	17.5	36.4	12.8
2008	3.5	16.6	–	11.4
2009	3.0	14.7	–	10.8
2010	2.5	14.8	34.7	7.7
2011	2.7	16.2	–	8.0
2012	2.3	16.9	33.6	6.8
2013	1.6	17.8	32.9	7.0
2014	1.6	17.4	32.4	7.2
2015	1.3	16.7	32.1	6.2
2016	1.5	16.0	31.5	8.4
2017	–	13.3	31.0	–
2018	–	11.2	30.5	–

Appendix E
Phase 2b: Quantitative Data – Moldova

Demographic

YEAR	INDICATOR							
	Total Population	Population Aged 0-14 (% of total)	Population Aged 65 and Above (% of total)	Population Density (people per km ²)	Population Growth (average annual growth rate)	Fertility Rate, Total (births per woman)	Rural Population (% of total population)	Urban Population (% of total population)
1989	2957047	27.9	8.1	103.0	0.6	2.5	53.1	46.9
1990	2969097	27.9	8.3	103.4	0.4	2.4	53.2	46.8
1991	2975523	27.9	8.5	103.7	0.2	2.3	53.3	46.7
1992	2977130	27.7	8.7	103.7	0.1	2.2	53.4	46.6
1993	2973114	27.4	8.8	103.3	-0.1	2.1	53.5	46.5
1994	2964277	27.0	8.9	103.0	-0.3	2.0	53.6	46.4
1995	2952307	26.6	9.0	102.6	-0.4	1.9	53.7	46.3
1996	2946401	26.0	9.2	102.4	-0.2	1.8	53.8	46.2
1997	2935524	25.5	9.3	102.1	-0.4	1.7	54.2	45.8
1998	2934339	24.9	9.3	102.1	0.0	1.6	54.6	45.4
1999	2929735	24.2	9.4	101.9	-0.2	1.5	55.0	45.0
2000	2923783	23.5	9.4	101.8	-0.2	1.4	55.4	44.6
2001	2917252	22.5	9.6	101.6	-0.2	1.4	55.8	44.2
2002	2910504	21.5	9.7	101.4	-0.2	1.3	56.2	43.8
2003	2902320	20.4	9.8	101.1	-0.3	1.2	56.6	43.4
2004	2895147	19.4	9.9	100.8	-0.2	1.2	57.0	43.0
2005	2888111	18.5	9.9	100.5	-0.2	1.2	57.2	42.8
2006	2880095	17.9	10.0	100.3	-0.3	1.2	57.3	42.7
2007	2873429	17.4	10.1	100.0	-0.2	1.2	57.3	42.7
2008	2867964	17.0	10.2	99.8	-0.2	1.3	57.3	42.7
2009	2864346	16.8	10.2	99.7	-0.1	1.3	57.3	42.7
2010	2861487	16.5	10.1	99.7	-0.1	1.3	57.4	42.6
2011	2859833	16.3	10.1	99.7	-0.1	1.3	57.4	42.6
2012	2859458	16.1	10.1	99.6	0.0	1.3	57.4	42.6
2013	2858692	15.9	10.0	99.5	0.0	1.3	57.5	42.5
2014	2856950	15.8	10.0	99.5	-0.1	1.3	57.5	42.5
2015	2834530	15.8	10.0	98.7	-0.8	1.3	57.5	42.5
2016	2802170	15.8	10.4	97.6	-1.1	1.3	57.5	42.5
2017	2755158	15.8	10.9	96.0	-1.7	1.3	57.4	42.6
2018	2706049	15.9	11.5	94.3	-1.8	1.3	57.4	42.6
2019	2657637	15.9	12.0	94.0	-1.8	–	57.3	42.7

Macroeconomic

YEAR	INDICATOR								
	GDP Per Capita (current US\$)	GDP Per Capita, Purchasing Power Parity (current international US\$)	GDP Annual Growth Rate	Public Expenditure (government expenditure as % of GDP)	Government Deficit/Surplus (% of GDP)	General Government Gross Debt (% of GDP)	Unemployment Total (% of labour force)	Poverty Rate (people at risk of poverty or social exclusion as % total population)	Income Inequality (Gini coefficient of disposable income)
1991	–	–	–	–	–	–	1.9	–	–
1992	–	–	–	–	–	–	3.7	–	–
1993	–	–	–	–	–	–	3.7	–	–
1994	–	–	–	–	–	–	5.8	–	–
1995	594	3186	-1.4	35.0	-2.2	55.1	5.3	–	–
1996	575	3060	-5.9	36.1	-6.2	60.7	7.9	–	–
1997	657	3176	1.6	38.3	-6.2	61.7	7.9	–	36.9
1998	579	3003	-6.5	32.6	-1.3	110.5	10.0	–	39.5
1999	400	2948	-3.4	27.5	-2.2	104.5	11.1	–	42.6
2000	441	3084	2.1	28.4	-3.0	61.5	8.5	67.8	36.4
2001	508	3351	6.1	24.6	-0.3	56.6	7.3	54.6	38.0
2002	571	3678	7.8	25.6	-1.0	51.4	6.8	40.4	35.8
2003	683	4005	6.6	27.9	0.4	42.0	7.9	29.0	34.9
2004	897	4428	7.4	29.0	0.5	33.0	8.2	26.5	35.0
2005	1035	4920	7.5	30.9	1.2	27.6	7.3	29.1	36.3
2006	1183	5327	4.8	33.6	-0.3	24.9	7.4	30.2	35.4
2007	1532	5648	3.0	35.6	0.1	19.9	5.1	25.8	34.4
2008	2111	6218	7.8	34.6	-0.7	15.7	4.0	26.4	34.7
2009	1899	5897	-6.0	37.7	-5.3	24.0	6.4	26.3	32.9
2010	2438	6396	7.1	34.1	-2.2	22.3	7.4	21.9	32.1
2011	2942	6914	5.8	32.6	-2.1	20.0	6.7	17.5	30.6
2012	3046	7363	-0.6	33.7	-1.9	20.5	5.6	16.6	29.2
2013	3322	8382	9.0	32.4	-1.6	20.0	5.1	12.7	28.5
2014	3329	8827	5.0	33.4	-1.6	25.6	3.9	11.4	26.8
2015	2732	9255	-0.3	31.9	-1.9	33.1	3.7	–	27.0
2016	2880	10610	4.4	30.3	-1.8	31.9	4.2	–	26.3
2017	3510	11651	4.7	30.6	-0.8	29.3	4.1	–	25.9
2018	4234	12674	4.3	31.3	-1.0	27.1	3.0	–	25.7
2019	4504	13627	3.6	33.9	-3.9	28.8	5.5	–	–
2020	–	–	–	33.3	-3.5	30.7	5.4	–	–

Population Health

Category 1: GHLC

YEAR	INDICATOR				
	Births Attended by Skilled Health Personnel (%)	Infant Mortality (per 1,000 live births)	Maternal Mortality (per 100,000 live births)	Life Expectancy (years, at birth)	Under-5 Mortality (per 1,000 live births)
1989	100.0	27.8	34.1	67.6	33.7
1990	100.0	27.5	44.1	67.6	33.2
1991	100.0	27.7	47.0	67.6	33.6
1992	100.0	28.5	50.8	67.4	34.5
1993	100.0	29.4	52.9	67.2	35.9
1994	100.0	30.4	25.8	67.0	37.3
1995	100.0	31.2	40.8	66.9	38.3
1996	100.0	31.4	42.4	66.8	38.6
1997	100.0	31.0	50.5	66.7	38.0
1998	98.0	29.9	36.3	66.8	36.5
1999	98.0	28.2	28.6	66.9	34.2
2000	98.0	26.1	44.0	67.0	31.4
2001	99.0	23.7	39.0	67.2	28.4
2002	99.6	21.5	38.0	67.4	25.5
2003	99.4	19.5	36.0	67.5	23.0
2004	99.3	18.0	32.0	67.7	21.1
2005	99.5	16.8	34.0	67.8	19.7
2006	99.6	16.0	31.0	68.0	18.7
2007	99.6	15.5	31.0	68.3	18.1
2008	99.5	15.2	29.0	68.7	17.7
2009	99.7	14.9	28.0	69.1	17.3
2010	99.2	14.7	29.0	69.6	17.1
2011	99.4	14.4	21.0	70.1	16.8
2012	99.2	14.2	22.0	70.6	16.5
2013	99.8	13.9	21.0	71.0	16.2
2014	99.7	13.7	23.0	71.3	15.9
2015	–	13.4	22.0	71.5	15.6
2016	–	13.1	20.0	71.6	15.3
2017	–	12.9	19.0	71.7	15.0
2018	–	12.6	–	71.8	14.7
2019	–	12.4	–	–	14.4

Category 2: Amenable Mortality

YEAR	INDICATOR (Mortality Per 100,000 Population)						
	Cerebrovascular Diseases	Diseases of Circulatory System	HIV/AIDS	Malignant Neoplasm of Breast	Malignant Neoplasm of Cervix Uteri	Malignant Neoplasm of Colon, Rectum and Anus	Malignant Neoplasm of Prostate
1989	187.3	643.4	–	12.0	7.6	17.7	7.4
1990	182.3	583.4	–	11.8	9.1	16.3	7.9
1991	188.6	601.5	–	12.7	9.9	17.7	7.2
1992	169.7	546.6	–	12.4	10.2	17.9	9.9
1993	182.4	587.8	–	13.4	10.0	17.7	7.3
1994	201.8	674.5	–	14.2	8.2	19.4	10.0
1995	207.5	755.4	–	14.1	9.5	18.5	7.9
1996	212.5	796.4	0.02	14.0	9.5	17.0	7.3
1997	220.4	828.0	0.1	12.6	7.8	15.7	9.1
1998	207.6	777.3	0.2	11.8	10.5	16.5	8.2
1999	216.0	830.4	0.1	14.3	9.8	17.4	7.0
2000	222.6	834.3	0.3	12.6	7.8	18.6	7.2
2001	225.1	815.5	0.2	13.9	10.3	17.3	8.0
2002	227.2	847.5	0.5	14.3	8.7	19.0	7.9
2003	235.6	857.6	0.6	14.1	9.4	18.6	8.4
2004	226.6	805.2	0.8	13.2	9.7	20.3	8.9
2005	236.9	858.4	1.2	13.5	10.5	20.2	11.6
2006	223.8	786.4	1.5	14.4	11.3	21.7	10.8
2007	214.7	749.3	1.7	13.7	8.7	22.6	10.2
2008	205.2	716.5	2.1	14.7	8.6	22.3	10.4
2009	195.4	715.2	1.5	16.1	8.4	24.5	13.6
2010	182.9	731.1	2.2	13.7	9.9	21.3	15.5
2011	176.5	664.7	1.9	14.4	7.6	24.4	12.6
2012	176.1	659.0	1.7	13.5	7.5	21.7	15.4
2013	168.4	625.8	1.9	13.5	8.1	22.9	14.2
2014	167.3	635.7	2.6	13.6	8.5	23.3	15.2
2015	159.9	631.0	2.3	14.6	7.3	22.6	15.0
2016	152.2	588.1	2.4	13.9	7.2	23.5	15.9
2017	141.2	561.7	2.1	13.4	8.1	22.8	19.2
2018	134.0	551.7	2.5	13.2	7.4	22.2	17.3

Category 3: Contextual Factors

YEAR	INDICATOR			
	TB Mortality (per 100,000 population)	Alcohol Consumption (litres of pure alcohol consumed by adults aged ≥ 15 years per capita)	Prevalence of Current Tobacco Use (% of adults aged ≥ 15 years)	Diabetes Mortality (per 100,000 population)
1989	5.9	–	–	8.5
1990	5.6	–	–	10.6
1991	6.6	–	–	10.6
1992	6.7	10.1	–	10.7
1993	7.2	11.6	–	11.0
1994	11.8	16.3	–	13.1
1995	10.8	15.8	–	12.1
1996	13.6	16.4	–	13.0
1997	12.4	16.4	–	10.7
1998	13.2	16.9	–	12.7
1999	16.2	14.4	–	14.2
2000	18.0	6.8	24.5	11.7
2001	16.1	6.3	–	10.9
2002	16.4	5.8	–	10.6
2003	16.4	6.3	–	11.7
2004	18.2	7.6	–	10.0
2005	18.9	11.8	24.6	11.6
2006	17.7	7.9	–	12.0
2007	17.6	7.8	24.7	11.0
2008	15.8	7.7	–	10.1
2009	16.3	6.2	–	9.6
2010	14.7	6.9	24.8	10.7
2011	12.6	8.2	–	8.9
2012	11.8	8.3	25.0	10.1
2013	8.6	8.5	25.0	10.2
2014	8.5	7.4	25.0	10.5
2015	7.3	6.8	25.0	11.2
2016	6.4	7.2	25.1	11.0
2017	5.1	7.5	25.2	10.5
2018	4.8	7.5	25.3	10.7

Appendix F

Quantitative Data – Sources

Source tables were compiled for Phase 2a and Phase 2b quantitative data, showing the online source and access/collection date for each item of quantitative data collected. For each source table, a source list was provided with the relevant link(s) to the online source(s) referenced in the table. Data was downloaded from the particular source on the listed date, and is available for each indicator upon request.

Phase 2a:

GDP per Capita (current US\$)

- World Bank:
 - GDP per capita (current US\$): <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

POST-SOVIET COUNTRY/REGION																
YEAR	Armenia	Azerbaijan	Belarus	Estonia	Georgia	Kazakhstan	Kyrgyzstan	Latvia	Lithuania	Moldova	Russia	Tajikistan	Turkmenistan	Ukraine	Uzbekistan	EU
1990	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	–	–	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1991	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	–	–	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1992	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	–	–	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1993	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	–	–	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1994	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	–	–	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1995	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1996	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1997	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1998	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1999	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2000	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2001	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2002	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21

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Phase 2b – Estonia:

Demographic

- World Bank:
 - Population, total: <https://data.worldbank.org/indicator/SP.POP.TOTL>
 - Population ages 0-14, total: <https://data.worldbank.org/indicator/SP.POP.0014.TO>
 - Population ages 65 and above, total: <https://data.worldbank.org/indicator/SP.POP.65UP.TO>
 - Population density (people per sq. km of land area):
<https://data.worldbank.org/indicator/EN.POP.DNST>
 - Population growth (annual %): <https://data.worldbank.org/indicator/SP.POP.GROW>
 - Fertility rate, total (births per woman): <https://data.worldbank.org/indicator/SP.DYN.TFRT.IN>
 - Rural population (% of total population):
<https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS>

- Urban population (% of total population): <https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS>

[illegible]

2017	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2018	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2019	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	World Bank 2/10/21	–	World Bank 2/10/21	World Bank 2/10/21

Macroeconomic

- Habicht et al.:
 - Estonia: health system review: <https://apps.who.int/iris/handle/10665/330201>
- Our World in Data
 - Income Inequality: <https://ourworldindata.org/income-inequality>
- Statistics Estonia:
 - LES08: INDICATORS OF POVERTY AND INCOME INEQUALITY by Year, Age group, Indicator, Sex and Value/standard error: https://andmed.stat.ee/en/stat/sotsiaalelu_sotsiaalne-terjutus-laekeni-indikaatorid_vaesus-ja-ebaverdsus/LES08/table/tableViewLayout1
- World Bank:
 - GDP per capita (current US\$): <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>
 - GDP per capita, PPP (current international \$): <https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>
 - GDP growth (annual %): <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>
 - Unemployment, total (% of total labor force) (modeled ILO estimate): <https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS>
- World Bank TCdata360:
 - General Government Total Expenditure, % Of GDP: https://tcdata360.worldbank.org/indicators/govt.exp?country=BRA&indicator=2777&viz=line_chart&years=1980,2024
 - General Government Net Lending/Borrowing, % Of GDP: https://tcdata360.worldbank.org/indicators/govt.lend?country=BRA&indicator=2779&viz=line_chart&years=1980,2024
 - General Government Gross Debt, % Of GDP: https://tcdata360.worldbank.org/indicators/govt.debt.grs?indicator=2787&viz=line_chart&years=1980,2024

YEAR	INDICATOR								
	GDP Per Capita (current US\$)	GDP Per Capita, Purchasing Power Parity (current international US\$)	GDP Annual Growth Rate	Public Expenditure (government expenditure as % of GDP)	Government Deficit/Surplus (% of GDP)	General Government Gross Debt (% of GDP)	Unemployment Total (% of labour force)	Poverty Rate (people at risk of poverty or social exclusion as % total population)	Income Inequality (Gini coefficient of disposable income)
1991	–	–	–	–	–	–	World Bank 2/10/21	–	–
1992	–	–	–	–	–	–	World Bank 2/10/21	–	–
1993	World Bank 2/10/21	World Bank 2/10/21	–	–	–	–	World Bank 2/10/21	–	Our World in Data 2/10/21
1994	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	–	–	World Bank 2/10/21	–	–

[illegible]

2014	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/11/21	World Bank 2/10/21	Statistics Estonia 2/16/21	World Bank 2/10/21
2015	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/11/21	World Bank 2/10/21	Statistics Estonia 2/16/21	World Bank 2/10/21
2016	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/11/21	World Bank 2/10/21	Statistics Estonia 2/16/21	World Bank 2/10/21
2017	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/11/21	World Bank 2/10/21	Statistics Estonia 2/16/21	World Bank 2/10/21
2018	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/11/21	World Bank 2/10/21	Statistics Estonia 2/16/21	Statistics Estonia 2/12/21
2019	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/11/21	World Bank 2/10/21	Statistics Estonia 2/16/21	Statistics Estonia 2/12/21
2020	–	–	–	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/11/21	World Bank 2/10/21	–	–

Population Health

Category 1: GHLC

- World Bank:
 - Births attended by skilled health staff (% of total): <https://data.worldbank.org/indicator/SH.STA.BRTC.ZS>
 - Mortality rate, infant (per 1,000 live births): <https://data.worldbank.org/indicator/SP.DYN.IMRT.IN>
 - Maternal mortality ratio (national estimate, per 100,000 live births): <https://data.worldbank.org/indicator/SH.STA.MMRT.NE>
 - Life expectancy at birth, total (years): <https://data.worldbank.org/indicator/SP.DYN.LE00.IN>
 - Mortality rate, under-5 (per 1,000 live births): <https://data.worldbank.org/indicator/SH.DYN.MORT>
- World Health Organisation European Health for All database (WHO European HFA-DB):
 - Maternal deaths per 100 000 live births, max of cod and clinical data: https://gateway.euro.who.int/en/indicators/hfa_90-1210-maternal-deaths-per-100-000-live-births/

YEAR	INDICATOR				
	Births Attended by Skilled Health Personnel (%)	Infant Mortality (per 1,000 live births)	Maternal Mortality (per 100,000 live births)	Life Expectancy (years, at birth)	Under-5 Mortality (per 1,000 live births)
1989	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1990	–	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1991	–	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1992	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1993	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1994	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1995	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1996	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21

1997	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1998	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1999	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
2000	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2001	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2002	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2003	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2004	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2005	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2006	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2007	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2008	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2009	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2010	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2011	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2012	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2013	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2014	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2015	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2016	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2017	–	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2018	–	World Bank 2/6/21	–	World Bank 2/6/21	World Bank 2/6/21
2019	–	World Bank 2/6/21	–	–	World Bank 2/6/21

Category 2: Amenable Mortality

- World Health Organisation European Mortality database (WHO European MDB):
 - SDR, Cerebrovascular diseases, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_146-sdr-cerebrovascular-diseases-per-100-000/
 - SDR, Diseases of the circulatory system, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_275-sdr-diseases-of-the-circulatory-system-per-100-000/
 - SDR, AIDS/HIV (as recorded by routine mortality statistics system), per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_86-sdr-aidshiv-as-recorded-by-routine-mortality-statistics-system-per-100-000/
 - SDR, Malignant neoplasm of breast, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_470-sdr-malignant-neoplasm-of-breast-per-100-000/
 - SDR, females, Malignant neoplasm of cervix uteri, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_481-sdr-females-malignant-neoplasm-of-cervix-uteri-per-100-000/

- SDR, Malignant neoplasm of colon, rectum and anus, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_492-sdr-malignant-neoplasm-of-colon-rectum-and-anus-per-100-000/
- SDR, males, Malignant neoplasm of prostate, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_585-sdr-males-malignant-neoplasm-of-prostate-per-100-000/

[illegible]

2013	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2014	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2015	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2016	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21

Category 3: Contextual Factors

- World Bank:
 - Prevalence of current tobacco use (% of adults):
<https://data.worldbank.org/indicator/SH.PR.V.SMOK>
- World Health Organisation European Health for All database (WHO European HFA-DB):
 - Pure alcohol consumption, litres per capita, age 15+:
https://gateway.euro.who.int/en/indicators/hfa_426-3050-pure-alcohol-consumption-litres-per-capita-age-15plus/
- World Health Organisation European Mortality database (WHO European MDB):
 - SDR, Tuberculosis, per 100 000: https://gateway.euro.who.int/en/indicators/hfamdb_809-sdr-tuberculosis-per-100-000/
 - SDR, Diabetes mellitus, per 100 000: https://gateway.euro.who.int/en/indicators/hfamdb_199-sdr-diabetes-mellitus-per-100-000/
- World Health Organisation Global Health Observatory (WHO GHO):
 - Prevalence of current tobacco use among persons aged 15 years and older (age-standardized rate): <https://www.who.int/data/gho/data/indicators/indicator-details/GHO/age-standardized-prevalence-of-current-tobacco-smoking-among-persons-aged-15-years-and-older>

YEAR	INDICATOR			
	TB Mortality (per 100,000 population)	Alcohol Consumption (litres of pure alcohol consumed by adults aged ≥ 15 years per capita)	Prevalence of Current Tobacco Use (% of adults aged ≥ 15 years)	Diabetes Mortality (per 100,000 population)
1989	WHO European MDB 2/12/21	–	–	WHO European MDB 2/12/21
1990	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1991	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1992	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1993	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1994	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1995	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1996	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1997	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1998	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1999	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2000	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	WHO GHO 2/16/21	WHO European MDB 2/12/21
2001	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2002	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21

2003	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2004	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2005	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	WHO GH0 2/16/21	WHO European MDB 2/12/21
2006	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2007	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2008	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2009	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2010	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2011	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2012	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2013	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	WHO GH0 2/16/21	WHO European MDB 2/12/21
2014	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2015	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	WHO GH0 2/16/21	WHO European MDB 2/12/21
2016	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2017	–	WHO European HFA-DB 2/16/21	WHO GH0 2/16/21	–
2018	–	WHO European HFA-DB 2/16/21	World Bank 2/14/21	–

Phase 2b – Moldova:

Demographic

- World Bank:
 - Population, total: <https://data.worldbank.org/indicator/SP.POP.TOTL>
 - Population ages 0-14, total: <https://data.worldbank.org/indicator/SP.POP.0014.TO>
 - Population ages 65 and above, total: <https://data.worldbank.org/indicator/SP.POP.65UP.TO>
 - Population density (people per sq. km of land area):
<https://data.worldbank.org/indicator/EN.POP.DNST>
 - Population growth (annual %): <https://data.worldbank.org/indicator/SP.POP.GROW>
 - Fertility rate, total (births per woman): <https://data.worldbank.org/indicator/SP.DYN.TFRT.IN>
 - Rural population (% of total population):
<https://data.worldbank.org/indicator/SP.RUR.TOTL.ZS>
 - Urban population (% of total population):
<https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS>

YEAR	INDICATOR							
	Total Population	Population Aged 0-14 (% of total)	Population Aged 65 and Above (% of total)	Population Density (people per km ²)	Population Growth (average annual growth rate)	Fertility Rate, Total (births per woman)	Rural Population (% of total population)	Urban Population (% of total population)
1989	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1990	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1991	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1992	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21

1993	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1994	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1995	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1996	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1997	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1998	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
1999	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2000	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2001	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2002	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2003	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2004	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2005	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2006	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2007	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2008	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2009	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2010	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2011	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2012	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2013	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2014	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2015	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2016	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2017	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2018	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21
2019	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	–	World Bank 2/10/21	World Bank 2/10/21

Macroeconomic

- National Bureau of Statistics of the Republic of Moldova (Moldova NBS):
 - Millennium Development Goals indicators by Indicators and Years: https://statbank.statistica.md/PxWeb/pxweb/en/30%20Statistica%20sociala/30%20Statistic%20sociala_ODM/ODM010100.px/table/tableViewLayout1/?rxid=b2ff27d7-0b96-43c9-934b-42e1a2a9a774
- Turcanu et al.:
 - Republic of Moldova: health system review: <https://apps.who.int/iris/handle/10665/330316>
- World Bank:
 - GDP per capita (current US\$): <https://data.worldbank.org/indicator/NY.GDP.PCAP.CD>

- GDP per capita, PPP (current international \$):
<https://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD>
- GDP growth (annual %): <https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG>
- Unemployment, total (% of total labor force) (modeled ILO estimate):
<https://data.worldbank.org/indicator/SL.UEM.TOTL.ZS>
- World Bank TCdata360:
 - General Government Total Expenditure, % Of GDP:
https://tcdata360.worldbank.org/indicators/govt.exp?country=BRA&indicator=2777&viz=line_chart&years=1980,2024
 - General Government Net Lending/Borrowing, % Of GDP:
https://tcdata360.worldbank.org/indicators/govt.lend?country=BRA&indicator=2779&viz=line_chart&years=1980,2024
 - General Government Gross Debt, % Of GDP:
https://tcdata360.worldbank.org/indicators/govt.debt.grs?indicator=2787&viz=line_chart&years=1980,2024

INDICATOR									
YEAR	GDP Per Capita (current US\$)	GDP Per Capita, Purchasing Power Parity (current international US\$)	GDP Annual Growth Rate	Public Expenditure (government expenditure as % of GDP)	Government Deficit/Surplus (% of GDP)	General Government Gross Debt (% of GDP)	Unemployment Total (% of labour force)	Poverty Rate (people at risk of poverty or social exclusion as % total population)	Income Inequality (Gini coefficient of disposable income)
1991	–	–	–	–	–	–	World Bank 2/10/21	–	–
1992	–	–	–	–	–	–	World Bank 2/10/21	–	–
1993	–	–	–	–	–	–	World Bank 2/10/21	–	–
1994	–	–	–	–	–	–	World Bank 2/10/21	–	–
1995	World Bank 2/10/21	World Bank 2/10/21	Turcanu et al. 2/16/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank 2/10/21	–	–
1996	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank 2/10/21	–	–
1997	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank 2/10/21	–	World Bank 2/10/21
1998	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank 2/10/21	–	World Bank 2/10/21
1999	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank 2/10/21	–	World Bank 2/10/21
2000	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank 2/10/21	Moldova NBS 2/16/21	World Bank 2/10/21
2001	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank 2/10/21	Moldova NBS 2/16/21	World Bank 2/10/21
2002	World Bank 2/10/21	World Bank 2/10/21	World Bank 2/10/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank TCdata360 2/12/21	World Bank 2/10/21	Moldova NBS 2/16/21	World Bank 2/10/21

Part C: Appendices

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Population Health

Category 1: GHLC

- World Bank:
 - Births attended by skilled health staff (% of total):
<https://data.worldbank.org/indicator/SH.STA.BRTC.ZS>
 - Mortality rate, infant (per 1,000 live births):
<https://data.worldbank.org/indicator/SP.DYN.IMRT.IN>
 - Maternal mortality ratio (national estimate, per 100,000 live births):
<https://data.worldbank.org/indicator/SH.STA.MMRT.NE>
 - Life expectancy at birth, total (years): <https://data.worldbank.org/indicator/SP.DYN.LE00.IN>
 - Mortality rate, under-5 (per 1,000 live births):
<https://data.worldbank.org/indicator/SH.DYN.MORT>
- World Health Organisation European Health for All database (WHO European HFA-DB):
 - Maternal deaths per 100 000 live births, max of cod and clinical data:
https://gateway.euro.who.int/en/indicators/hfa_90-1210-maternal-deaths-per-100-000-live-births/

YEAR	INDICATOR				
	Births Attended by Skilled Health Personnel (%)	Infant Mortality (per 1,000 live births)	Maternal Mortality (per 100,000 live births)	Life Expectancy (years, at birth)	Under-5 Mortality (per 1,000 live births)
1989	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1990	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1991	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1992	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1993	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1994	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1995	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1996	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1997	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1998	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
1999	World Bank 2/6/21	World Bank 2/6/21	WHO European HFA-DB 2/16/21	World Bank 2/6/21	World Bank 2/6/21
2000	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2001	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2002	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2003	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2004	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2005	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2006	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2007	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2008	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2009	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2010	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21

2011	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2012	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2013	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2014	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2015	–	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2016	–	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2017	–	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21	World Bank 2/6/21
2018	–	World Bank 2/6/21	–	World Bank 2/6/21	World Bank 2/6/21
2019	–	World Bank 2/6/21	–	–	World Bank 2/6/21

Category 2: Amenable Mortality

- World Health Organisation European Mortality database (WHO European MDB):
 - SDR, Cerebrovascular diseases, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_146-sdr-cerebrovascular-diseases-per-100-000/
 - SDR, Diseases of the circulatory system, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_275-sdr-diseases-of-the-circulatory-system-per-100-000/
 - SDR, AIDS/HIV (as recorded by routine mortality statistics system), per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_86-sdr-aidshiv-as-recorded-by-routine-mortality-statistics-system-per-100-000/
 - SDR, Malignant neoplasm of breast, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_470-sdr-malignant-neoplasm-of-breast-per-100-000/
 - SDR, females, Malignant neoplasm of cervix uteri, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_481-sdr-females-malignant-neoplasm-of-cervix-uteri-per-100-000/
 - SDR, Malignant neoplasm of colon, rectum and anus, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_492-sdr-malignant-neoplasm-of-colon-rectum-and-anus-per-100-000/
 - SDR, males, Malignant neoplasm of prostate, per 100 000:
https://gateway.euro.who.int/en/indicators/hfamdb_585-sdr-males-malignant-neoplasm-of-prostate-per-100-000/

YEAR	INDICATOR (Mortality Per 100,000 Population)						
	Cerebrovascular Diseases	Diseases of Circulatory System	HIV/AIDS	Malignant Neoplasm of Breast	Malignant Neoplasm of Cervix Uteri	Malignant Neoplasm of Colon, Rectum and Anus	Malignant Neoplasm of Prostate
1989	WHO European MDB 2/12/21	WHO European MDB 2/12/21	–	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
1990	WHO European MDB 2/12/21	WHO European MDB 2/12/21	–	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
1991	WHO European MDB 2/12/21	WHO European MDB 2/12/21	–	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
1992	WHO European MDB 2/12/21	WHO European MDB 2/12/21	–	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
1993	WHO European MDB 2/12/21	WHO European MDB 2/12/21	–	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
1994	WHO European MDB 2/12/21	WHO European MDB 2/12/21	–	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
1995	WHO European MDB 2/12/21	WHO European MDB 2/12/21	–	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21

1996	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
1997	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
1998	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
1999	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2000	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2001	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2002	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2003	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2004	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2005	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2006	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2007	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2008	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2009	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2010	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2011	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2012	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2013	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2014	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2015	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2016	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2017	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21
2018	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21	WHO European MDB 2/12/21

Category 3: Contextual Factors

- World Bank:
 - Prevalence of current tobacco use (% of adults):
<https://data.worldbank.org/indicator/SH.PR.V.SMOK>
- World Health Organisation European Health for All database (WHO European HFA-DB):
 - Pure alcohol consumption, litres per capita, age 15+:
https://gateway.euro.who.int/en/indicators/hfa_426-3050-pure-alcohol-consumption-litres-per-capita-age-15plus/
- World Health Organisation European Mortality database (WHO European MDB):
 - SDR, Tuberculosis, per 100 000: https://gateway.euro.who.int/en/indicators/hfamdb_809-sdr-tuberculosis-per-100-000/
 - SDR, Diabetes mellitus, per 100 000: https://gateway.euro.who.int/en/indicators/hfamdb_199-sdr-diabetes-mellitus-per-100-000/
- World Health Organisation Global Health Observatory (WHO GHO):
 - Prevalence of current tobacco use among persons aged 15 years and older (age-standardized rate): <https://www.who.int/data/gho/data/indicators/indicator-details/GHO/age-standardized-prevalence-of-current-tobacco-smoking-among-persons-aged-15-years-and-older>

INDICATOR

YEAR	TB Mortality (per 100,000 population)	Alcohol Consumption (litres of pure alcohol consumed by adults aged ≥ 15 years per capita)	Prevalence of Current Tobacco Use (% of adults aged ≥ 15 years)	Diabetes Mortality (per 100,000 population)
1989	WHO European MDB 2/12/21	–	–	WHO European MDB 2/12/21
1990	WHO European MDB 2/12/21	–	–	WHO European MDB 2/12/21
1991	WHO European MDB 2/12/21	–	–	WHO European MDB 2/12/21
1992	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1993	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1994	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1995	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1996	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1997	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1998	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
1999	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2000	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	WHO GHO 2/16/21	WHO European MDB 2/12/21
2001	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2002	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2003	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2004	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2005	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	WHO GHO 2/16/21	WHO European MDB 2/12/21
2006	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2007	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2008	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2009	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2010	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2011	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	–	WHO European MDB 2/12/21
2012	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2013	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	WHO GHO 2/16/21	WHO European MDB 2/12/21
2014	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2015	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	WHO GHO 2/16/21	WHO European MDB 2/12/21
2016	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21
2017	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	WHO GHO 2/16/21	WHO European MDB 2/12/21
2018	WHO European MDB 2/12/21	WHO European HFA-DB 2/16/21	World Bank 2/14/21	WHO European MDB 2/12/21

Appendix G
Phase 2b: Qualitative Data – Estonia

LEGEND*	
Organisation and Governance	General/Miscellaneous ^{#1}
	Decentralisation and Recentralisation ^{#2}
	Privatisation ^{#3}
Financing	Financing [§]
Physical and Human Resources	Physical Resources ^{%1}
	Human Resources ^{%2}
Provision of Services	Public Health ^{&1}
	Primary Health Care ^{&2}
	Specialised and Inpatient Services ^{&3}

*Where a health system reform/event aligned with multiple themes, the reform/event was assigned to the most relevant theme

YEAR	HEALTH SYSTEM	POLITICAL AND ECONOMIC EVENTS
1988	The Estonian Medical Association is re-established; it is the main representative association for doctors [1].^{%2}	
1990	The Estonian Nurses Union is re-established; the Union is active in redefining professional standards in nursing, developing guidelines and improving the training curriculum for nurses [1].^{%2}	April 3: Edgar Savisaar of the Popular Front of Estonia becomes Prime Minister of the interim government in first free election since Soviet occupation.
1991	- The Health Insurance Act is passed, establishing a wage-based social health insurance system administered through 22 regional sickness funds [1].[§] - The provider licensing system is improved [1].^{%2} - PHC reforms begins, with the aim of developing a family medicine-centred primary health care (PHC) system and establishing family medicine as a medical specialty [1].^{&2} - Re-specialisation training for family doctors is introduced [1].^{&2} - The Estonian Society of Family Doctors is established. The Society plays an important role in developing family medicine and implementing PHC reform [1].^{&2}	August 20: Estonia regains independence following the dissolution of the USSR. September 17: Estonia joins the United Nations (UN), and signs several international conventions.
1992	- The Social Affairs Committee is formed; this standing committee of parliament deals with draft acts concerning social insurance and welfare, labour relations, health, and health care [1].^{#1} June 28: Estonia adopts a new constitution – the fourth in its history. The constitution establishes the right to the protection of health [1, 2].^{#1} - Medical staff are moved from a civil service status and begin to work under private labour regulations [1].^{#3} - Sickness funds are established as independent public organisations in the counties and large cities [1].[§] - The first essential drug list is developed [1].^{%1} - The Estonian Midwives Association is established [1].^{%2} - The National Human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) Programme 1992-1997 is adopted [1].^{&1} - Re-specialisation courses for family practitioners start at the University of Tartu [1].^{&2}	- The government adopts a new radical fiscal strategy, cutting taxes and spending. January 29: Tiit Vähi, an independent, becomes Prime Minister of the interim government. June 20: Estonia reintroduces kroon as its currency, replacing Soviet ruble. October 6: Lennart Meri of the nationalist Pro Patria National Coalition Party is elected President in first elections in newly independent Estonia. October 21: Mart Laar of the Pro Patria National Coalition Party is elected Prime Minister.
1993	The Ministry of Social Affairs (MoSA) is created, as merger of three separate ministries: the Ministry of Health, the Ministry of Social Welfare, and the Ministry of Labour [1].^{#1}	Government launches a large-scale economic privatisation programme.

	- The State Agency of Medicines (SAM) and Centre for Health Promotion are established. The SAM is responsible for the marketing authorisation and quality control of human and veterinary pharmaceuticals, as well as regulation and control of pharmaceutical trade [1].^{#1} - A reimbursement system for prescription pharmaceuticals is introduced [1].[§] - Family medicine is designated and recognised as an official medical specialty, and a new three-year postgraduate training programme in family medicine is set up [1].^{&2}	Additionally, import and export tariffs are decreased to encourage trade.
1994	- Health Services Organisation Act is passed, devolving some health system responsibilities to the municipalities and creating the basic framework for PHC [1, 3, 4].^{#1} - Lack of coordination among sickness funds leads to the establishment of a Central Sickness Fund (CSF), subordinate to MoSA and responsible for the activities of the county-based sickness funds [1].[§]	- Estonia expands efforts to attract foreign investment. November 8: Andres Tarand of the centre-left Moderate People's Party (later the Social Democratic Party) is elected Prime Minister.
1995	- The Health Policy Document is approved [1].^{#1} - Patient co-payments for PHC and specialist visits are introduced [1].[§] - The Medicinal Products Act is adopted, allocating regulatory power to the SAM [1].^{%1} - Medical student admissions quota is set at 70, down from 200 in the 1980s [4].^{%2} - The Public Health Act is adopted, which provides public health infrastructure, sustainable funding, and a legislative framework [1].^{&1} - MoSA introduces a financing mechanism for national and community-based health promotion projects, with the EHIF dedicating a certain amount of its budget to these activities. MoSA also starts training regional community health promotion specialists [1].^{&1}	April 17: Tiit Vähi of the centre-right Coalition Party and centre/centre-left Estonian Country People's Party (later the People's Union of Estonia) is elected Prime Minister. November 6: Tiit Vähi is re-elected Prime Minister.
1996	- A draft of the Patient Rights Act is discussed in parliament [1].^{#1} - The EHIF begins to conduct annual surveys on patient satisfaction with different aspects of the health system [1].^{#1} - Public health is now coordinated by county governments [1].^{#2} - The number of hospitals in Estonia is reduced to 78 [5].^{&3}	Lennart Meri is re-elected President.
1997	- Medical and dental training standards are established [4].^{%2} - The Mental Health Act is adopted [1].^{&1} - The Artificial Insemination and Embryo Protection Act is adopted [1].^{&1} - The National Programme on the Prevention of HIV/AIDS and Other Sexually Transmitted Diseases 1997-2001 is adopted [1].^{&1} - The National Tuberculosis (TB) Programme 1998-2003 is adopted [1].^{&1} - Registration requirements for family doctors are established, part of a wave of ministerial regulations related to PHC and general practitioners (GPs) [6, 7].^{&2}	March 17: Mart Siimann of the Coalition Party and Estonian Country People's Party is elected Prime Minister.
1998	- PHC privatisation process begins [1].^{#3} - Family physician payment reform is introduced, as a continued wave of PHC-related ministerial regulations are issued, including establishing the legal status of GPs, and the package of services provided the GPs [1, 6, 7].^{&2} - Hospital Master Plan (HMP) 1999-2000 is developed in response to hospital inefficiencies exacerbated by the Russian financial crisis [5].^{&3}	- Estonia abolishes the death penalty. - Russian financial crisis begins.

1999	- Providers are required to check each patient's insurance status, which is confirmed by any document that states their national identification number [1].⁵ - Occupational Health and Safety Act is adopted, regulating responsibilities in the field of occupational health and safety at the state and enterprise level [1].^{8,1}	March 25: Mart Laar, now of the Pro Patria Union Party (formed after the Pro Patria National Coalition Party merged with the Estonian National Independence Party), is elected to his second term as Prime Minister. November 13: Estonia joins the World Trade Organisation.
2000	- The PRAXIS Centre for Policy Studies is established as an independent non-profit civil initiative think tank. Its main policy research areas, alongside health policy, include education, civil society, and labour and social policy [1].^{#1} - The EHIF is established as an independent public legal body, merging the CSF and the 17 remaining regional sickness funds. The EHIF is an active purchasing agency, and its responsibilities include contracting with health care providers, paying for health services, reimbursing pharmaceutical expenditure, and paying for temporary sick leave and maternity benefits [1].⁵ - SAM opens the Medical Devices Department, responsible for ensuring quality control of medical devices entering the Estonian market [4].^{%1} - HMP 2015 is approved, with the aim of improving specialised and inpatient services [1].^{8,3} - The general long-term planning of specialist care becomes the responsibility of MoSA [1].^{8,3}	
2001	- A new Health Services Organisation Act is adopted. The Act defines four types of health care: PHC provided by family doctors, emergency medical care, specialised (secondary and tertiary) medical care, and nursing care; and formalises the requirements of quality assurance for health service providers [1]. The Act also requires all hospitals to incorporate under company or foundation law [8], and defines all GPs as private practitioners [1].^{#1} - The government sets up the Estonian Genome Project Foundation [1].^{#1} - Local governments no longer have any legal responsibility for funding or organising health care [1].^{#2} - The EHIF gains its current status as an independent public organisation, no longer subordinate to MoSA [1].⁵ - The Estonian Centre of Behavioural and Health Sciences at the University of Tartu, Faculty of Social Sciences, is recognised as a national centre of excellence in research. The main objective of the Centre is to develop interdisciplinary research and organise doctoral studies in the fields of behavioural and health sciences [1].^{%1} - The Law of Obligations Act is adopted, establishing a new relationship between patients and providers based on legally binding contractual agreements [1].^{%2} - The nursing profession is incorporated in Estonian legislation [1].^{%2} - Health worker accreditation becomes voluntary [4].^{%2} - The University of Tartu Faculty of Medicine begins offering a Master of Science programme in public health (Master of Science in Health Sciences), with options to specialise in epidemiology, health management or environmental health [1].^{%2} - The Alcohol Act is adopted [1].^{8,1} - Hospital management structure is agreed upon as a two-tier management model (supervisory and management boards), and is put into operation [1].^{8,3}	October 8: Arnold Rüütel of the People's Union of Estonia is elected President.

	• A MoSA decree introduces waiting time targets for different types of treatment [1].^{&3}	
2002	• The Health Care Board (HCB) is established [1].^{#1} • A draft of the Patient Rights Act is again discussed in parliament [1].^{#1} • The Law of Obligations Act is enforced, defining the contractual relationship between the patient and their doctor, and requiring the involvement of patients in decisions regarding their own health [1].^{#1} • Decisions about waiting time targets are delegated to the EHIF Supervisory Board [1].^{#1} • Estonia signs and ratifies the Biomedical Convention, which enters into force and regulates, among other things, issues surrounding gene testing [1].^{#1} • The PHC privatisation process is completed [1].^{#3} • A new Health Insurance Act is adopted [1].⁵ • Regulations on how new treatment methods and procedures should be introduced into the EHIF benefit package take effect [1].⁵ • Regulations on how new pharmaceuticals should be evaluated in order to be reimbursed by the EHIF take effect, and positive list of reimbursed pharmaceuticals is introduced; prior to this, all prescription medicines with marketing authorisation were reimbursed to a certain extent [1].⁵ • Groups not covered by the EHIF are now able to obtain coverage on a voluntary basis. This is due to the absence of insurance products in the market [1].⁵ • Dental care for adults is excluded from the EHIF benefit package, replaced by cash benefits [1].⁵ • The financing of day care is separated from ambulatory and hospital settings, with the aim of stimulating the development of day care and day surgery [1].⁵ • All doctors, nurses, midwives, and dentists working in Estonia must now be registered with the HCB, which issues registration certificates after verifying training and qualifications. This registrations procedure begins in 2002, and is regulated under the Health Services Organisation Act [1].^{%2} • All health providers obtain the legal status of private entities operating under private law [1].^{%2} • Medical student quota is increased to 100 [1, 9].^{%2} • MoSA establishes a committee on the training of health professionals to advise the Ministry of Education. The committee comprises the MoSA, the Ministry of Education and Research, all three training institutions and representatives from major professional associations [1].^{%2} • Medical and dental training standards established in 1997 are approved by the European Commission [4].^{%2} • The National HIV/AIDS Prevention Programme 2002-2006 is established [1].^{&1}	• January 28: Siim Kallas of the centre-right Reform Party is elected Prime Minister.
2003	• The National Institute for Health Development (NIHD) is established through the merger of three public health institutions. The public health research and development agency is responsible for applied research, and public health monitoring and evaluation [1].^{#1} • MoSA requires the EHIF to administer the reimbursement claims for emergency medical care for the uninsured population, although the state continues to fund this care [1].⁵	• April 10: Juhan Parts of the conservative Res Publica Party is elected Prime Minister.

	- The pharmaceutical reimbursement system begins to operate via a reference pricing system; that is, medicines from different manufacturers containing the same or similar active ingredient are clustered in groups with a maximum reimbursement price [1].[§] - The EHIF begins to fund home nursing and inpatient nursing care [1].[§] July: Capital costs are now included in the prices paid to providers by the EHIF, with the aim of ensuring geographical consistency and fairness in infrastructure development. Costs cover the investment in medical technology and depreciation of premises [1].^{%1} - A three-year residency programme is introduced to train family doctors [1].^{%2} - The Communicable Diseases Prevention and Control Act is adopted. Included is the general legal framework for immunisation [1].^{&1} - The National Strategy for Drug Use Prevention until 2012 is adopted – the first intersectoral health strategy [1].^{&1} - A grant of US\$10 million is received from the Global Fund to Fight AIDS, TB and Malaria for the 2003-2007 period, following an outbreak of HIV/AIDS among injecting drug users [1].^{&1} - The Hospital Network Development Plan (HNDP) 2015 is approved – an update to HMP 2015 [1].^{&3}	
2004	- The EHIF implements a diagnostic-related groups-based payment system for inpatient services [1].[§] - European Union (EU) structural funds become an additional financial resource for health care infrastructure investments, with the government launching the National Development Plan for the Implementation of EU Structural Funds [1, 4].^{%1} December: The Medicinal Products Act is updated and renewed, regulating manufacturing, marketing, and the advertising of medical devices, and making rules for market supervision [1, 4].^{%1} - The HCB begins to collect information on the numbers of doctors, nurses and other health care professionals working in the country, as well as on those wishing to work abroad [1].^{%2} - The National TB Programme 2004-2007 is adopted [1].^{&1} - The Nursing Care Network Development Plan 2004-2015 is published, providing nursing care targets to match the hospital targets set out in the Estonian Hospital Master Plan 2015 [1].^{&3}	March 29: Estonia joins the North Atlantic Treaty Organisation. May 1: Estonia joins the EU.
2005	- The EHIF begins to collaborate with MoSA to conduct annual patient satisfaction surveys [1].^{#1} - The first analyses about the long-term sustainability of health care financing are published by PRAXIS [1].[§] January: The average daily dose price of the second cheapest pharmaceutical product begins to be utilised as the reference price [1].[§] - The Estonian eHealth Foundation is established, with MoSA initiating the development of four eHealth projects: the central health information system, digital images, digital registration, and digital prescription [1].^{%1} - MoSA develops a new health workforce planning model to determine annual admissions quotas [4].^{%2} - The Blood Act is adopted [1].^{&1}	- The National Strategy on Sustainable Development “Sustainable Estonia 21” is published, outlining Estonia’s sustainable development principles. The plan serves as a basis for targeting national investment as well as EU funds. April 12: Andrus Ansip, leader of the Reform Party, is elected Prime Minister.

	- Estonia approves the World Health Organisation (WHO) Framework Convention on Tobacco Control, with the adoption of the Tobacco Act [1].^{&1} - The National Strategy for the Prevention of Cardiovascular Diseases 2005-2020 is adopted [1].^{&1} - The National HIV/AIDS Strategy 2006-2015 is adopted [1].^{&1} - The Family Doctor Hotline service is launched, offering 24-hour access to PHC consultation for the public, 7 days a week, 365 days a year. It aims to provide access to medical advice when family physician offices are closed and to decrease the burden on emergency rooms and ambulances [1].^{&2}	
2006	- Share of out-of-pocket payments begins to decline [1].[§] - Patients are allowed to choose the health care provider with the EHIF contract they prefer. Prior to this, choice was limited to the contracted providers of the EHIF regional department where a given patient was registered [1].[§] - A new quality bonus systems is introduced for family physicians, with the main purpose of increasing the quality and effectiveness of preventive services and improving monitoring of chronic diseases [1].^{&2} - Medical student quota is increased to 140 [1, 9].^{&2} - HNDP 2015 is updated [1].^{&3}	Toomas Hendrik Ilves of the Social Democratic Party is elected President.
2007	- Perceived access to health care begins to decline [1].^{#1} - The Estonian Genome Project becomes the responsibility of the Estonian Genome Centre at the University of Tartu [1].^{#1} - Health financing becomes slightly progressive, i.e., households with higher gross income pay more for health care [1].[§] - The National Cancer Strategy 2007-2015 is adopted [1].^{&1} - A curricula for health promotion specialists is opened at Tallinn Health Care College, indicative of expanding training possibilities for public health specialists [1].^{&1} - The Ministry of Rural Affairs, with its Veterinary and Food Board, becomes the leading institution for all major legislation and supervision concerning food, including alcohol [1].^{&1}	- Onset of global financial crisis. - Estonia joins the Schengen Area. April 5: Andrus Ansip is re-elected Prime Minister.
2008	- The National Health Plan (NHP) is adopted. The NHP aims to integrate all activities aimed at improving the health of the population and linkages between the various stakeholders of the health system and other sectors. It is thus a main tool for intersectoral health planning [1].^{#1} - Estonia hosts a WHO European regional ministerial conference, resulting in the adoption of 'The Tallinn Charter: Health Systems for Health and Wealth' [1].^{#1} - The local government is now permitted to act as a partner and shareholder of a PHC company [1].^{#3} - The Estonian Health Information System (EHIS)—the nationwide eHealth system—is established [1].^{%1} - A curricula for health promotion specialists is opened at Haapsalu College, Tallinn University, indicative of a further expansion in training possibilities for public health specialists [1].^{%2} - The National TB Strategy 2008-2012 is adopted [1].^{&1} - The Poisoning Information Centre is established, with the purpose of maintaining a database with information on first aid and therapy for each type of poisoning and informing the public [1].^{&1}	

	• EU structural funds are allocated to activities to reduce work-related health risks and to promote health in the workplace [1].^{&1}	
2009	• The Emergency Act is adopted as the main legislative act in emergency preparedness and response. It provides a framework for the organisation of planning and action during emergencies [1].^{#1} • The EHIF, in collaboration with MoSA and the WHO Regional Office for Europe, conducts an in-depth analysis of the Estonian health financing system's mid- and long-term sustainability, with the main conclusion that the public revenue base needs to be broadened for the health sector to achieve its objectives [1].^{\$} • July: Owing to the financial crisis, the cash benefits system providing compensation for temporary health-related incapacity for work undergoes reform, increasing the financial responsibilities of the patients and employers [1].^{\$} • The country's physical health system infrastructure is considerably improved since independence [9].^{%1} • Municipalities and county governments are encouraged to compile health profiles, develop local public health action plans, and increase funding for evidence-based health promotion activities [1].^{&1} • October: The Estonian Communicable Diseases Registry is launched, storing national data on reports of 59 communicable diseases and 91 etiological agents [1].^{&1}	
2010	• The Health Board is established (through merger with the HCB, the Chemicals Notification Centre, and the medical devices department of the SAM). The Health Board takes over from the SAM as the competent authority for medical devices in the country [1].^{#1} • Entitlement to EHIF coverage begins to be incrementally extended to include additional small population groups based on political priorities [1].^{\$} • A 15% co-insurance rate for inpatient nursing care is introduced [1].^{\$} • September: The EHIF starts an awareness campaign to empower patients to make more price-aware choices in the pharmacy and to ask for an INN-based (generic) prescription from their doctor, if not already offered [1].^{\$} • The digital prescription project is launched by the EHIF. Doctors prescribe medications for patients using their computer software and forward an e-prescription to the national database. The e-prescription is then immediately accessible in every pharmacy on patient request [1].^{%1} • The Health Board begins to analyse health threats and risks from the living environment, preparing guidelines for the assessment of the impact of environmental risk so on health and informing the general public of health risks. This is in response to prior impact assessments prepared by a limited number of licensed experts, in accordance with the Environmental Impact Assessment and Environmental Management System Act, which were rather general and lacked details [1].^{&1} • All medical wards and hospitals are integrated with the EHIS [1].^{&3}	• December 9: Estonia joins the Organisation for Economic Cooperation and Development (OECD).
2011	• The Guideline Advisory Board is established, with the aim of improving the quality of health services by supervising the development of efficient and evidence-based clinical guidelines [1].^{#1} • The Patient Rights Act is again raised in parliament, but does not result in any legislation [1].^{#1}	• The National Reform Programme "Estonia 2020" is established, setting out objectives to be used towards improving Estonian competitiveness. The plan serves as a basis for

	- The Estonian Nurses Union and the Estonian Midwives Association draft a strategy setting priorities for development for 2011-2020 [1].^{%2} - MoSA commissions the University of Tartu to evaluate the cost-effectiveness of three vaccination schemes: rotavirus, Streptococcus pneumoniae (pneumococcus), and human papillomavirus [1].^{&1}	targeting national investment as well as EU funds. January 1: Estonia joins the Eurozone and adopts EU single currency. January 15: The Estonian kroon ceases to be legal tender. April 6: Andrus Ansip is re-elected to a third term as Prime Minister. August: Toomas Hendrik Ilves is re-elected as President.
2012	- PHC organisation is centralised [1].^{#2} - A structural deficit in the EHIF budget encourages investigation into the need for diversified revenue sources [10].^{\$} - The partners of self-employed individuals active in their spouse's business activities earn entitlement to EHIF coverage [1].^{\$} - Caps on pharmaceuticals with a 50% reimbursement rate are abolished due to effective price control [1].^{\$} - The Centre for Health Technology Assessment is established at the Institute of Family Medicine and Public Health of the University of Tartu, the only academic medical institution in Estonia [1].^{%1} - Negotiations regarding health professionals' salaries arrive at an impasse, resulting in a 25-day health worker strike [1].^{%2} - The NHP is updated, integrating national public health strategies [1].^{&1} - The National Strategy for the Prevention of Cardiovascular Diseases 2005-2020 is abolished [1].^{&1} - A new Estonian Mental Health and Well-Being Coalition (VATEK) is established by the initiative of the Estonian-Swedish Mental Health and Suicidology Institute, with support from the MoSA [1].^{&1} - The EHIF begins to report on selected indicators of the HNBP hospitals [1].^{&3}	
2013	- The Advisory Board for the Development of Quality Indicators is established in cooperation with the University of Tartu and the EHIF [1].^{#1} - PHC-related administrative functions (assigning patient lists, temporary substitution of family physicians, supervision) are recentralised from county governors to the Health Board [1].^{#2} - The EHIF makes the benefits package selection process fully public by publishing all information about the process on their website (i.e., the submitted application, supporting documents, and the decision about inclusion/exclusion) [1].^{\$} - The EHIF starts remunerating new innovative e-consultations, in which family physicians consult with specialists through the health information system without sending the patient to the specialist care provider [1].^{\$} - E-consultation is launched. The software allows family doctors and specialists to consult with specialist doctors about specific cases via the internet [1].^{%1} July: The national patient's portal, within which individuals can access their own medical data, is relaunched with new features [1].^{%1}	
	An additional allowance is introduced for family doctors employing a second nurse, with the aim of supporting the nurse's increasing role in monitoring patients with chronic	

	diseases and acute health disorders, as well as in counselling and prevention [1]. ^{&2}	
2014	- MoSA begins to be directed by two ministers: the Minister of Health and Labour, and the Minister of Social Protection [1].^{#1} - Strategic paper “Health Care Development Directions until 2020,” which complements the NHP, is adopted [1].^{#1} - Risk-sharing scheme is implemented through which pharmaceutical companies are required to bear the cost of a pharmaceutical if the desired clinical impact has not been achieved – this mostly applies to oncological pharmaceuticals [1].⁵ - Persons receiving creativity grants earn entitlement to EHIF coverage [1].⁵ - The EHIF adopts new purchasing procedures and criteria. Main changes include redefined access criteria based on population need, and an increased emphasis on quality [1].⁵ - Revisions to the Medicinal Products Act are introduced [1].^{%1} - The submission of digital images becomes mandatory for all health care providers. The images are linked to the central information system—the digital image archive—which is managed by the Estonian Picture Archiving and Communication System [1].^{%1} - The Green Paper on Alcohol Policy is adopted [1].^{&1} - The Green Paper on Tobacco Policy is adopted [1].^{&1} - The White Paper on reducing illegal drug use is adopted, developed by the Ministry of the Interior [1].^{&1} - Family physicians may now receive an allowance for overtime work, and nurses for appointments outside of working hours (before 8:00 or after 18:00) [1].^{&2} - The EHIF launches a public awareness campaign—to promote the role of family doctors—with the message: “The solution for any health problem starts with the family doctor” [1].^{&2} - The EHIF Supervisory Board agrees on waiting times for specialist ambulatory care services [1].^{&3}	- The European Commission publishes a report indicating that corruption in Estonia—in general but also specifically in health care—is lower than the EU27 average. March 26: Taavi Rõivas of the Reform Party becomes the new Prime Minister following Andrus Ansip’s resignation.
2015	- The Estonian Patient’s Union widens its activities [1].^{#1} - The EHIF develops geographical accessibility criteria, to be used for annual contract planning and as a basis for selective contracting. These criteria relate access requirements to a particular geographical location (county) instead of provider [1].⁵ - The Estonian eHealth Strategy is approved. The strategy aims to contribute to the achievement of the targets set out in the NHP [1].^{%1} February: A new e-service and innovation division is created within MoSA [1].^{%1} - A MoSA project originally targeting doctors who had the required training but who were not in the health care workers’ registry, is reoriented to target nurses. 21 nurses completed the subsequent course, and several started working in the health sector [1].^{%2} - The NIHD begins to manage the registries related to cancer screenings [1].^{&1}	March: The ruling Reform Party wins the parliamentary election. April 9: Taavi Rõivas is re-elected Prime Minister.
	The WHO conducts an assessment of the Estonian health system and its capability to address the growing burden of non-communicable diseases. The assessment concludes that while remarkable progress has been made, there are	

	still challenges that need addressing regarding the quality and access of care [1].^{&1} • Participation in the quality bonus system becomes obligatory for all family physicians; the individual results are publicly reported [1].^{&2} • August: The Minister of Health and Labour defines the minimum requirements for PHC centres to receive investment grants. These include: PHC centres must be staffed by at least three family doctors, six in bigger cities; midwife, home nurse and physiotherapy services should be offered in addition to family doctor and nurse services, with a wider scope of services encouraged [1].^{&2} • The National Audit Office assesses inpatient nursing care hospitals and home nursing services in the areas of accessibility, patient's demands, and sustainable financing. The audit finds a lack of coordination between nursing care services and the social support system, and regional inequities in nursing care provision. The Office recommends the development of uniform need assessment tools, better integration of social and nursing care, and the reduction of regional disparities in access to care [1].^{&3} • Strategic document "Estonian Health Care Development Directions Until 2020" is approved by the government, advocating for the continued prioritisation of hospital networking [1].^{&3}	
2016	• MoSA commissions an external evaluation to analyse the institutional setup of the health sector to identify efficiency gains and options to merge some functions. It finds that there are not many overlapping activities, and that regulatory clarification and ministerial leadership are the main tools that could improve efficiency [1].^{#1} • A formal evaluation of the NHP is carried out [1].^{#1} • The NIHD begins reporting health care service quality indicators data to OECD [1].^{#1} • The government, in its coalition agreement, agrees to make a once-off direct transfer from the state budget into the EHIF to improve adult dental care coverage and access to specialist care in 2017 [1].[§] • The EHIF increases the share of the basic allowance, which practices receive to cover costs of the premises and transport for doctors and nurses. At the same time, the share of capitation in the payment scheme is reduced [1].[§] • The EHIF makes considerable changes to the quality bonus system for family physicians, raising the payment by 25% and rewarding bundled activities over single activities [1].[§] • The EHIF reports its highest ever deficit [1].[§] • Community-based health promotion on the county level begins to, again, be funded solely from the state budget, after several years of being financed by different sources (including the state budget, the EHIF and EU structural funds) [1].[§] • July: A database of drug interactions is introduced [1].^{%1} • The project targeting individuals with nurse training outside the health sector, for the purposes of bringing them into the health sector, is continued owing to its success in 2015 [1].^{%2} • November: A consensus agreement to increase training capacity for nurses is signed between several key stakeholders, aiming to increase nurse training capacities from 400 in 2016 to 517 in 2020 [1].^{%2} • VATEK publishes the new Mental Health Strategy for 2016-2025 [1].^{&1}	• Estonia is classified as a high-income country by the World Bank. • October 10: Kersti Kaljulaid is elected President as an Independent – the first female President of Estonia. • November 23: Jüri Ratas, chairman of the centre/centre-left Centre Party, becomes the new Prime Minister after Rõivas government loses a parliamentary vote of no confidence.

	- After several years of stakeholder discussions, family nurses receive the right to prescribe a limited number of medicines, mainly for chronic conditions [1].^{&2} - A first report is published by the Advisory Board for the Development of Quality Indicators, specifying quality monitoring indicators for five specialties – neurology, oncology, intensive care, gynaecology, and surgery [1].^{&3}	
2017	- In-kind dental care for all adults is included in the benefit package covered by the EHIF [1].⁵ April: EHIF revenue base is broadened by introducing state contributions for pensioners [1].⁵ - The Centre of Health and Well-Being Infosystems (CeHWIS) is established, by merging the eHealth Foundation and the Information and Communication Technology (ICT) units MoSA [1].^{%1} - The project targeting individuals with nurse training outside the health sector, for the purposes of bringing them into the health sector, is continued owing to its success in 2015 and 2016 [1].^{%2} April: After more than 6 months of difficult wage negotiations between representative bodies of health professionals, medical associations and unions, a collective agreement is reached, lasting until April 2019 [1].^{%2} - The National HIV/AIDS Action Plan for 2017-2025 is approved [1].^{&1} - An independent evaluation concludes that domain-specific national public health action plans should be restored if health system governance is to be improved [1].^{&1} January 1: The Atmospheric Air Protection Act is introduced, replacing the previous Ambient Air Protection Act, which regulates responsibilities and measures with regard to air pollution and noise [1].^{&1} - A new basic allowance is introduced for PHC centres with the aim of motivating individual PHC providers to form groups and provide a wider scope of services [1].^{&2} - The EHIF, in cooperation with the World Bank, undertakes a pilot project on enhanced care management of high-risk patients by family physicians [1].^{&2}	Administrative reforms are instituted, creating a single-tiered local government system with 79 local governments, including 15 cities and 64 municipalities.
2018	- A campaign to collect an additional 100,000 gene samples for the Estonian Genome Project, in addition to the 51,515 existing samples, is launched [1].^{#1} - EHIF takes over responsibility for administering the positive list and price setting of medicinal and pharmaceutical products, receiving advice on these responsibilities from the Pharmaceutical Committee [1].⁵ - The EHIF takes over financing for ambulance, in vitro fertilisation treatment and replacement of family physicians [1].⁵ 2017 reform introducing state contributions to the EHIF officially goes into effect [10].⁵ - The EHIF takes over responsibility for negotiating standard contract conditions with emergency care providers [1].⁵ - MoSA can initiate changes to the benefits package and request EHIF to submit an application [1].⁵ - The additional reimbursement of costs of prescription pharmaceuticals is changed to an in-kind benefit. Previously, insured people could apply for additional reimbursement of pharmaceutical expenditures if their annual expenditure exceeded €300. With the new rules, this threshold is lowered to €100 with automatic reimbursement [1].⁵	

	The project targeting individuals with nurse training outside the health sector, for the purposes of bringing them into the health sector, is relaunched for doctors [1].%2	
2019	- The EHIF takes over responsibility for procurement of pharmaceuticals from MoSA, with the aim of ensuring more effective coverage and financial protection [1].⁵ - The EHIF starts financing emergency care for the uninsured and for immunisation, and TB and HIV drugs procurement [1].⁵	- Parliamentary elections take place. Jüri Ratas' Centre Party forms a new coalition government with the Conservation People's Party and Isamaa; the Reform Party and the Social Democratic Party form the opposition. April 29: Jüri Ratas is re-elected Prime Minister. June 7: Estonia is elected a non-permanent member of the UN Security Council.
2020		
2021		January 13: Jüri Ratas resigns as Prime Minister following a corruption scandal. January 26: Kaia Kallas, the leader of the Reform Party, becomes Prime Minister - the first female Prime Minister of Estonia; the Reform Party and Centre Party join a two-party coalition to form the new government.

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Appendix H
Phase 2b: Qualitative Data – Moldova

LEGEND*	
Organisation and Governance	General/Miscellaneous ^{#1}
	Decentralisation and Recentralisation ^{#2}
	Privatisation ^{#3}
Financing	Financing [§]
Physical and Human Resources	Physical Resources ^{%1}
	Human Resources ^{%2}
Provision of Services	Public Health ^{&1}
	Primary Health Care ^{&2}
	Specialised and Inpatient Services ^{&3}

*Where a health system reform/event aligned with multiple themes, the reform/event was assigned to the most relevant theme

YEAR	HEALTH SYSTEM	POLITICAL AND ECONOMIC EVENTS
1990		• September 3: Formerly the Chairman of the Supreme Soviet of the Moldavian Soviet Socialist Republic, Mircea Snegur is elected President as an Independent. • The Transnistria War begins.
1991	• Ownership of primary health care (PHC) and inpatient facilities at district and municipal levels are transferred to the local authorities at those levels [1].^{#2}	• The Transnistria region of Moldova declares independence, going unrecognised both internally and internationally. • May 28: Valeriu Muravschi of the Popular Front of Moldova is appointed Prime Minister. • August: Moldova declares independence, with the dissolution of the Soviet Union. • December: Moldova joins the Commonwealth of Independent States (CIS).
1992	• Parliament adopts the Law on Health Assistance through Health Insurance, which paves the way for a shift to an insurance-led system; however, this law is not ratified for several years due to difficult social, political, and economic conditions [2].[§]	• The Transnistria War ends. • Moldova becomes an official member of the United Nations (UN), signing various international treaties. • July 1: Andrei Sangheli of the of the centrist Democratic Agrarian Party (later the Agrarian Party) is appointed Prime Minister.
1993	• State medical university introduces family physician training, under the Faculty of Family Medicine [3].^{&2}	• The Moldovan lei is introduced as the national currency, replacing the ruble.
1994	• The Constitution of 1994 guarantees the right to health and to a free-of-charge minimum package of health services offered by the state [1, 4].^{#1} • The Law of Petitions is passed by government. Patients' requests or complaints are examined within this framework [1].^{#1} • Over 400 pharmacies are private following major privatisation of the pharmaceutical sector [2, 5].^{#3}	• Special autonomy status is granted to the Gagauz region (Territorial Administrative Unit of Gagauzia). • July 29: A new constitution is adopted, replacing the old Soviet constitution of 1979.

	December 7: The Government Decision on the Organisation of the Health Insurance Experiment is adopted, setting up the mechanisms for a pilot scheme in four districts; the central sector of Chisinau, Anenii Noi, Dondusheni and Sholdaneshti. The scope of the experiment includes a reduction in bed numbers, new models of delivering PHC, and the creation of voluntary health insurance (VHI) funds [2].[§] - The Association of Nursing of the Republic of Moldova is founded [1].^{%2} - An integrated national immunisation programme is introduced, targeting eight diseases (tetanus, diphtheria, polio, measles, tuberculosis (TB), pertussis, hepatitis B, and mumps), with vaccinations free-of-charge for all children [2, 5].^{&1}	
1995	March 28: The Law on Health Protection (or Health Care) is passed by government. The law identifies three forms of health assistance (statutory, private, and insurance-based); determines the relative responsibilities of the local and central authorities, managers of enterprises, and citizens; and confirms the necessity of health system decentralisation and financial reform. It also postulates the introduction of charges for health services, and defines patients' rights to choose their physician and services [2].^{#1} April: The Basic Law on Health Care is adopted, defining the minimum level of free health services the state is required to provide, establishing the basis for the family medicine model, and creating some allowance for the privatisation of outpatient and inpatient health facilities [2, 3, 5].^{#1} August 4: The Government Decision on Approval of the State Program for Health Care System Development under the New Conditions for 1995-1997 is adopted. This emphasises the necessity of the following: elaboration and implementation of state programs and plans for certain key policy areas; health insurance development; development of a private sector in health; introduction and development of charges for services; licensing of health care institutions and providers; definition of a 'basic package' of state services and its implementation; creation of a framework for the managerial and financial autonomy of health institutions; development of contractual relationships in the health sector; and making PHC a priority [2].^{#1} - The 'Health Lifestyles' Centre is developed under the National Centre of Preventive Medicine [5].^{&1}	Moldova becomes one of the first post-Soviet countries to join the Council of Europe.
1996	- The state health budget is set at 4.7% of gross domestic product (GDP) [2].[§] - A two-year postgraduate residency is instituted for medical specialties [2].^{%2}	The Alliance of Centrist Democrats takes power, replacing the Agrarian Party.
1997	- The Association of Nursing of the Republic of Moldova joins the World Health Organisation (WHO) European Forum of Nursing [1].^{%2} December 16: The Law on Mental Health is passed [1].^{&1} - Government Decree Regarding the Development of Primary Medical Assistance is adopted [3, 5].^{&2}	January 15: Petru Lucinschi of the Democratic Agrarian Party is elected President. January 24: Ion Ciubuc of the non-Communist Alliance for Democracy and Reforms coalition is appointed Prime Minister.
1998	The negative effects of the fiscal shock—the result of the Russian financial crisis—peak, and almost all rural hospitals are closed. The fiscal shock also results in dramatic decreases in the total expenditure on health and public expenditure on health as a proportion of GDP [1].[§]	August 17: Russian financial crisis begins, causing fiscal shock in Moldova.

	• February 27: Parliament approves the Law on Mandatory Health Insurance (MHI), but its implementation is postponed because of the economic crisis [1].⁵ • 'Health Lifestyles' Centre launches health education programmes targeting human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) prevention, smoking cessation, and mental health [5].^{8,1} • Government designs the Health Investment Fund Project, in collaboration with the World Bank, aiming to strengthen the PHC sector [3].^{8,2}	
1999	• July 21: All former state dental care institutions are transformed into state self-financed enterprises, except for those providing paediatric and emergency services [1].^{#1} • The Law on Local Public Administration provides the framework for decentralisation of the health structure [5].^{#2} • Law on Privatisation is passed, rendering almost all pharmacies and dental clinics private entities [5]. • The Law on the Minimum Package of Free-of-Charge Health Care Guaranteed by the State is approved. This regulatory act introduces a minimum package of services to be provided free of charge to the entire population, with the government and local public authorities responsible for its financing [1].⁵ • The League of Doctors of the Republic of Moldova is founded [1].^{%2}	• February 5: Serafim Urechean, an Independent, becomes Acting Prime Minister. • February 19: Ion Sturza of the Alliance for Democracy and Reforms coalition is appointed Prime Minister. • July 14: The Law on State Social Allocations for Some Categories of Citizens is approved. This Law and its subsequent modifications (in 2006 and 2010) delineate beneficiaries of monthly allowances. • December 21: Dumitru Braghîş, an Independent, is appointed Prime Minister.
2000		• Drought hinders some parts of agricultural production. • Moldova becomes a parliamentary republic after legislation is passed limiting executive authority.
2001	• The National Health Insurance Company (NHIC) is created [1].⁵	• Moldova joins the World Trade Organisation. • April 7: Vladimir Voronin of the left-wing/far-left Party of Communists is elected President. • April 19: Vasile Tarlev of the Party of Communists is appointed Prime Minister.
2002	• The National Council for Evaluation and Accreditation in Health is created [1].^{#1} • Government Resolution No. 156, Statute of the NHIC is adopted, establishing 11 territorial branches of the NHIC [3].⁵ • The National Medicines Policy is approved by parliament [1].^{%1}	
2003	• The new MHI financing mechanism is piloted in the Hînceşti rayon [1].⁵ • December 29: The payment of most health workers begins to be regulated by the Government Decision on Approving the Regulation on Remuneration of Employees of Public Medical and Sanitary Institutions which are part of the MHI System [1].⁵ • The Emergency Health Care Service is created [1].^{8,1}	• A new Public Administration Law is passed reorganising the country into 32 local districts (rayons), three municipalities, and two autonomous regions – Gagauz-Yeri and Transnistria. • December 25: The Law on Social Protection is passed.
2004	• MHI is implemented nationwide [1].⁵ • PHC services begin to be purchased on a per capita basis. Incentives are refined to better reflect variations in need [1].^{8,2} • All public hospitals become state enterprises, increasing hospital autonomy [3, 5].^{8,3}	• Moldova signs the European Neighbourhood Policy (ENP) Action Plan. The ENP was created as an alternative to further EU expansion.

	- Specialist outpatient care begins to be purchased prospectively using capitation [1].^{&3} - Hospital services are purchased retrospectively according to number of patients treated [1].^{&3}	
2005	- The Law on Patient Rights and Responsibilities is passed by parliament [1].^{#1} - Moldova ratifies the International Health Regulation of 2005 [1].^{#1} - Per capita funding is combined with retrospective extra payments for achieving certain quality indicators (e.g., providing tuberculosis (TB) care, care of women in the first trimester of pregnancy, providing gynaecological cytological screening examinations and care of children in the first year of life) [1].⁵ December 23: Health workers involved in public health services, rehabilitation centres for children and school health services begin to be paid according to the Law on the Salary System in the Budgetary Sector [1].⁵ - The Medicines Agency is created [1].^{%1} - The Law on the Exercise of Medical Profession is passed. This regulates continuous medical education. According to this law, every doctor is obliged to accumulate a certain number of continuous training hours and to pass an examination every five years confirming the previous qualification or awarding a new category of qualification [1].^{%2} August 26: The National Strategy on Reproductive Health for 2005-2015 is approved, which sets specific targets related to family planning [1].^{&1} - Hospital services add an extra section to its payment mechanism for consultants [1].^{&3}	
2006	December 21: The Law on Insurance is passed. This forms the legal base for the regulation of the VHI market by the National Commission of Financial Market [1].⁵ - A value added tax of 8% is applied to pharmaceutical products [1].^{%1} - Hospital services add an extra section to its payment mechanism for internal medicine [1].^{&3} - The number of hospitals stabilises at around 80 [1].^{&3}	
2007	- The National Centre of Health Management (NCHM) is created [1].^{#1} - The National Health Policy 2007-2021 document, developed in accordance with WHO recommendations, is approved by government. Main objectives include reducing the health inequalities for all social groups and the consolidation of intersectoral partnership for strengthening the population's health [1].^{#1} December: The Unified Programme benefits package is approved [1].⁵ - Government Decision on the Setting of Conditions for the Marketing and Use of Medical Devices is issued [1].^{%1} April 13: The Law on Public Procurement is approved. This guides the public procurement of medicines and medical devices [1].^{%1} - National Centre for Health Management is established, with responsibility for strategic planning, and the collection and analysis of national health data [1].^{&1} June 12: The National Programme for the Promotion of the Healthy Lifestyle is approved; among other things, this Government Decision obliges public media to reserve	Onset of global financial crisis.

	broadcasting space for health education and health promotion [1].^{&1} • July: The Chief Sanitary Doctor approves a decision banning the advertising of calorie-dense products in institutions for children [1].^{&1}	
	• August: New water quality norms, harmonised with EU norms, are approved. The State Service on Public Health Surveillance (SSPHS) is responsible for monitoring the quality of drinking-water, surface water and water in recreational areas [1].^{&1}	
	• Formal survey on the condition of facilities in primary care is conducted, as part of the World Bank project on Health and Social Assistance Services [1].^{&2}	
2008	• The government approves the National Plan for the implementation of the International Health Regulation of 2005 [1].^{#1} • October: The Law on Public-Private Partnership is approved, which creates the necessary premises for attracting private investments in the public sector [1].^{#3} • The Health System Development Strategy for 2008-2017 is approved. This aims to improve public health by consolidating improvements in the health system [1].^{&1} • The Law on Security and Health in the Workplace is approved by parliament [1].^{&1} • December 25: The Ministry of Health (MoH) adopts methodological norms for annual preventive check-ups of the population. According to the norms, check-ups should include examination of lymph nodes, breasts, and thyroid gland; gynaecological and rectal examination; measurement of blood pressure, eye pressure and electrocardiography; and biological tests [1].^{&1} • Legal separation of PHC at the district level takes place, with the aim of increasing the efficiency of primary care services at the district level [1].^{&2} • Contracting began to use global budgets for patients requiring long inpatient stays (e.g., psychiatric care) [1].^{&3} • The MoH issues Order No. 324 on Developing the Palliative Care Services in the Republic of Moldova, by which approval is also granted for the Concept of Developing the Palliative Care Services in the Republic of Moldova [1].^{&3} • December 31: National Programme on the Creation of an Integrated System of Social Services for 2008-2012 is approved by government. The Programme aims to extend community and specialised social services rapidly as an alternative to residential services and improve their effectiveness and efficiency by combining prevention and rehabilitation services and by dealing with patients at the community level before their problems get more complex [1].^{&3}	• A household survey is conducted by the National Bureau of Statistics (NBS) [1]. • March 31: Zinaida Greceanii of the Party of Communists is appointed Prime Minister.
2009	• The MoH sets up the Health Sector Coordination Council for External Assistance [1].^{#1} • The MoH creates its Internal Audit Service, which conducts audit activities in subordinated institutions [1].^{#1} • The MoH develops a draft Law on Civil Liability Insurance that was examined and commented on by the other ministries involved; its progress was stopped, however, because the implementation of such a law might have generated legal and financial problems [1].^{#1} • Amendments and supplements to the national legislation are made, which eliminate barriers to attracting private investment in the health sector. As a result, a private multi-profile hospital is opened in Chisinau within the year [1].^{#3}	• September 11: Mihai Ghimpu of the centre-right Liberal Party becomes Acting President, as part of the anti-communist Alliance for European Integration coalition. • September 14: Vitalie Pîrlog of the Party of Communists becomes Acting Prime Minister. • September 25: Vladimir Filat of the centre-right Liberal Democratic Party, also part of the Alliance for European Integration, is appointed Prime Minister.

	- Amendments are made to the Law on MHI, providing insurance coverage to families living below the poverty line, regardless of employment status [6].⁵ - There is an increase in public expenditure on health (mainly the result of additional resources being allocated from the national budget for specific health programmes). Total health expenditure as a proportion of GDP in Moldova is now the highest in the WHO European region [1].⁵ - The capitation formula begins to be risk-adjusted (by age) and is estimated based on the number of patients registered at a given practice [1].⁵ - Payments according to the number of treated patients for certain conditions (e.g., TB) is initiated [1].⁵ - OpenMEDIS is launched, Moldova's health technology management system. MEDEX 2.0, an automated PHC system, is implemented shortly after [1].¹ September: The Government Decision on Approving Regulation for the Procurement of Medicines and Other Products with Medical Destination is issued, which further regulates the procurement of medical equipment [1].¹ - The Law on State Surveillance of Public Health is approved; marks a shift from the old-style sanitary-epidemiological system focusing on communicable disease control and sanitary inspection, to more emphasis on noncommunicable disease control, health promotion and disease prevention [1].¹ March 30: The Ministerial Order on the Organisation and Functioning of Emergency Health Care in the Republic of Moldova is approved. This order further approves the Regulation of the Emergency Health Care Service [1].¹ - The EU-supported project 'Support to the Health Reform: Strengthening PHC in Moldova' provides basic modern equipment to rural health centres, autonomous health centres and family medicine centres to a value of €3.9 million [1].² - The Hospital Master Plan (HMP) is developed with World Bank support [1].³ January 17: The MoH issues a special Order on Community Mental Health Centres (CMHC), which approves the minimum requirements on CMHC staffing, spaces, and equipment, as well as the case volume for a CMHC service user, making it possible for the NHIC to contract such services [1].³ June: The MoH issues Order No. 154 on the Organization of Palliative Care Services, by which the necessary regulation for palliative care is approved. The Regulation defines the types of palliative care, the recipients, and providers of such services (including multidisciplinary teams) and the basic principles of palliative care [1].³ July 12: Ministry of Labour, Social Protection and Family Order No. 55 is approved, stipulating the referral mechanism to residential care. According to this Order, the territorial social assistance units refer to residential care institutions patients with complex issues that cannot be solved by primary social and medical care services but do so only after exhausting all other options at community and family levels [1].³	
2010	The Health Sector Coordination Council for External Assistance begins to operate in line with the Governmental Regulation on the Institutional Framework and Coordination Mechanism of the External Assistance	A household survey is conducted by NBS.

	provided to the Republic of Moldova by International Organisations and Donor Countries [1].^{#1} • The Transplant Agency is created [1].^{#1} • The MoH, jointly with the Ministry of the Environment, develops the report 'Children's Health and the Environment in the Republic of Moldova' [1].^{#1} • Quality control in medical facilities (irrespective of their property type and organisational form) begins to be delegated through a ministerial order to the National Council for Evaluation and Accreditation in Health [1].^{#1} • February 16: The MoH, along with other government authorities, develop internal rules for ensuring transparency in the decision-making process, in line with the Governmental Decision on the Actions for the Implementation of Law No. 239-XVI (from 13 November 2008) Regarding the Transparency in the Decision-Making Process [1].^{#1} • December 27: The Participation of All Partners in the Strengthening of Population's Health is made an objective. Under this objective, the development of community and home care services is made part of the MoH Activity Plan for 2011 [1].^{#1} • December: A special Government Decision, on Public-Private Partnerships (PPP) in the Provision of some Health Services, is issued. Based on this decision, two PPP projects begin development in partnership with the International Finance Corporation: the diagnostic imaging services in the Republican Clinic Hospital and the radiotherapy services in the Institute of Oncology [1].^{#3} • Further amendments are made to the Law on MHI, including granting universal access to PHC services to Moldovan citizens, regardless of employment status or income level [6].⁵ • The NHIC begins managing a fund for the development and modernisation of public health services providers. Every public provider that has a contract with the NHIC may submit an investment project that is examined and approved for financing on a competitive basis, according to a special regulation approved by the government. The development fund consists of 1% of the total health insurance fund [1].⁵ • The Regulation on the Approval and Registration of Producers' Prices for Medicines is approved. Main objectives include ensuring economic accessibility and the social interests of consumers, as well as transparency in regulating the prices for medicines [1].⁵ • The MoH promotes and parliament approves amendments and supplements to the legislation to stipulate that activities involving medical devices are regulated by law [1].^{%1} • The MoH begins testing an information system to collect information on medical devices that would allow demand to be estimated more accurately in several pilot facilities; it is not, however, applicable to all public medical facilities [1].^{%1} • The full renovation of seven health centres and one family doctor office are finalised, and another 18 health centres are being repaired. This is in collaboration with the World Bank project on Health and Social Assistance Services [1].^{%1} • October 27: The Development Programme of the Medical and Pharmaceutical Education in the Republic of Moldova for 2011-2020 is approved. This, in conjunction with the	• December 28: Vladimir Filat becomes Acting President. • December 30: Marian Lupu of the centre/centre-left Democratic Party, another member of the Alliance for European Integration, becomes Acting President.
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	Development Strategy of the State University of Medicine and Pharmacy “Nicolae Testemitanu” for 2011-2020, aims to modernise the medical education system and adjust it to EU and World Federation for Medical Education standards and practices [1].^{%2} • A special module on notification and evaluation of public health events of international concern is developed within the electronic system of epidemiological warning, in line with Annexes 1 and 2 of the International Health Regulation of 2005 [1].^{&1} • In support of the National Programme on Immunisations, the Global Alliance for Vaccines and Immunisations provides 132,200 combined vaccine doses (DPT plus <i>Haemophilus influenzae</i> type B) [1].^{&1} • There is a significant increase in tax rates for all categories of cigarettes (with and without filter) [1].^{&1} • The National Strategy against Drugs for 2011-2018 is approved by government [1].^{&1} • The National Strategy for Road Safety is approved by parliament [1].^{&1} • May 12: A regulation setting up the SSPHS and its staffing is approved, paving the way for the creation, and strengthening of noncommunicable disease control and health promotion units at central and local levels [1].^{&1} • December: The National Programme on Immunisations for 2011-2015 is approved in line with the WHO Global Immunisation Vision and Strategy. The programme goal is to ensure free-of-charge vaccinations against TB, hepatitis B, polio, diphtheria, tetanus, whooping cough, measles, mumps, rubella, <i>Haemophilus influenzae</i> type B, rotavirus, and pneumococcal infections [1].^{&1} • December: The National Programme on TB Control for 2011-2015 is approved [1].^{&1} • December: The National Programme on Prevention and Control of HIV/AIDS and sexually transmitted infections for 2011-2015 is approved [1].^{&1} • December 27: The MoH working group is set up to evaluate the epidemiological situation regarding noncommunicable diseases, and to identify priority conditions having a negative impact on public health [1].^{&1} • The Strategy for the Development of PHC for 2010-2013 is approved. Main objectives include strengthening and ensuring sustainability for the PHC system [1].^{&2} • September 9: The Regulation on Populations Registering with the Institution providing PHC within MHI is adopted. This describes the choice of family doctor, mentioning freedom of choice as a basic principle in the process of registering [1].^{&2} • October 13: The MoH Order on PHC in the Republic of Moldova revises the organisation of primary care. According to this, primary care may be provided by both public and private providers. The services provided are divided into basic primary care services and additional medical services. This also includes stipulations on the organisation of day care at the primary care level [1].^{&2} • The HMP is revisited and revised, but is not implemented [1].^{&3} • The Government of Japan provides modern equipment for the district hospitals in Criuleni and Anenii Noi and for the National Scientific and Practical Centre of Emergency Medicine under the KUSANONE grants program [1].^{&3}	
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	- The Swiss Development Cooperation Agency equips the paediatric emergency and intensive care services under the project 'Regionalization of Paediatric Emergency and Intensive Care Services in the Republic of Moldova'; supports the piloting of a health technology management system [1].^{&3} - The government conducts the Evaluation of Hospital Safety, which reveals structural safety problems in 10 (16.4%) of the institutions covered, most built at the end of the 19th and first half of the 20th century [1].^{&3} January 29: Ministerial Order No. 62 updates the organisation of perinatal care services. According to this document, the service is structured in three levels. The first level is represented by 26 district perinatal centres and 1 municipal perinatal centre in Chisinau. The second level comprises 10 more-advanced perinatal centres, which serve as regional referral centres for the first level. The third level is represented by the Institute of Scientific Research in the Field of Mother and Child Health Care in Chisinau [1].^{&3} May 7: The Programme for the Development of Hospital Health Care for 2010-2012 is approved, with the goal of increasing the efficiency and quality of hospital services through their development and modernisation [1].^{&3} August 20: The MoH issues the Order on Organisation and Functioning of the Mental Health Service in the Republic of Moldova which guides the organisation and development of mental health care services [1].^{&3} December 27: The MoH modifies the Norms of Medical Personnel for Hospital Care in Republican (national), Municipal and District Institutions by introducing palliative care at the level of doctors, nurses, and lower-level health care personnel in municipal and district public hospitals [1].^{&3} December 27: The MoH approves the set cost for one assisted case of palliative care provided in hospital/hospice [1].^{&3} December 30: The MoH issues Order No. 884 on Approving the National Standards on Palliative Care [1].^{&3}	
2011	- The MoH develops and approves over 1,000 quality indicators for health care. Implementation is made the responsibility of health care facility managers, while the development of monitoring and evaluation mechanisms for these indicators is made the responsibility of the NCHM [1].^{#1} - The government attempts to introduce co-payments for visits to family doctors to be paid by uninsured individuals. This is rejected by parliament [1].⁵ April 29: Methodological Norms for the Application of the Unified Programme of MHI is approved by a joint MoH and NHIC Order [1].⁵ - The MoH initiates procedures for a governmental decision attributing the regulatory functions for medical devices to the Medicines Agency [1].^{%1} - The MoH, with World Bank support, drafts the Strategy for the Development of Human Resources for Health with the aim of adjusting the supply of health personnel to the contemporary needs of the system and to encourage health worker retention [1].^{%2} May: The MoH approves two new regulations: the Regulation on the Attestation of Doctors and Pharmacists,	

	and the Regulation on the Quantification of Credits under Continuous Medical Education [1].^{%2} • October: A WHO/EU-supported project, 'Better Managing the Mobility of Health Personnel in the Republic of Moldova', is officially launched [1].^{%2}	
	• The State Programme for the Development and Technical/Material Outfit of the SSPHS for 2011-2016 and the list of fees for public health services are approved [1].^{&1} • The National programme to reduce and eradicate iodine deficiency is developed and approved by government [1].^{&1} • December 13: The National Programme for the Development of Emergency Health Care for 2011-2015 is approved by government. The objectives of this programme are to improve access to emergency care and improve the efficiency and quality of services [1].^{&1} • October 4: List of examinations and investigations during annual check-ups is updated in order to avoid duplications between the preventive check-ups and the check-ups conducted within the approved standards of care for children and pregnant women [1].^{&2} • An innovative project for online appointments for consultations with specialists and diagnostic services in the Republic Diagnostic Centre begins [1].^{&3} • Inpatient TB care begins to be financed according to bed-days [1].^{&3} • March 31: The MoH issues Order No. 244 on the Organisation of Palliative Care Services for Persons Living with HIV/AIDS [1].^{&3} • May 25: The Order on the Organisation and Functioning of Medical Rehabilitation and Physical Medicine Service in the Republic of Moldova is approved. This regulates the organisation of the occupational therapy services in public and private medical facilities, rehabilitation, and social assistance services; it also makes an occupational therapist a member of multidisciplinary rehabilitation teams [1].^{&3} • May 25: The MoH issues Order No. 434 on the Development of a Neurological Rehabilitation Service in the Republic of Moldova, also approving the Concept and Action Plan (2011-2012) for its implementation [1].^{&3}	
2012	• The NHIC development fund is increased from 1% to 2% of the total health insurance fund [1].⁵ • March 21: The government further extends the Unified Programme benefits package by including new immunological, radiological, and nuclear medicine investigations [1].⁵ • March 30: Parliament approves a new law by which the positive balance of financial resources accumulated at the end of the year, after the disbursement of all MHI funds, is transferred to the next year: 25% to the Basic Fund; 25% to the Reserve Fund and 50% to the Development and Modernisation Fund [1].⁵ • April: The government revises its regulation on the modalities of approval and registration of producers' prices for medicines; this sets the share of allocation for reimbursed medicines at 4.3% of the basic MHI fund [1].⁵ • Government announces plans to develop an integrated medical information system for hospitals [1].^{%1} • April 26: The MoH develops a Law on Medical Devices, which is approved by parliament [1].^{%1} • Parliament approves the Non-Communicable Diseases Prevention and Control Strategy 2012-2020 [7].^{&1}	• March 23: Nicolae Timofti is elected President as an Independent affiliated with the Alliance for European Integration.

	- The NHIC provides financial support for pilot screening programmes for cervical and breast cancer in some territories [1].^{&1} - The national programme to reduce and eradicate iron and folic acid deficiencies is developed and approved by government [1].^{&1} February 16: The Comprehensive National Programme on Tobacco Control is officially approved by government. This follows the ratification of the 2003 WHO Framework Convention on Tobacco Control [1].^{&1} June: The national alcohol control programme is approved by government [1].^{&1} - Diagnostic-related groups begin to be developed and are piloted in nine hospitals around the country [1].^{&3}	
2013		April 25: Lurie Leancă of the Liberal Democratic Party is appointed Prime Minister.
2014		
2015		February 18: Chiril Gaburici, an Independent, is appointed Prime Minister. June 22: Natalia Gherman of the Liberal Democratic Party is appointed Prime Minister. July 30: Valeriu Streleț of the Liberal Democratic Party is appointed Prime Minister. October 30: Gheorghe Brega of the Liberal Party becomes Acting Prime Minister.
2016		2000 legislation limiting executive authority is overturned by the independent Constitutional Court, restoring direct presidential elections. January 20: Pavel Filip of the Democratic Party is appointed Prime Minister. December 23: Igor Dodon of the pro-Russian, left-wing Party of Socialists, a successor party of the Party of Communists, is elected President.
2017		
2018	An updated version of the 1997 Government Decree on PHC is approved – the Government Decision for the Approval of the Rules for the Organisation of PHC [8].^{&2}	
2019		June 8: Maia Sandu of the pro-EU, centre-right Party of Action and Solidarity is appointed Prime Minister. November 14: Ion Chicu, an Independent, is appointed Prime Minister.
2020	Health reform begins to focus on reducing out-of-pocket payments [6].^{&}	December 24: Maia Sandu is elected President. December 31: Aureliu Ciocoi, an Independent, becomes Acting Prime Minister.

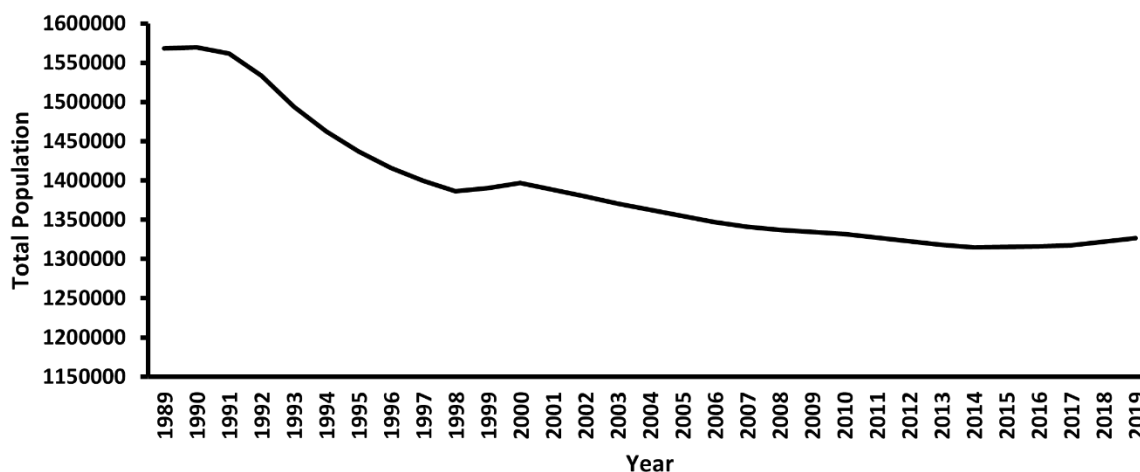
References

1. Turcanu G, Domete S, Buga M, Richardson E. Republic of Moldova: Health system review: World Health Organisation Regional Office for Europe; 2012.
2. Goroshenko B, Volovei V, Mochniaga A. Health Care Systems in Transition: Moldova: World Health Organisation Regional Office for Europe; 1996.
3. Atun R, Richardson E, Shishkin S, Kacevicius G, Ciocani M, Sava V. Health systems in transition: Moldova: World Health Organisation Regional Office for Europe; 2008. 1-160 p.
4. Constituteproject.org. Moldova (Republic of)'s Constitution of 1994 with Amendments through 2016 2016 [Available from: https://constituteproject.org/constitution/Moldova_2016?lang=en].
5. Maclehose L, McKee M, World Health Organisation. Health care systems in transition: Republic of Moldova: World Health Organisation Regional Office for Europe; 2002.
6. Vian T, Feeley FG, Domete S, Negruta A, Matei A, Habicht J. Barriers to universal health coverage in Republic of Moldova: A policy analysis of formal and informal out-of-pocket payments. BMC Health Services Research. 2015;15(1):319.
7. Sécula F, Erismann S, Cerniciuc C, Chater A, Shabab L, Glen F, et al. Evidence-based policy making for health promotion to reduce the burden of non-communicable diseases in Moldova. BMC proceedings.14:1-10.
8. Government of the Republic of Moldova. Government Decision No. 988 of 10-10-2018 for the Approval for the Rules of the Organisation of Primary Health Care. Chisinau: Government of the Republic of Moldova; 2018.

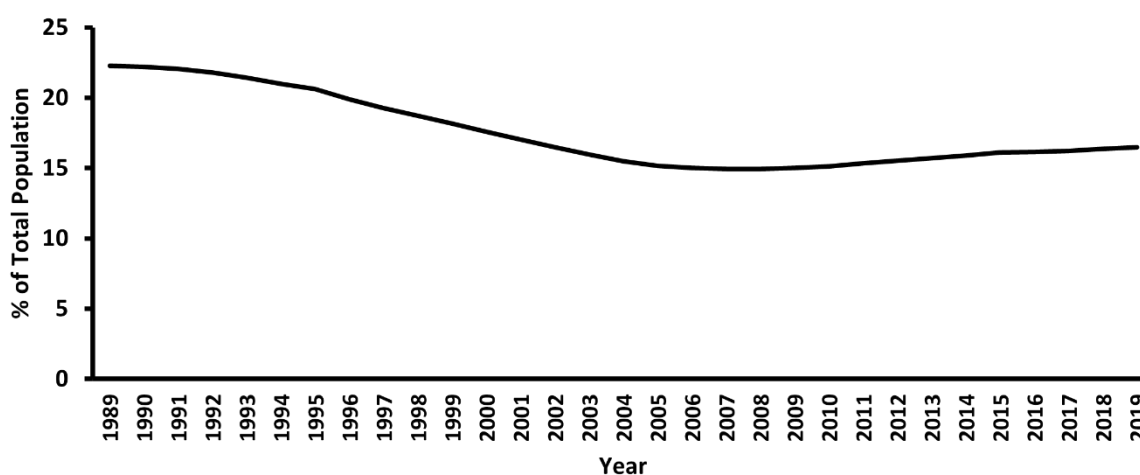
Appendix I Phase 2b: Time Series Analyses – Estonia

Demographic

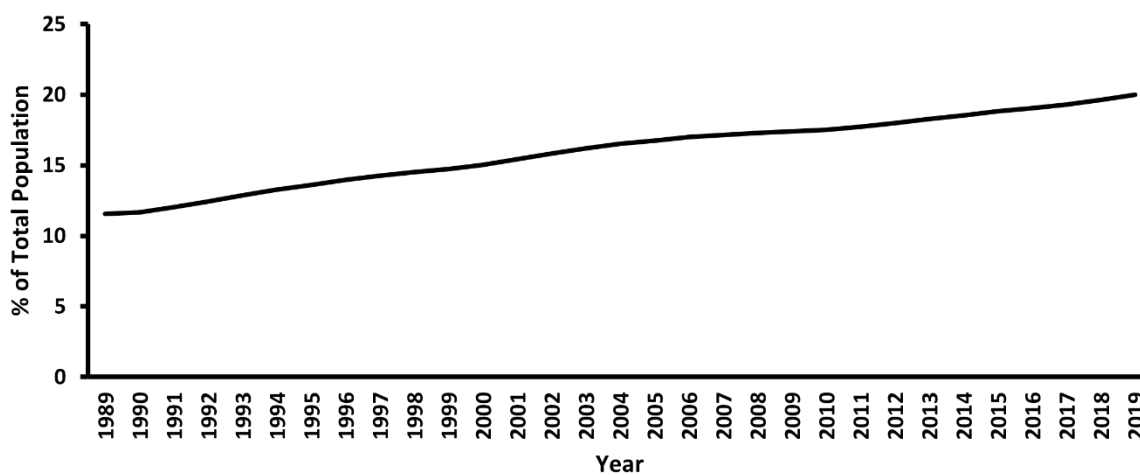
Total population:

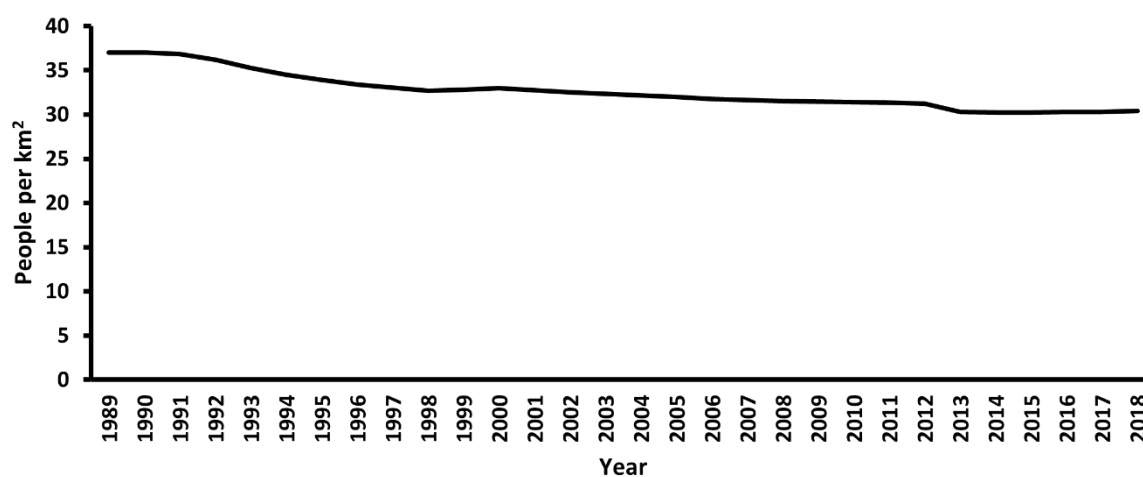


Population aged 0-14 (% of total population):

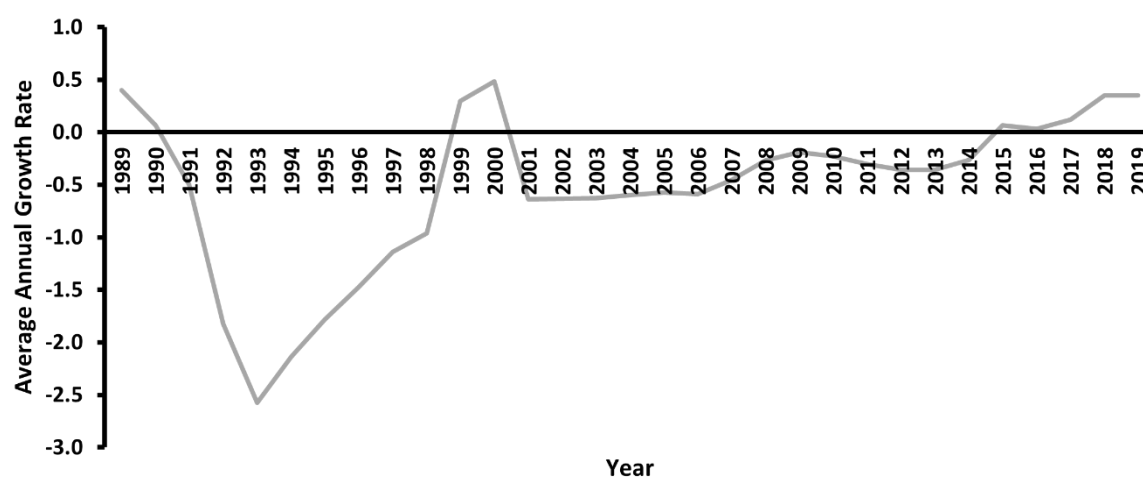


Population aged 65 and above (% of total population):

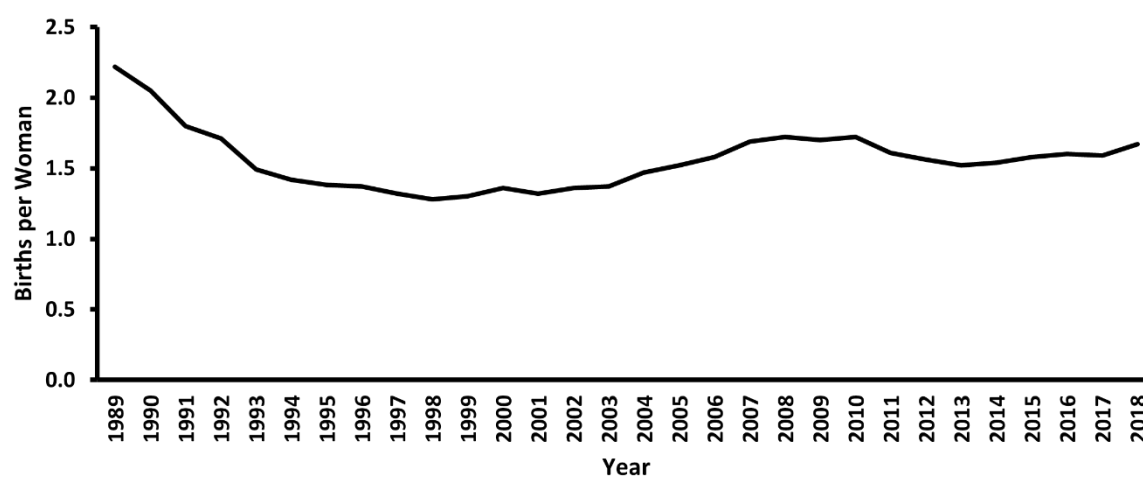


Population density (people per km²):

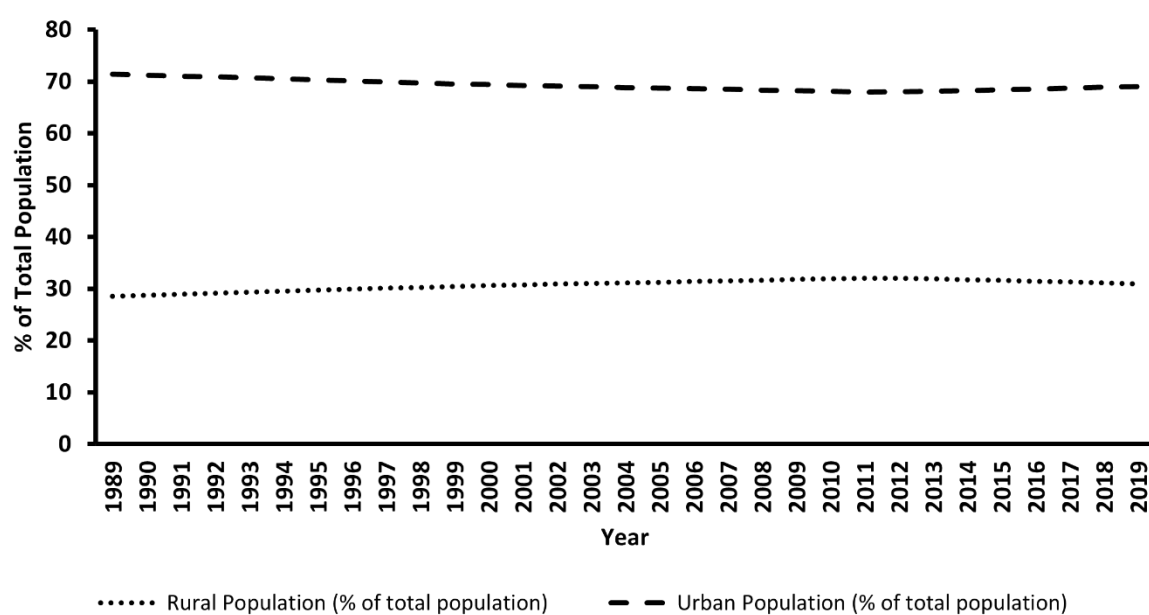
Population growth (average annual growth rate):



Fertility rate (births per woman):

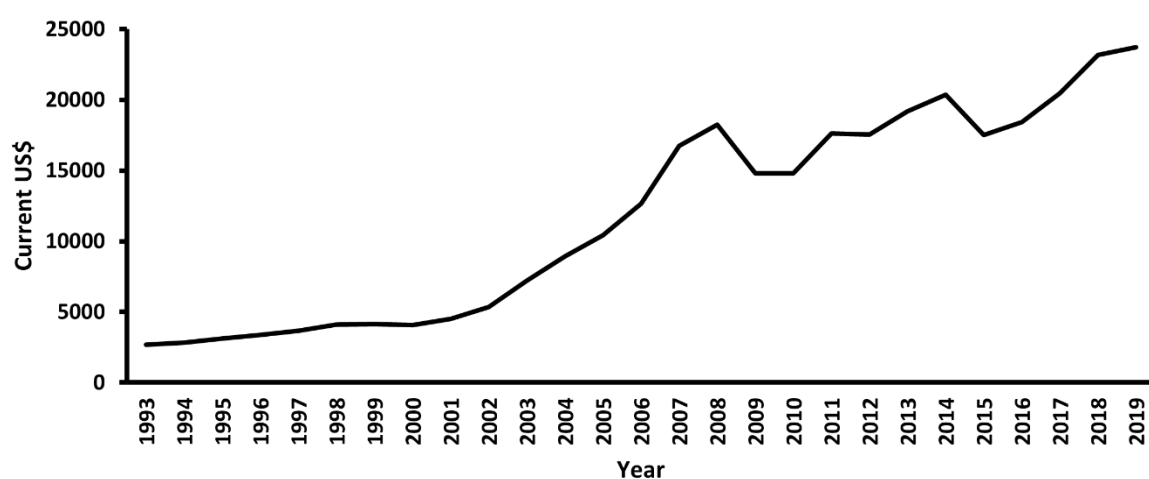


Distribution of population (rural/urban as % of total population):

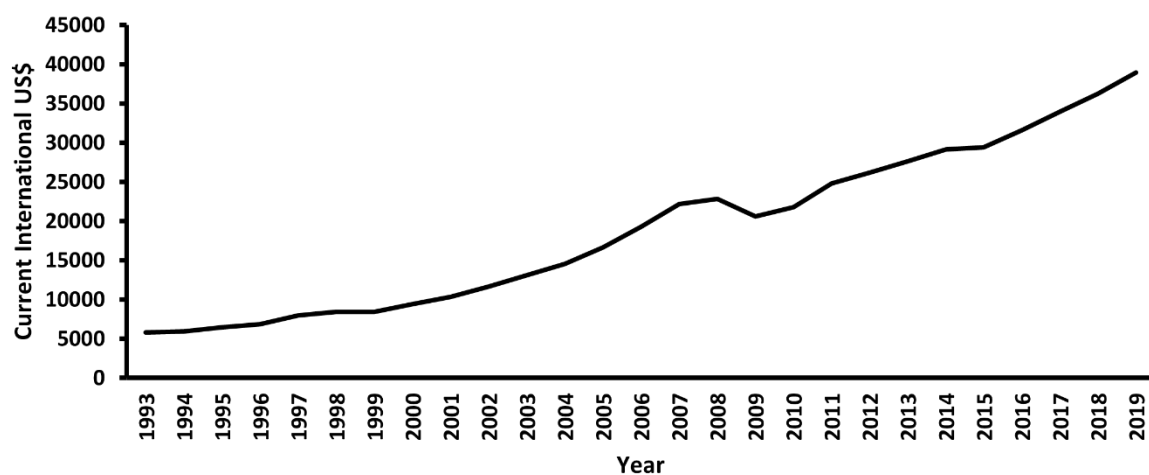


Macroeconomic

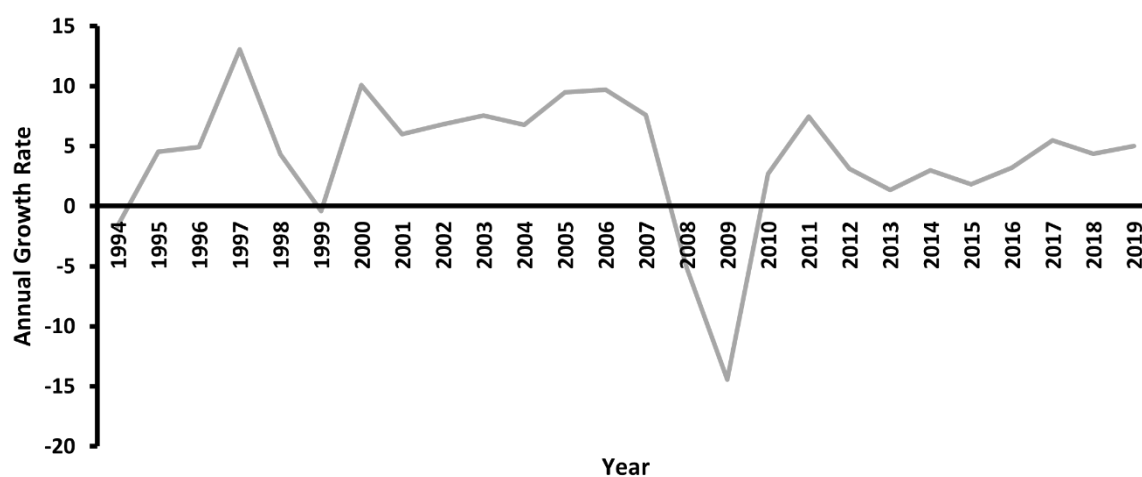
GDP per capita (current US\$):



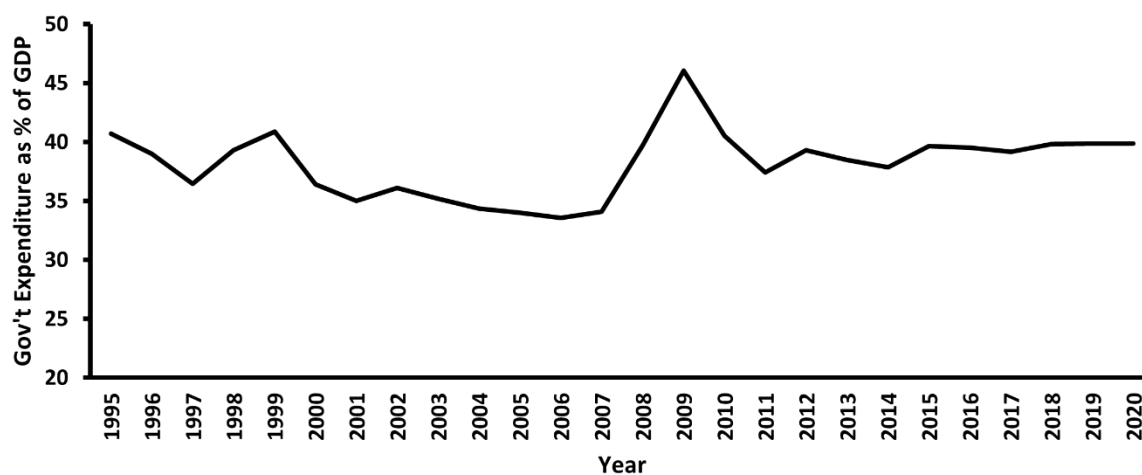
GDP per capita, purchasing power parity (current international US\$):



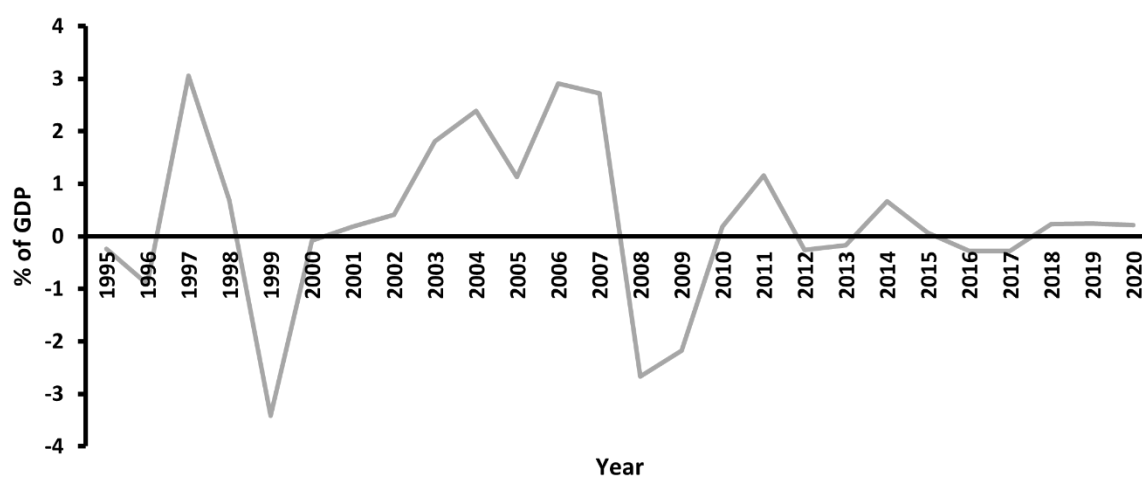
GDP annual growth rate:



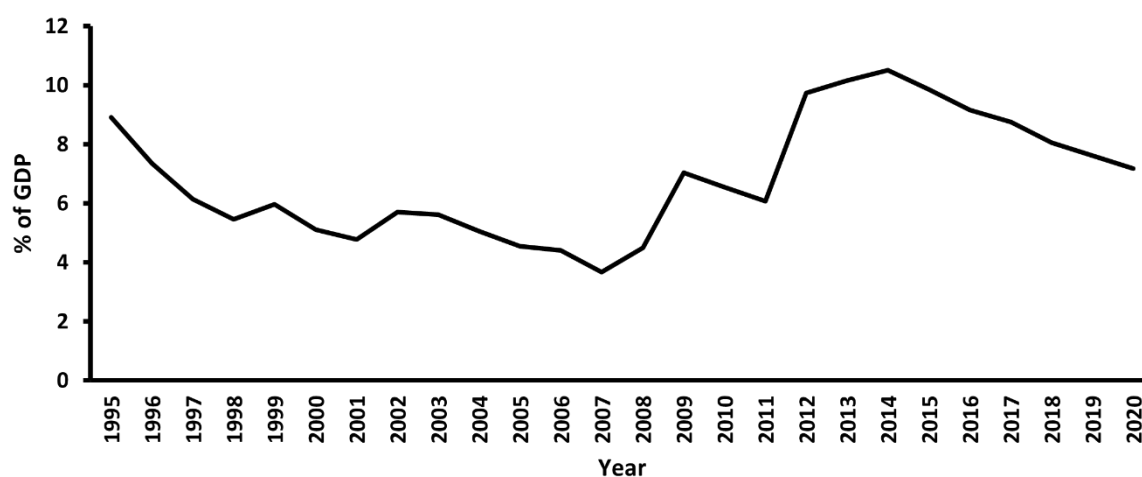
Public expenditure (government expenditure as % of GDP):



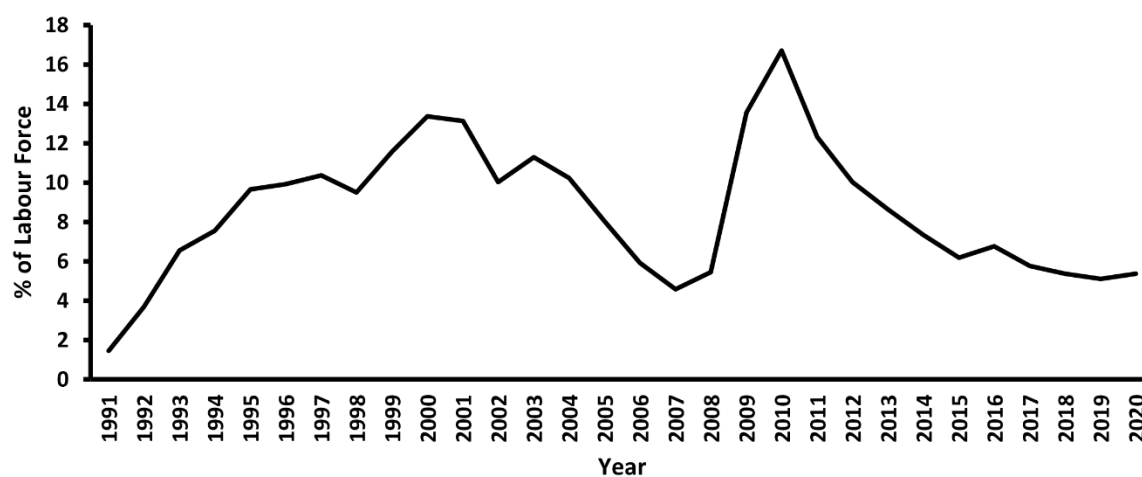
Government deficit/surplus (% of GDP):



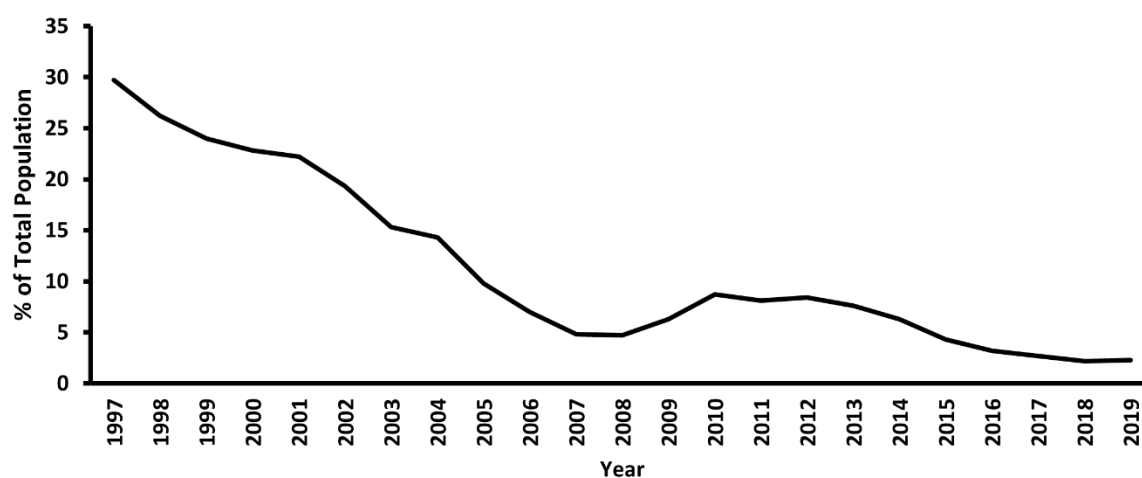
General government gross debt (% of GDP):



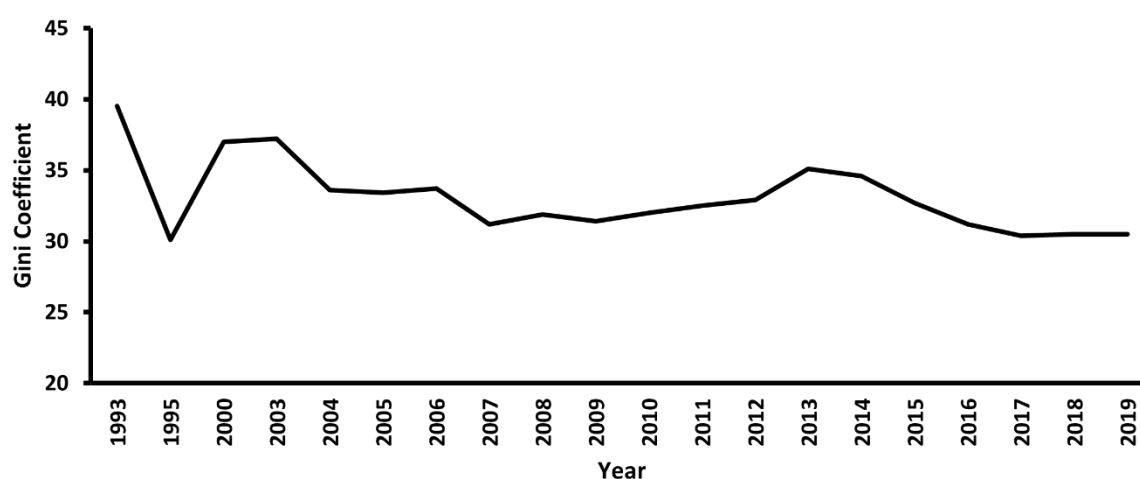
Unemployment, total (% of labour force):



Poverty headcount ratio at national poverty lines (% of total population):

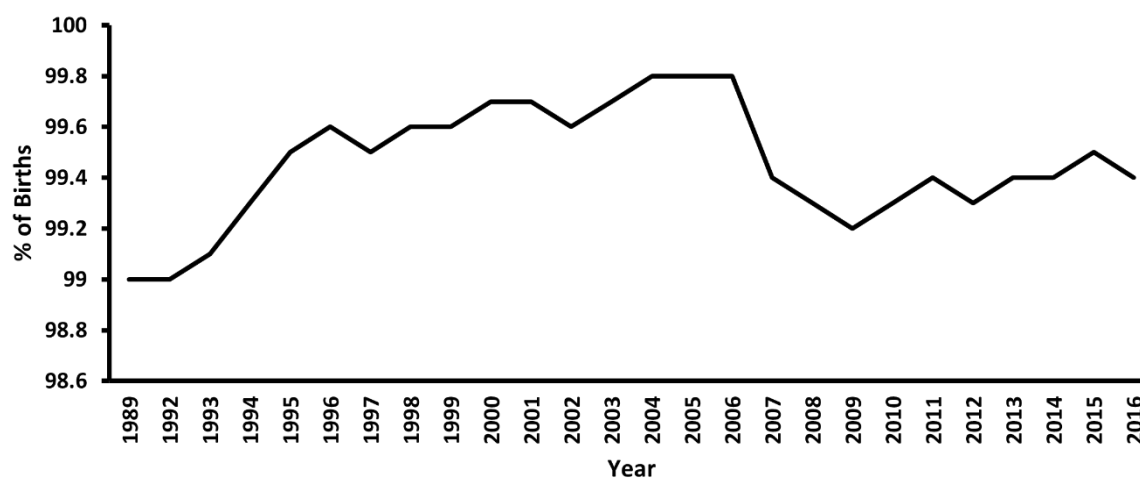


Income inequality (Gini coefficient of disposable income):

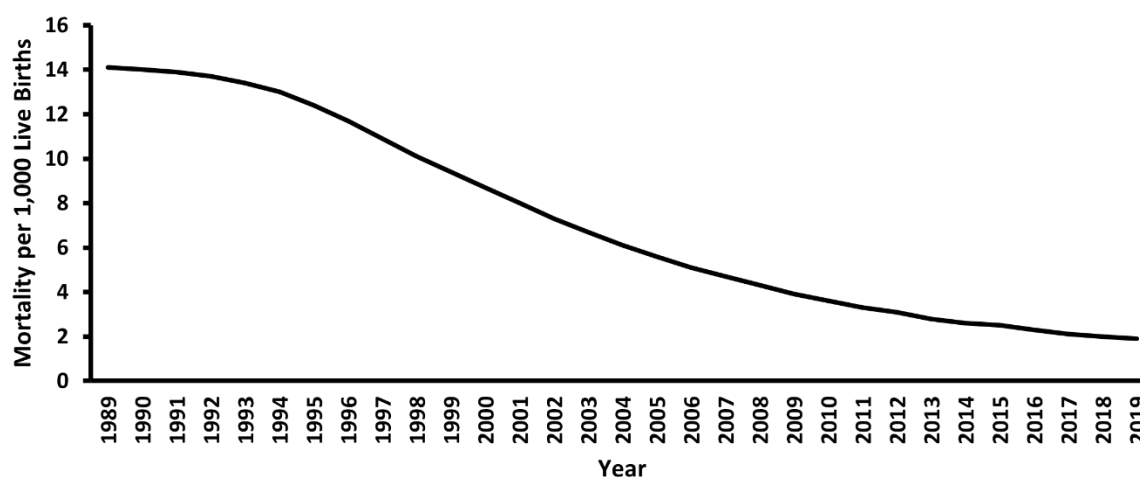


Population Health

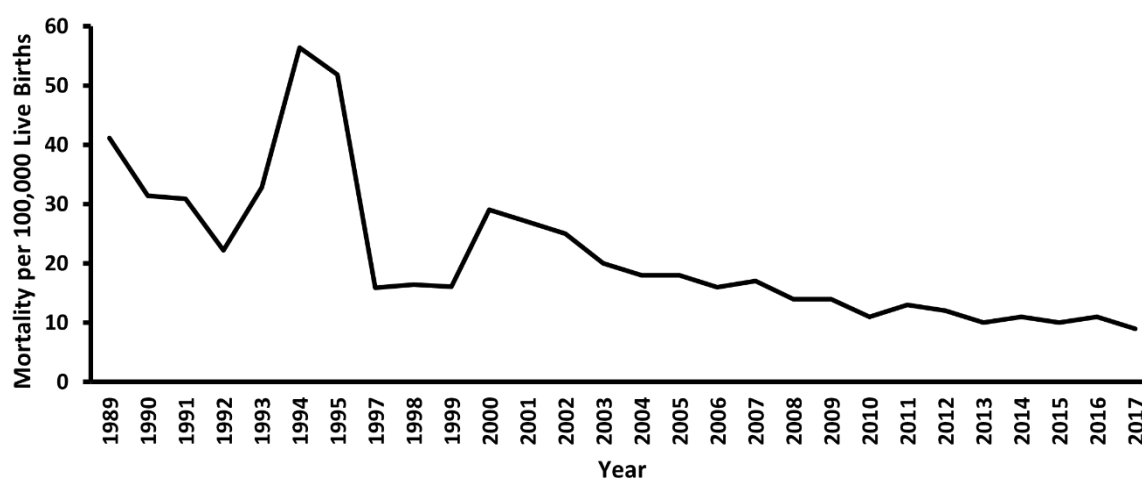
Births attended by skilled health personnel (%):



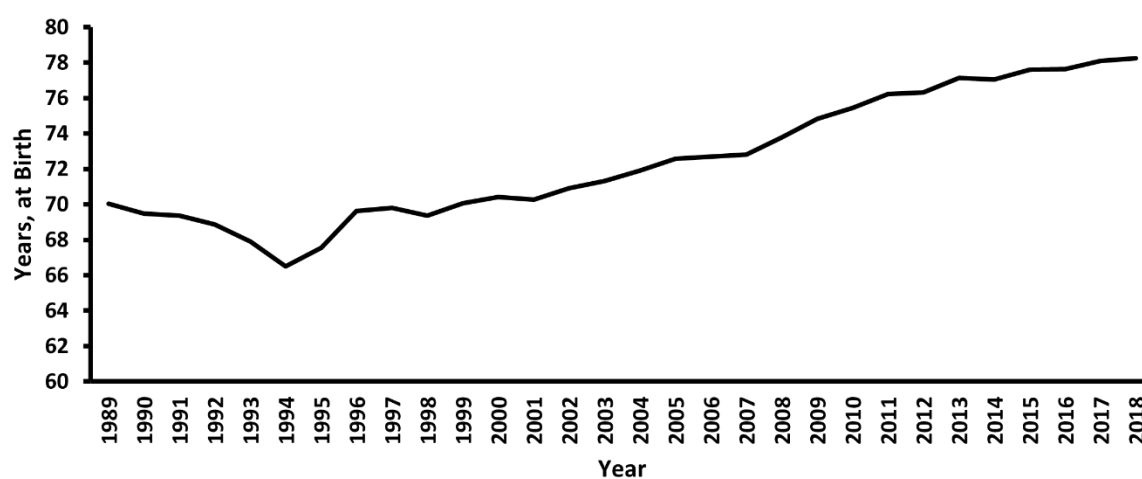
Infant mortality (per 1,000 live births):



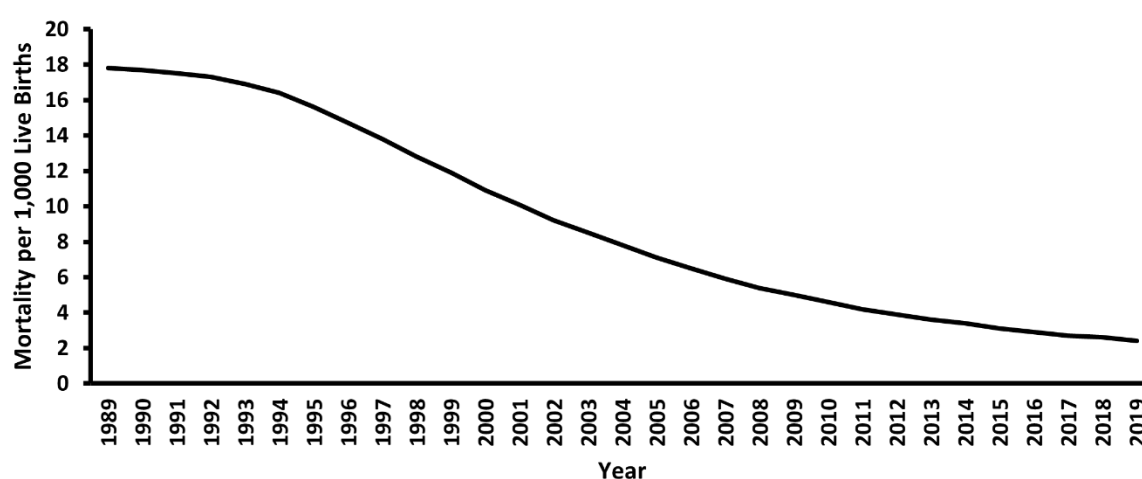
Maternal mortality (per 100,000 live births):



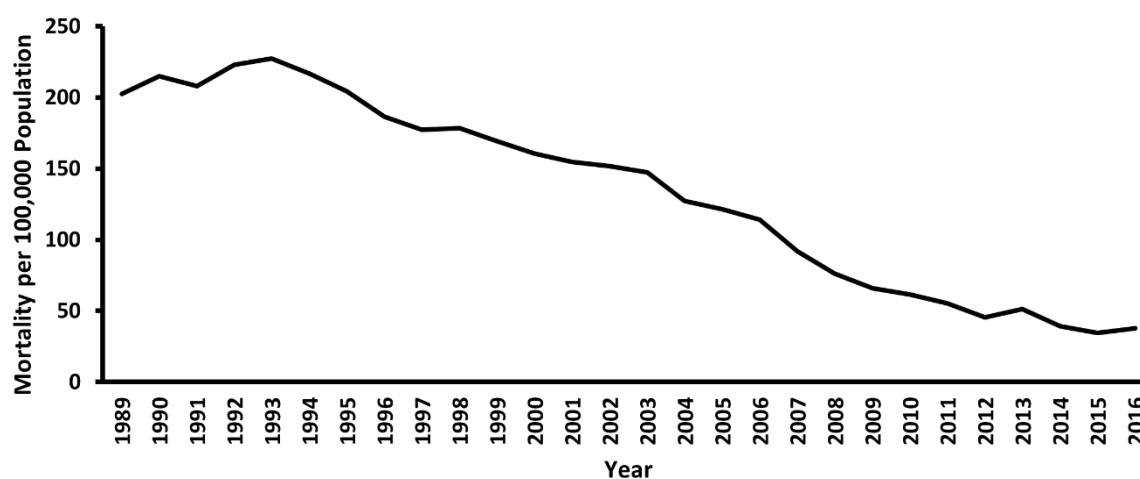
Life expectancy (years, at birth):



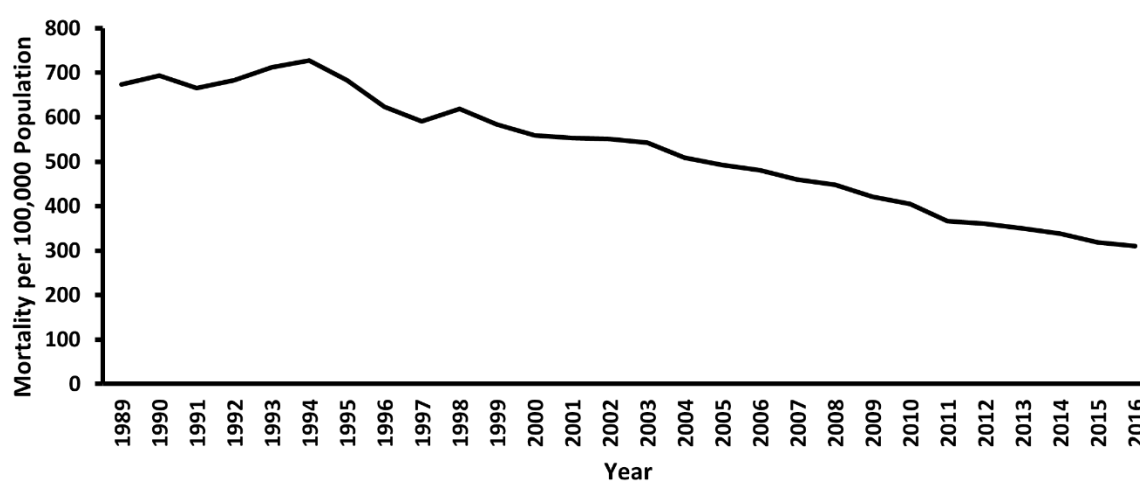
Under-5 mortality (per 1,000 live births):



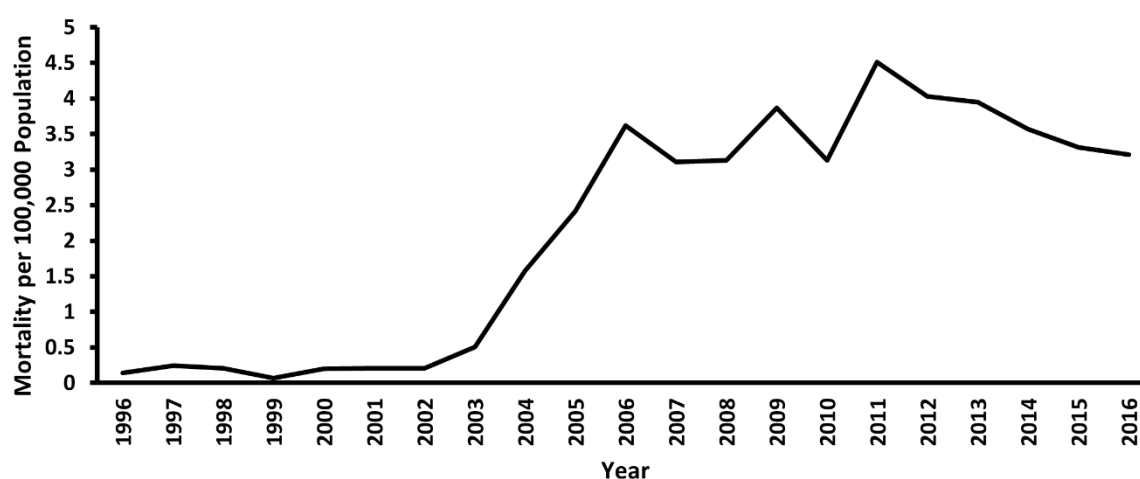
Cerebrovascular disease mortality (per 100,000 population):



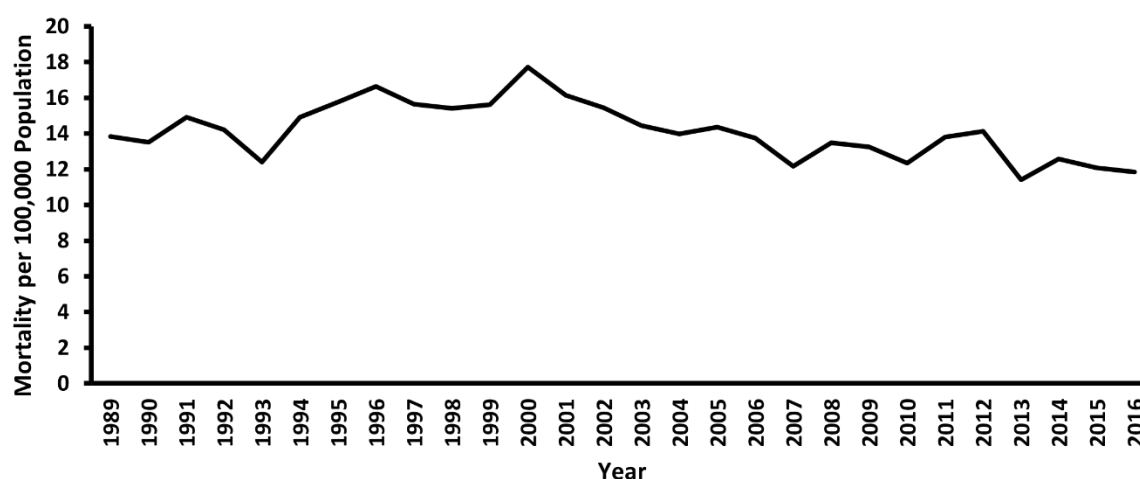
Diseases of circulatory system mortality (per 100,000 population):



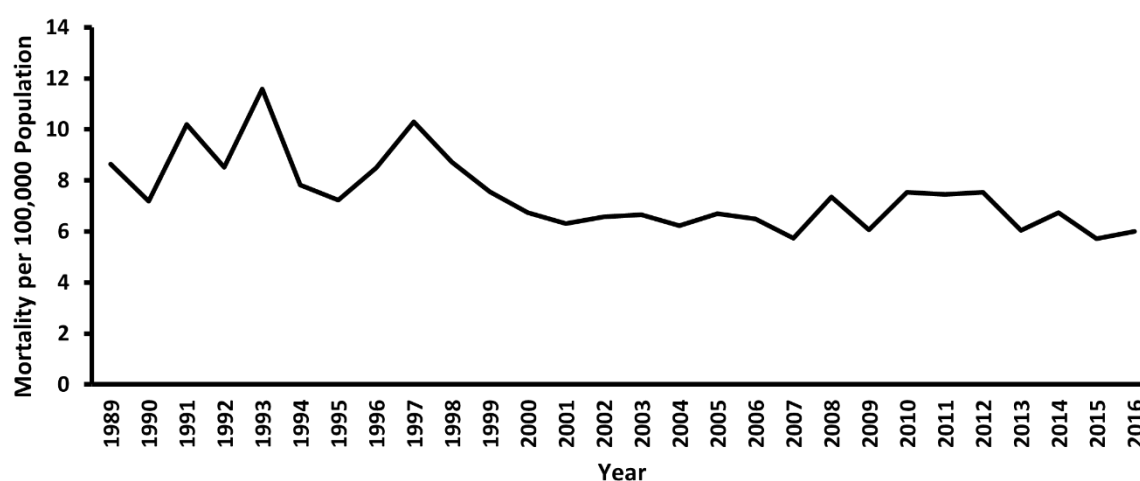
HIV/AIDS mortality (per 100,000 population):



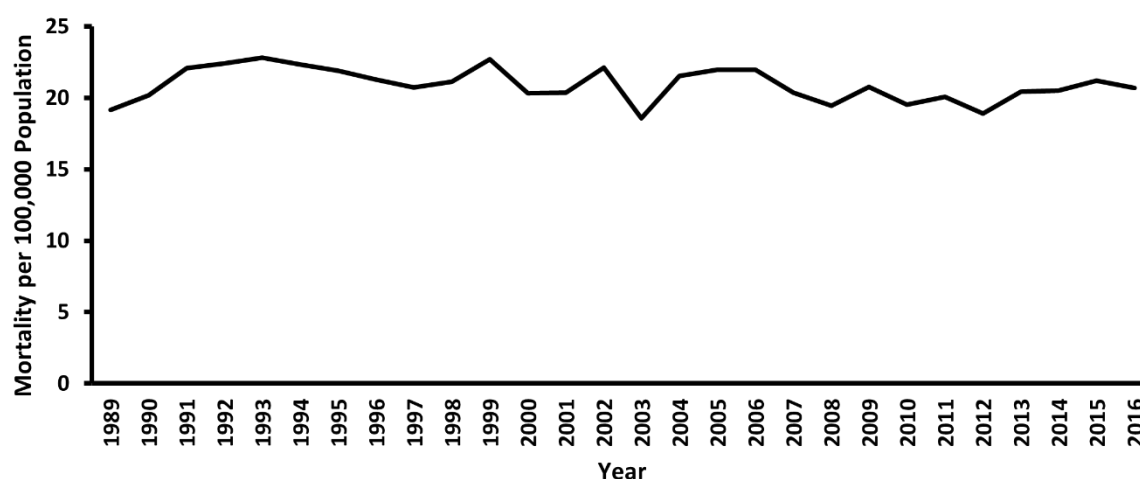
Malignant neoplasm of breast mortality (per 100,000 population):



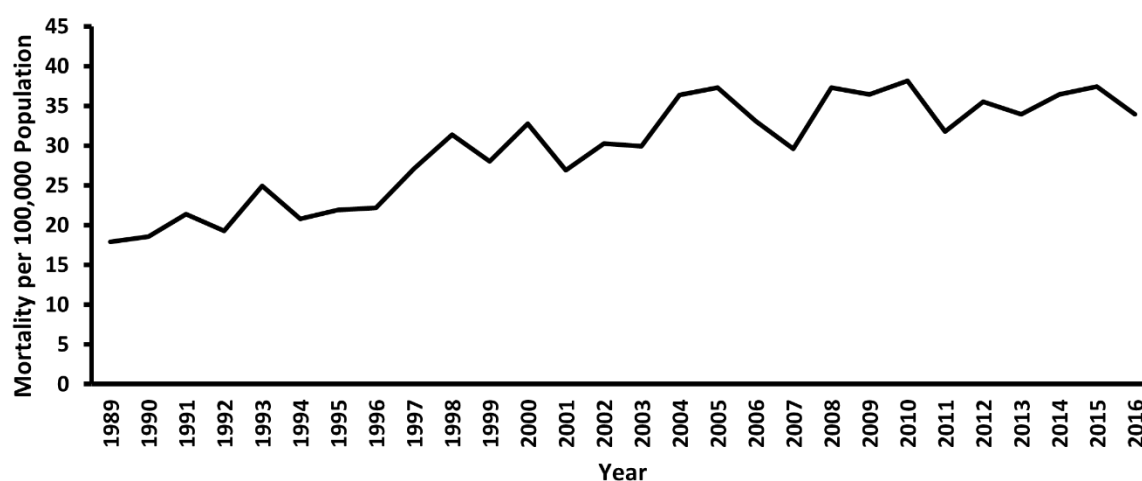
Malignant neoplasm of cervix uteri mortality (per 100,000 population):



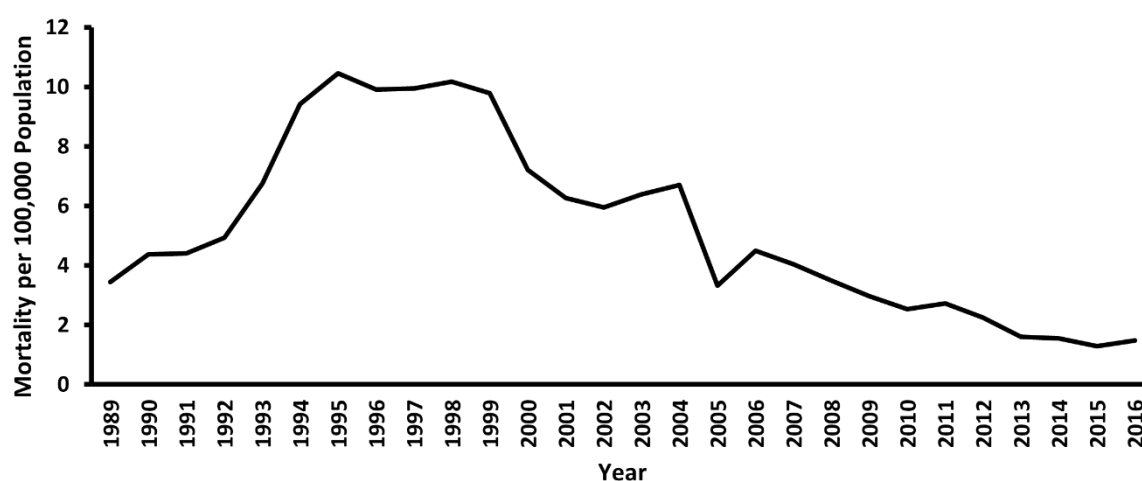
Malignant neoplasm of colon, rectum and anus mortality (per 100,000 population):



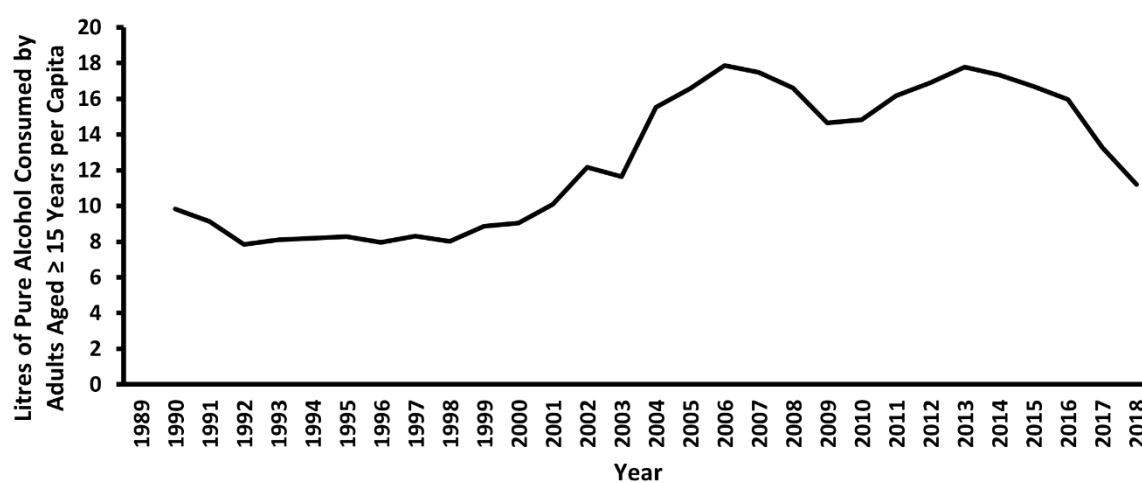
Malignant neoplasm of prostate mortality (per 100,000 population):



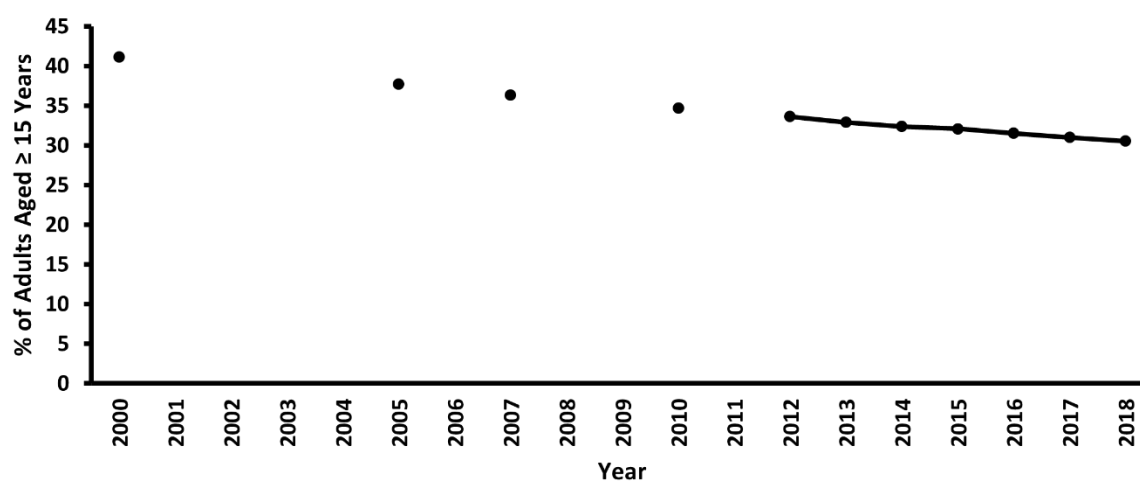
TB mortality (per 100,000 population):



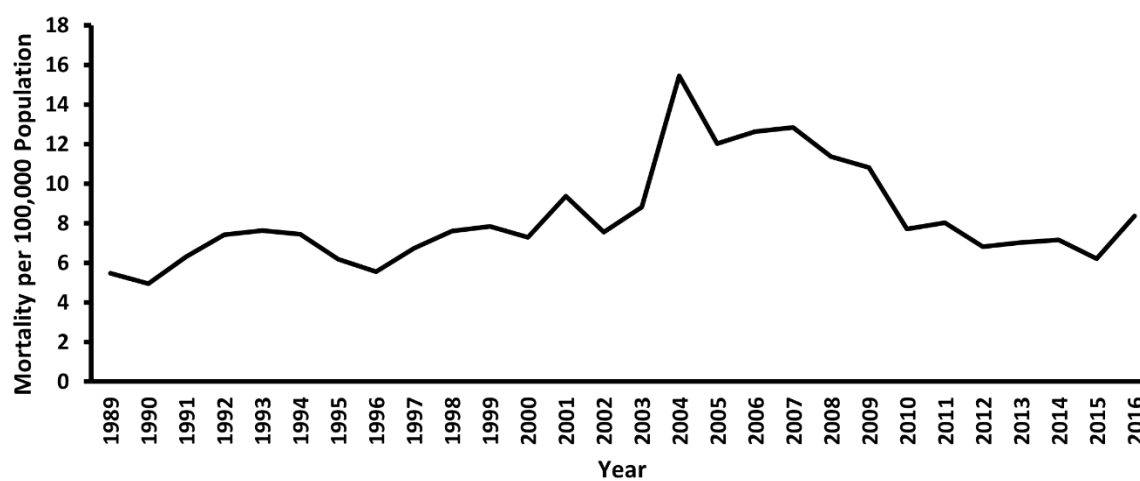
Alcohol consumption (litres of pure alcohol consumed by adults aged ≥ 15 years per capita):



Prevalence of current tobacco use (% adults aged ≥ 15 years):



Diabetes mortality (per 100,000 population):

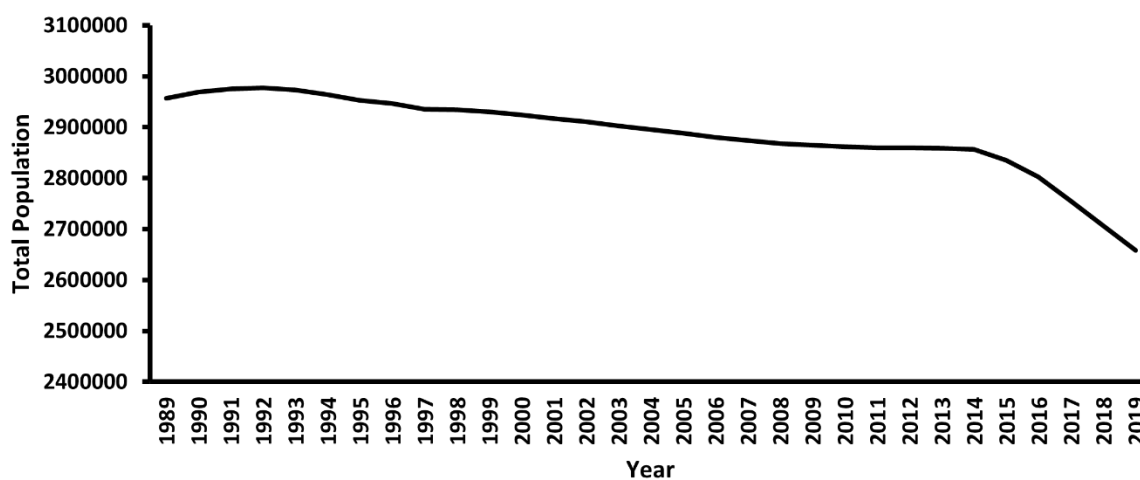


Appendix J

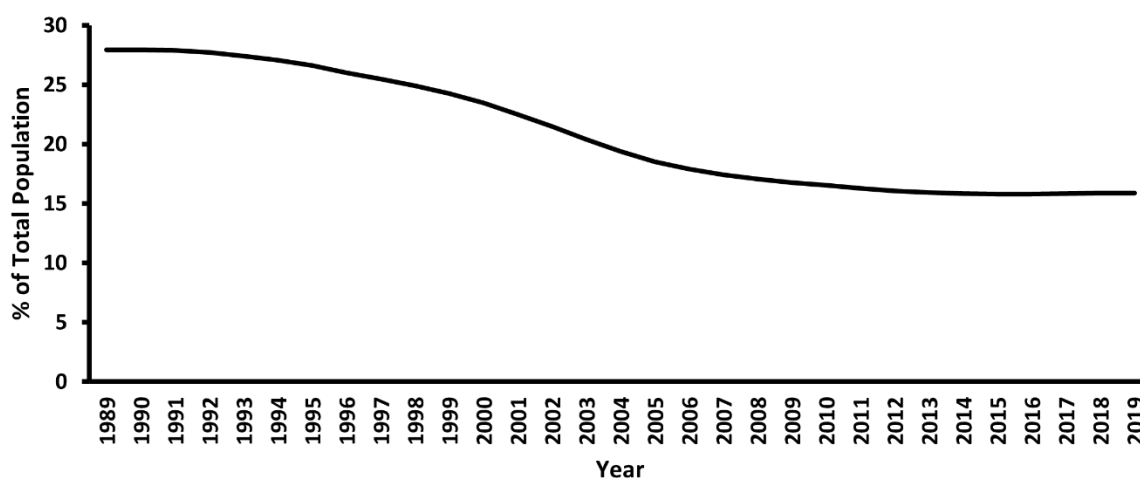
Phase 2b: Time Series Analyses – Moldova

Demographic

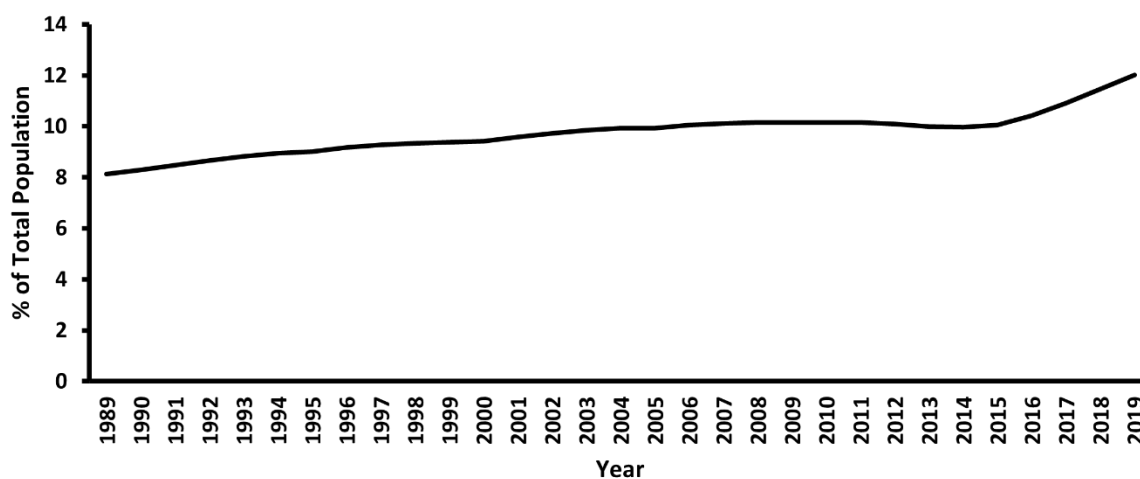
Total population:

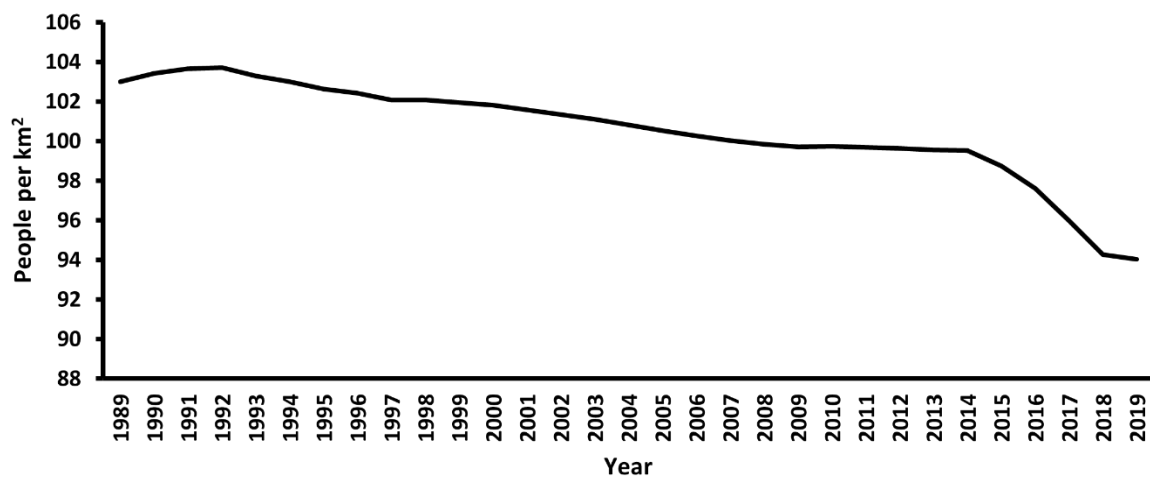


Population aged 0-14 (% of total population):

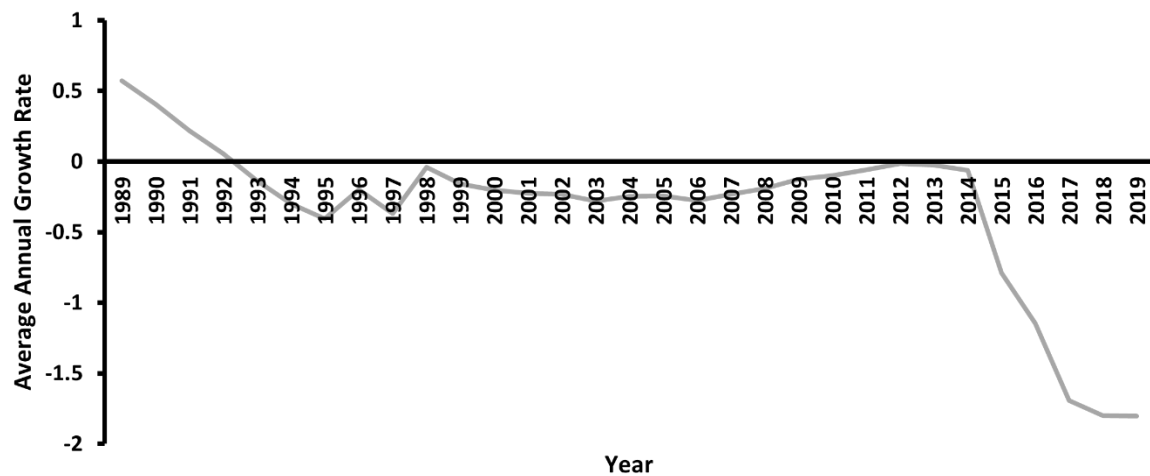


Population aged 65 and above (% of total population):

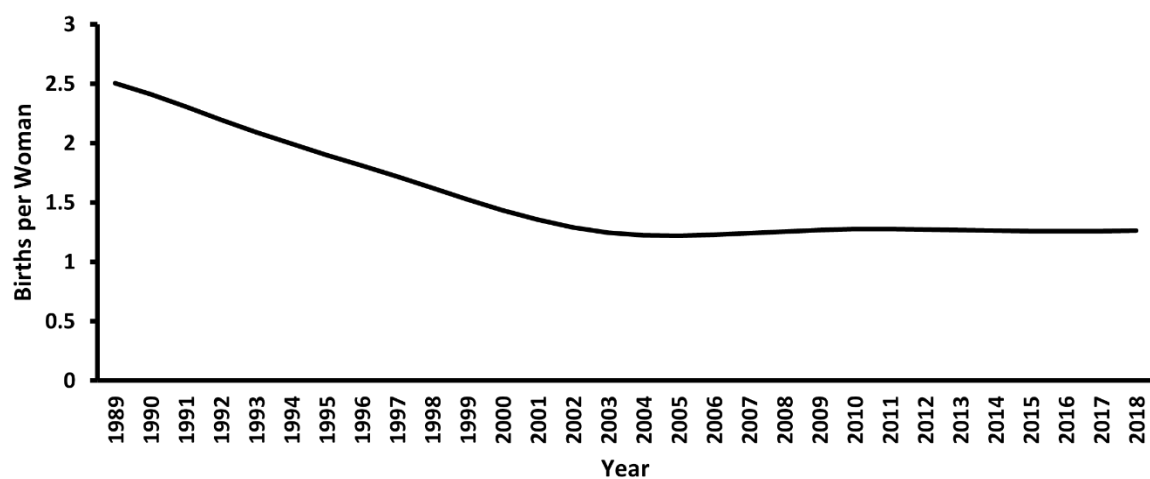


Population density (people per km²):

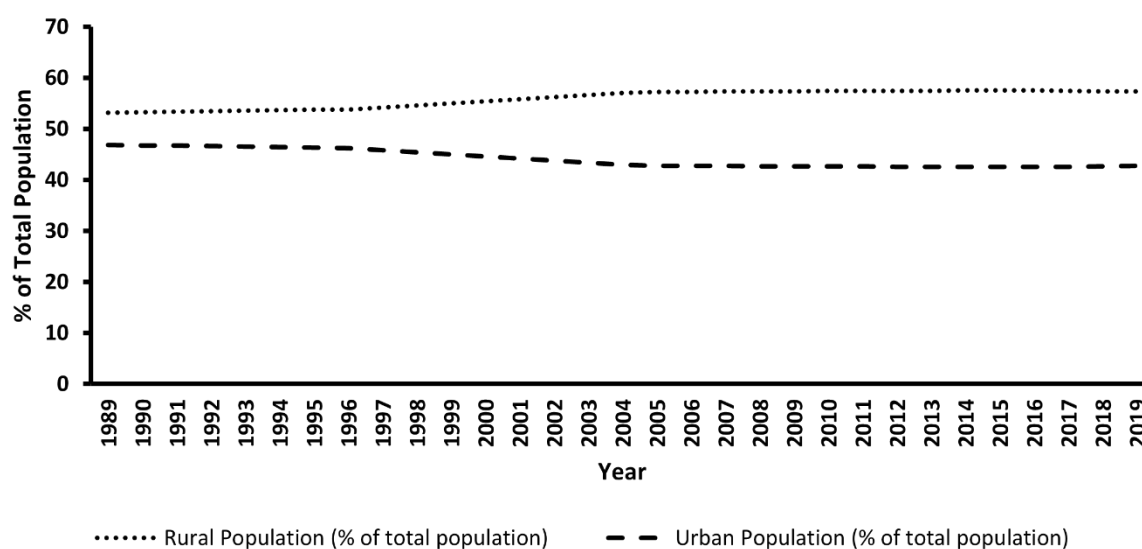
Population growth (average annual growth rate):



Fertility rate (births per woman):

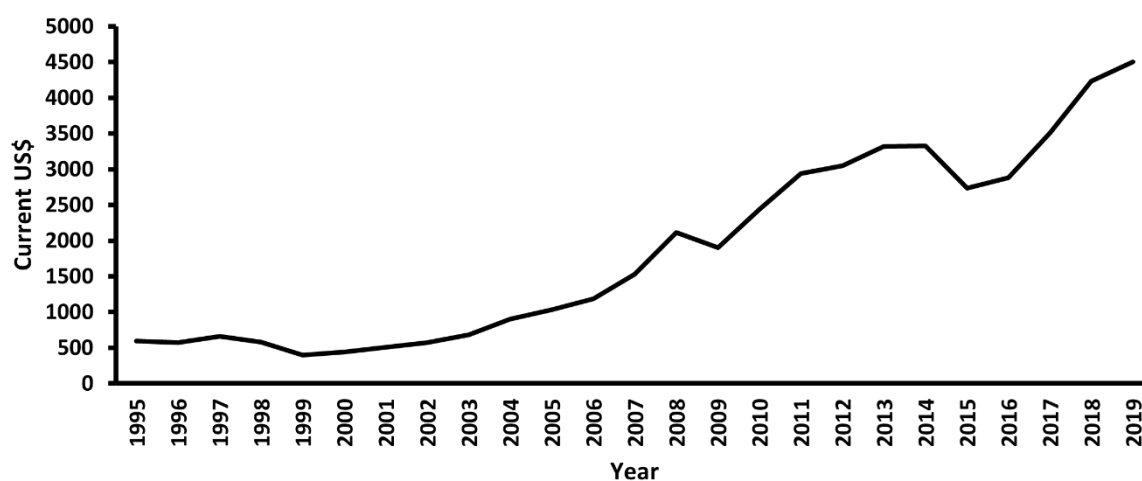


Distribution of population (rural/urban as % of total population):

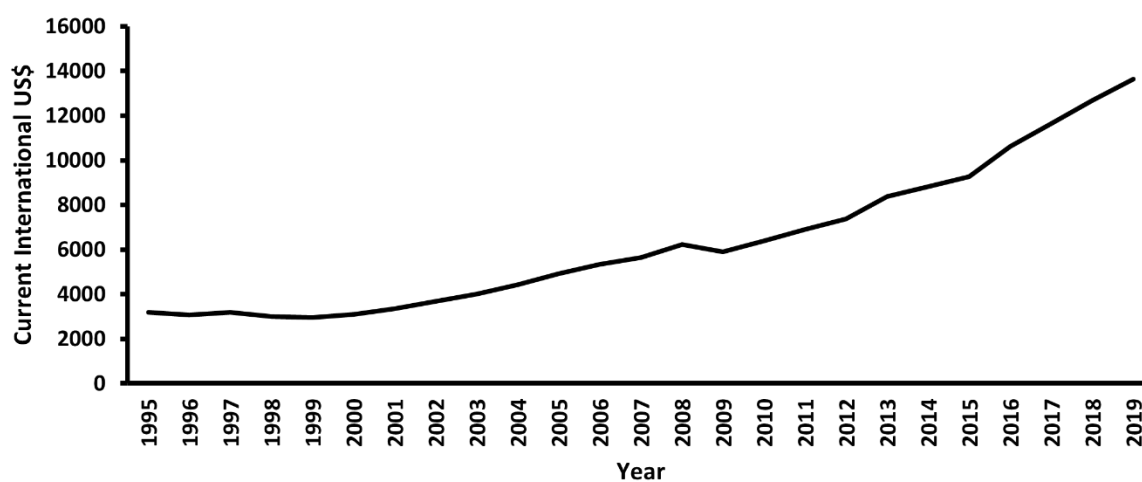


Macroeconomic

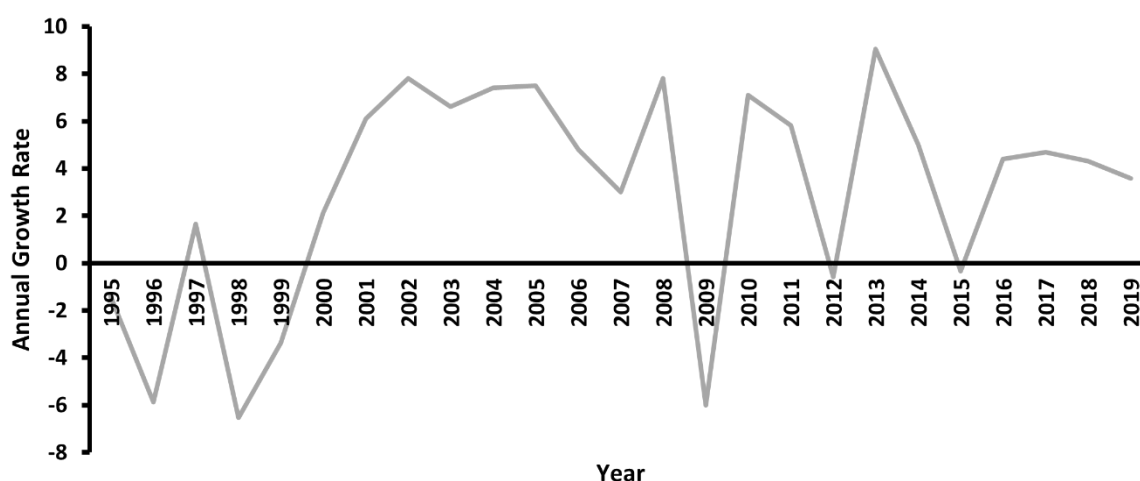
GDP per capita (current US\$):



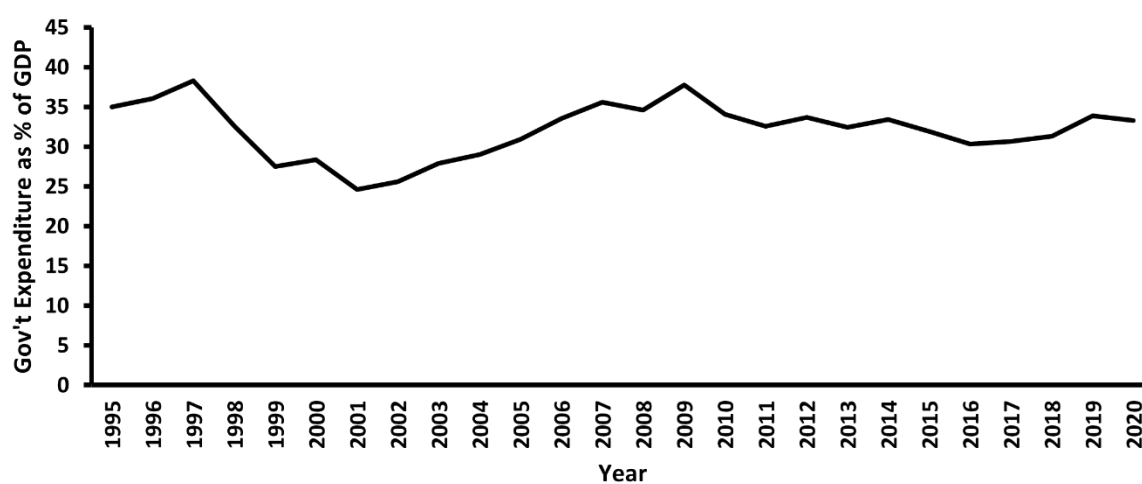
GDP per capita, purchasing power parity (current international US\$):



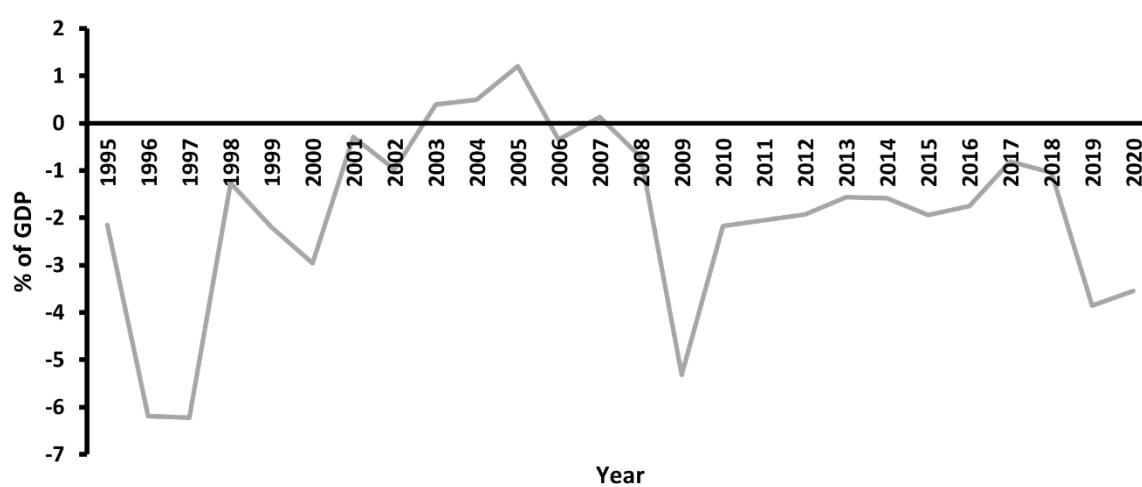
GDP annual growth rate:



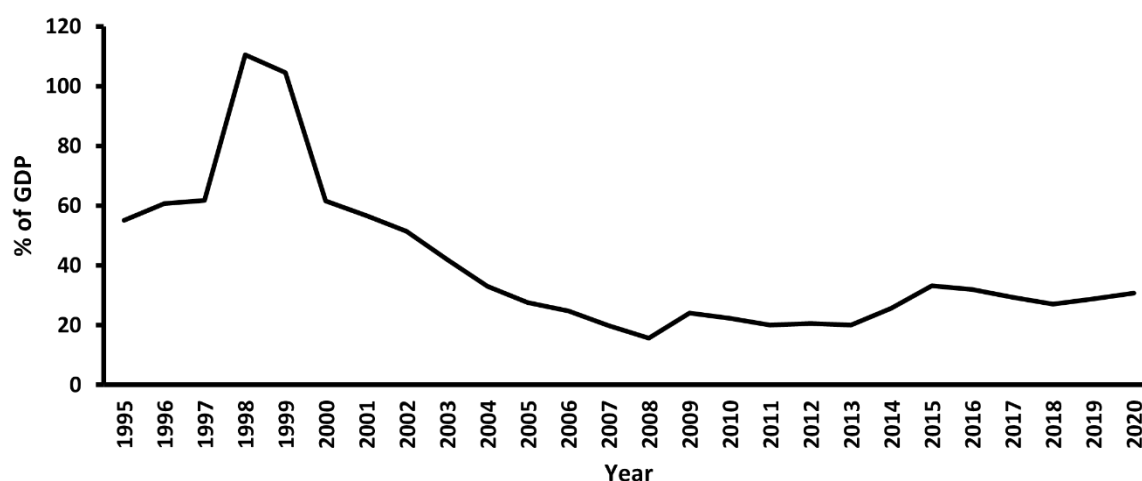
Public expenditure (government expenditure as % of GDP):



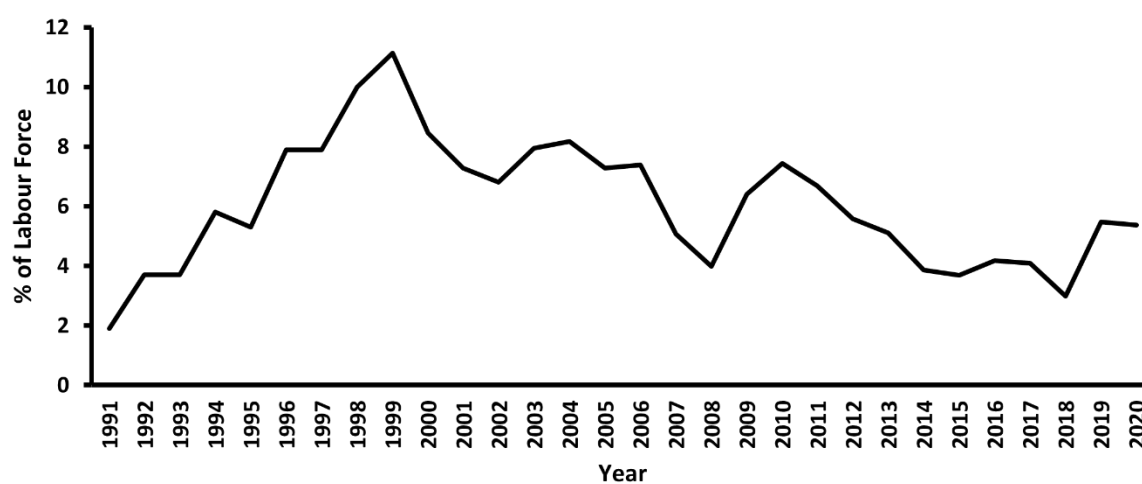
Government deficit/surplus (% of GDP):



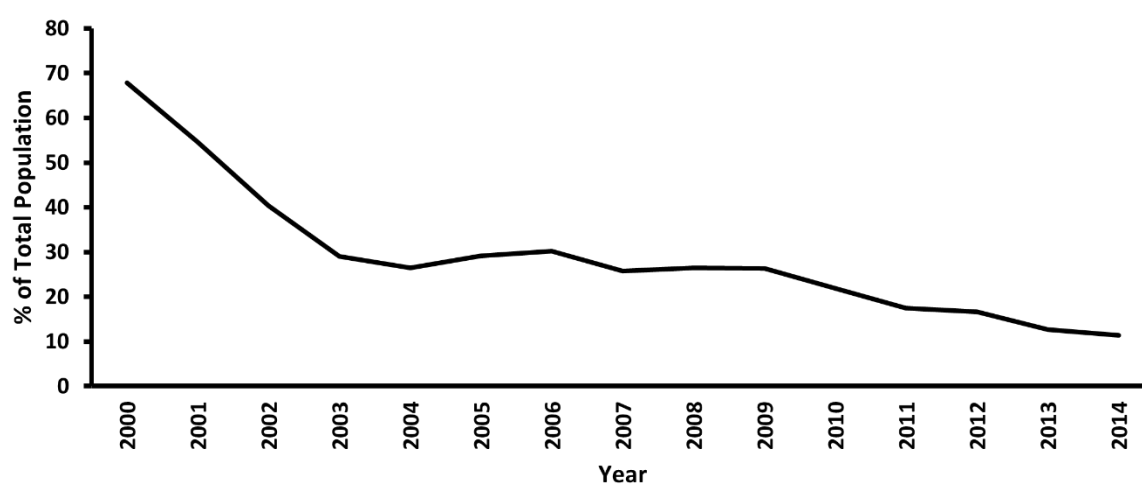
General government gross debt (% of GDP):



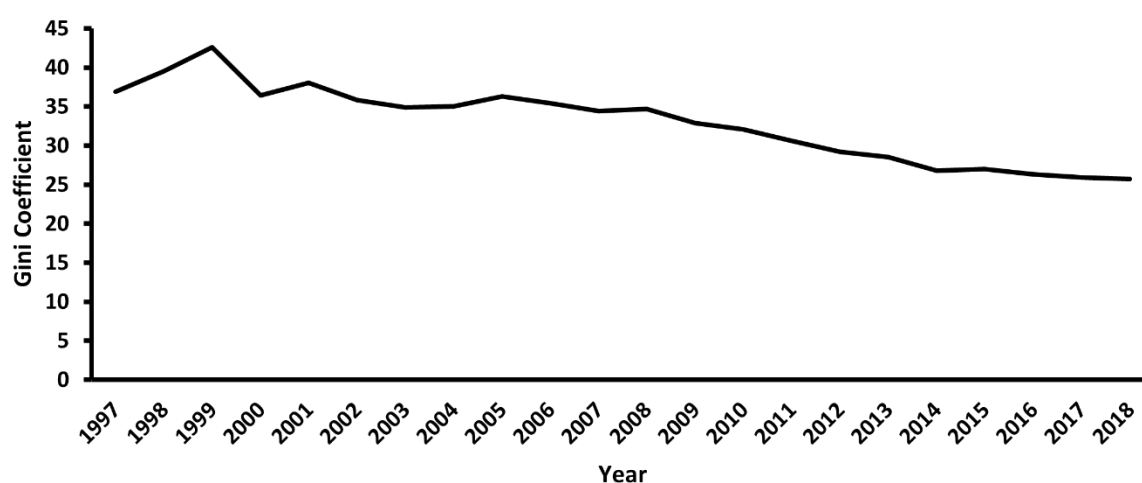
Unemployment, total (% of labour force):



Poverty headcount ratio at national poverty lines (% of total population):

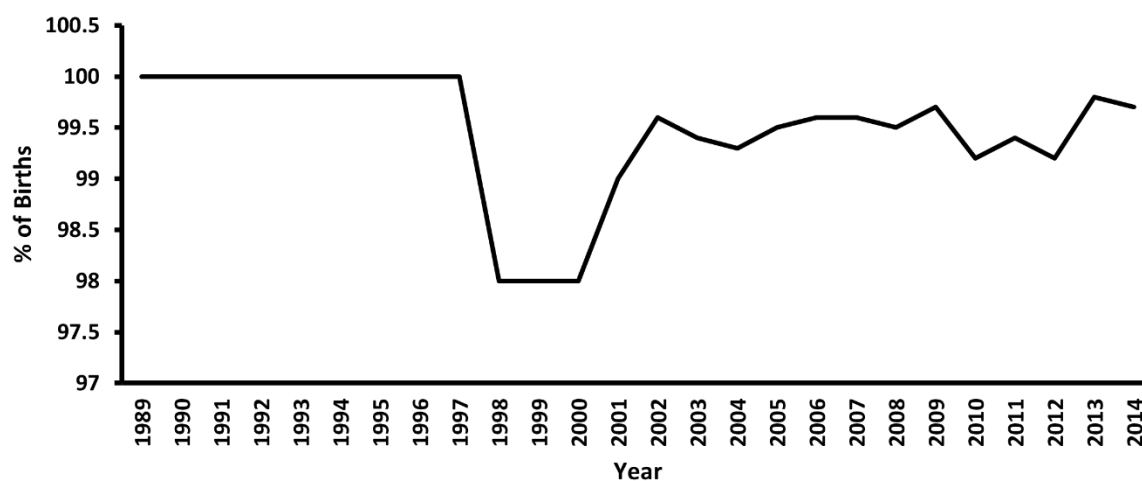


Income inequality (Gini coefficient of disposable income):

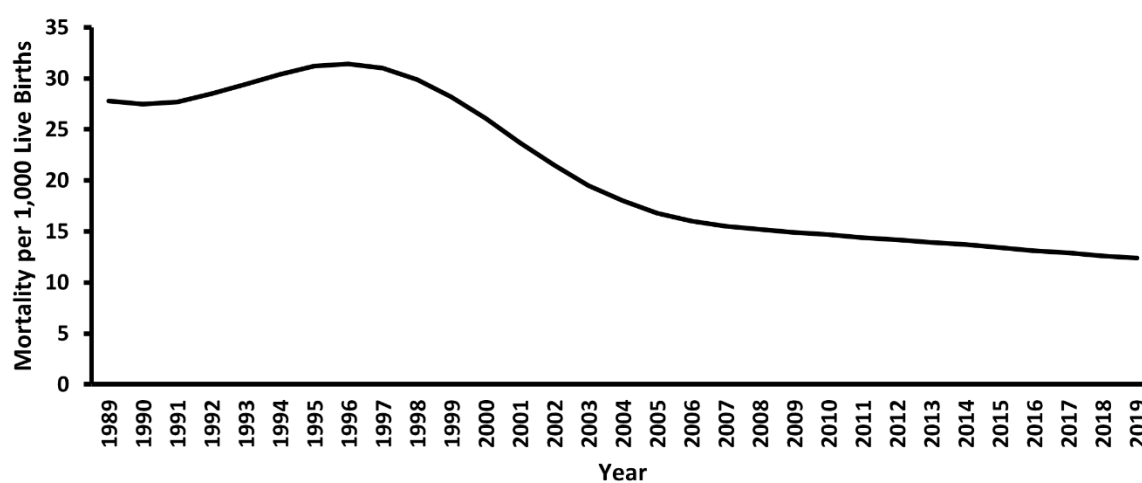


Population Health

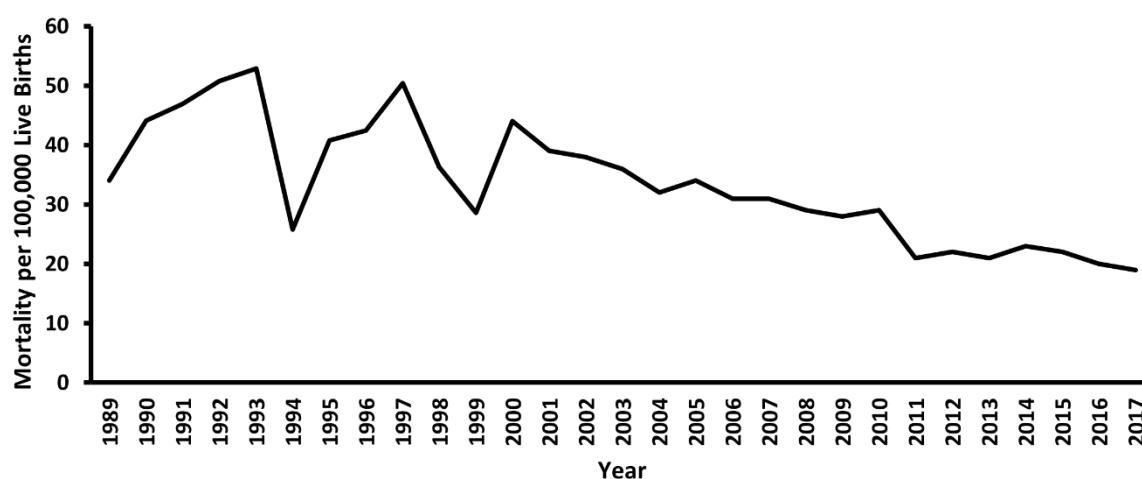
Births attended by skilled health personnel (%):



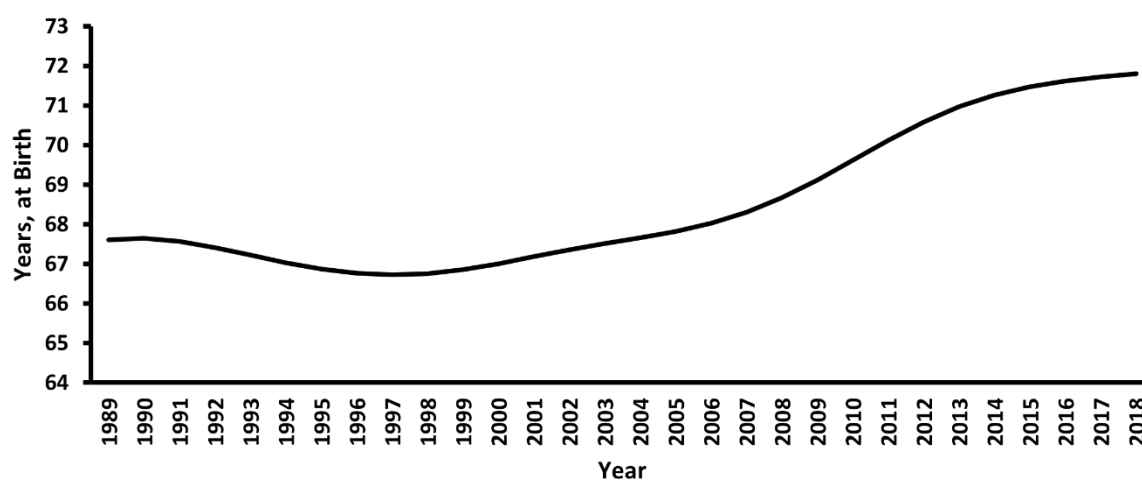
Infant mortality (per 1,000 live births):



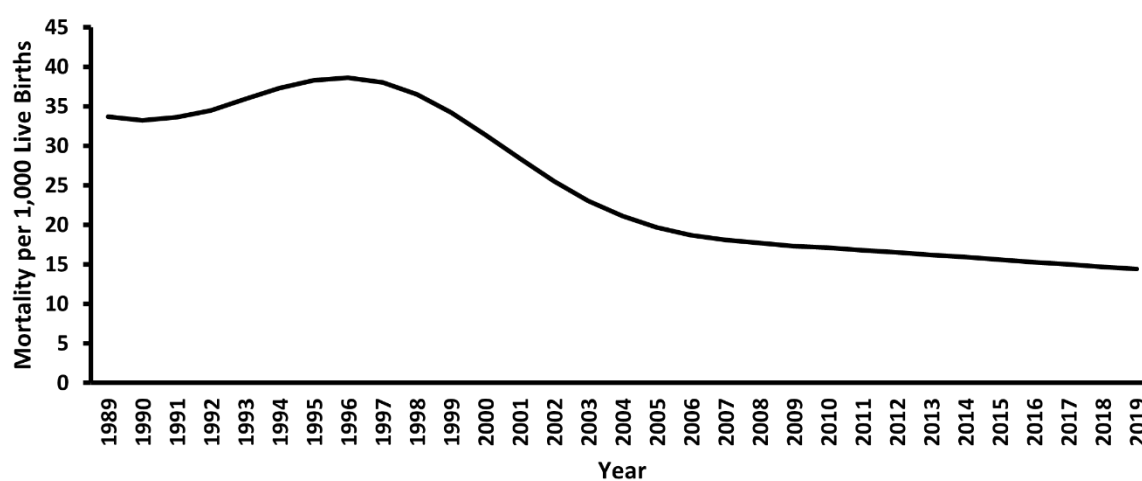
Maternal mortality (per 100,000 live births):



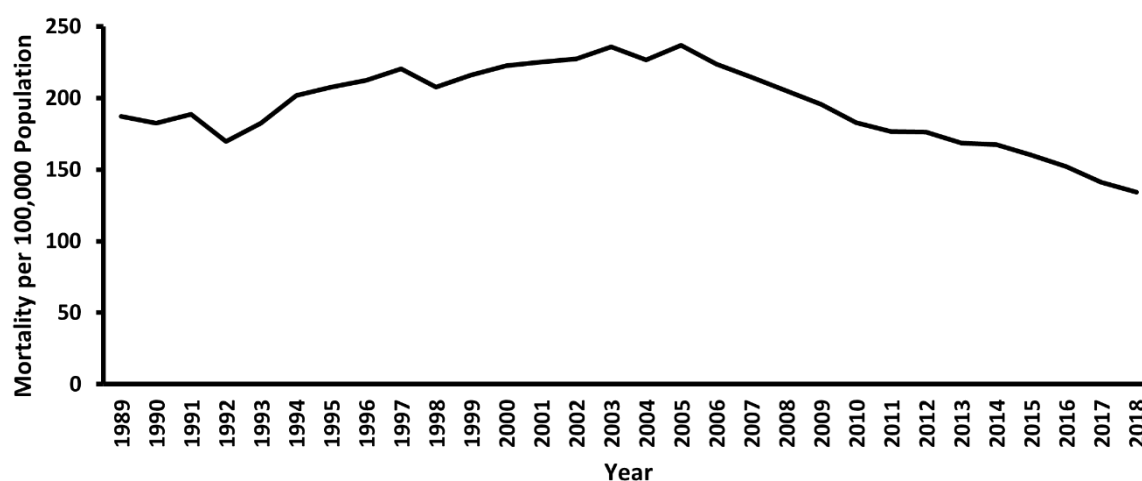
Life expectancy (years, at birth):



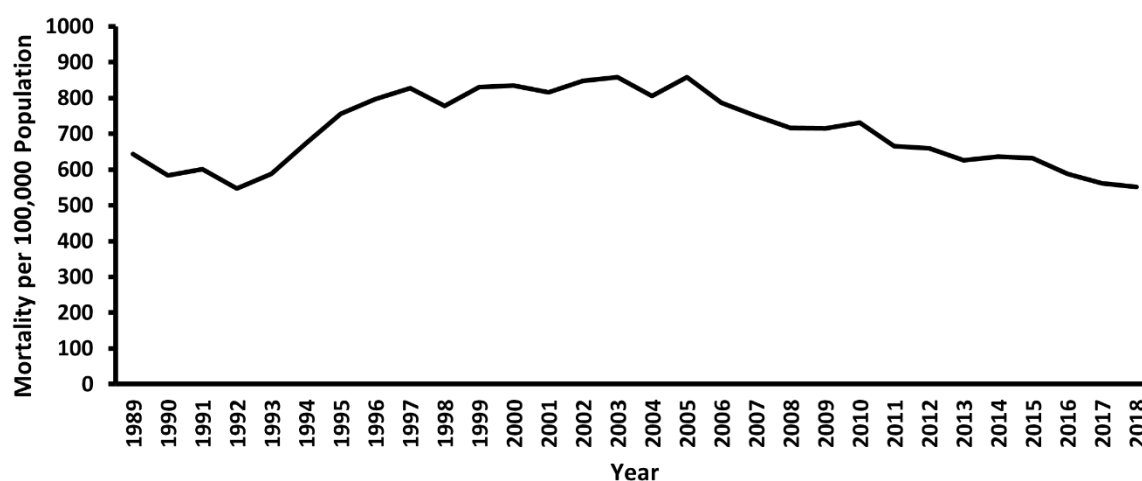
Under-5 mortality (per 1,000 live births):



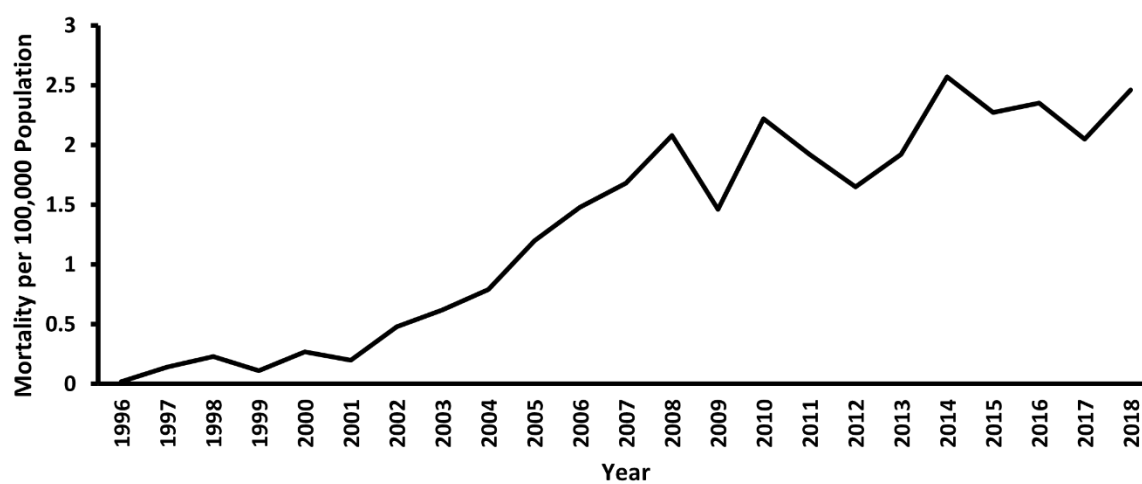
Cerebrovascular disease mortality (per 100,000 population):



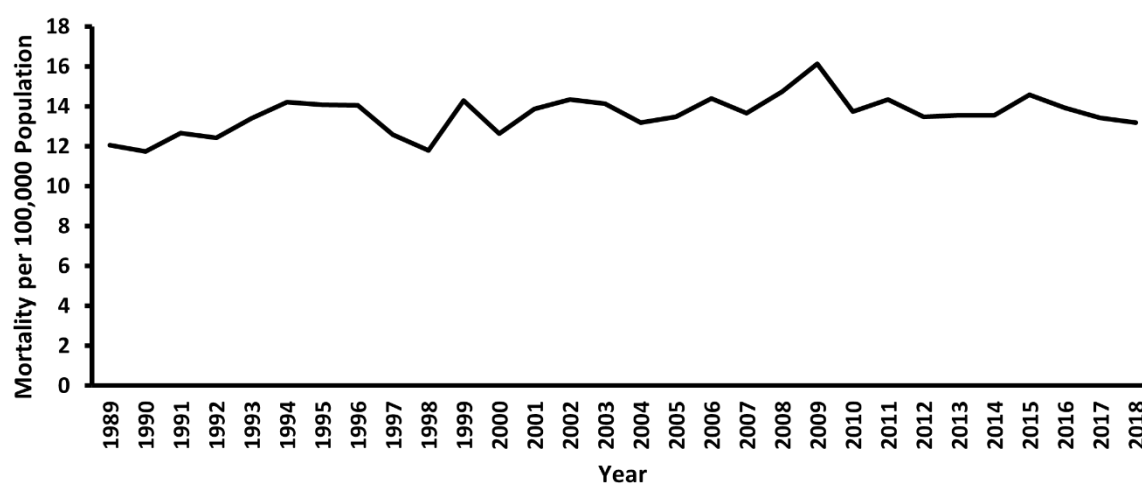
Diseases of circulatory system mortality (per 100,000 population):



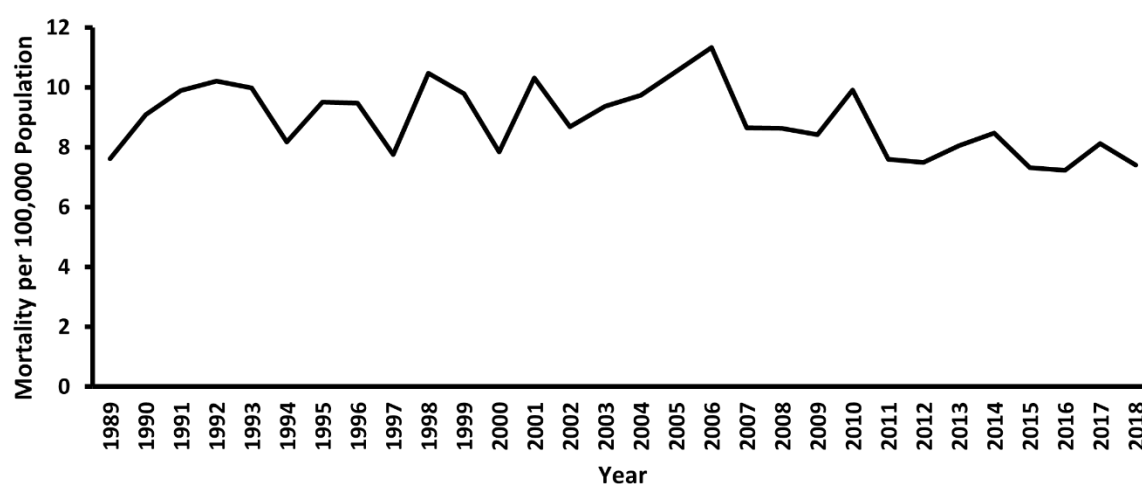
HIV/AIDS mortality (per 100,000 population):



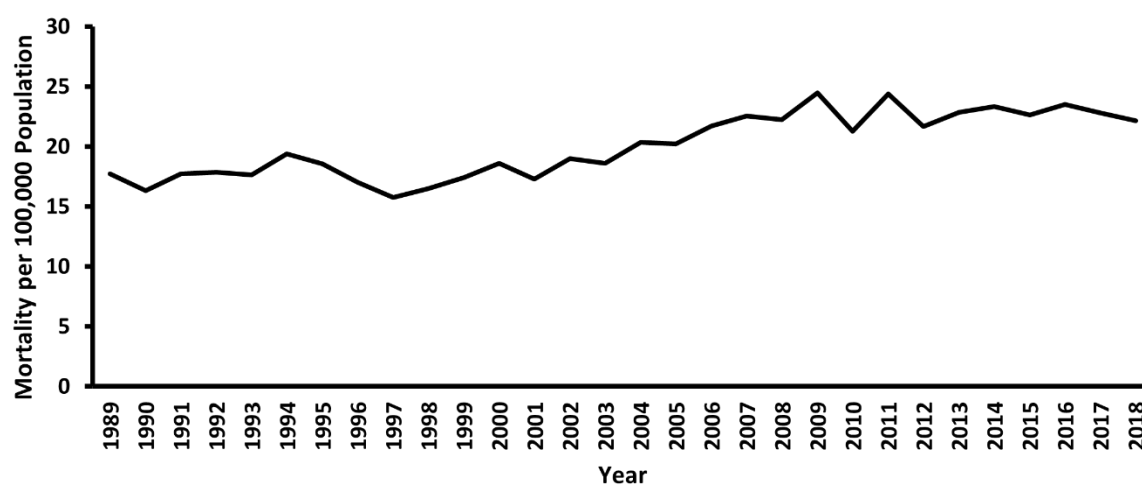
Malignant neoplasm of breast mortality (per 100,000 population):



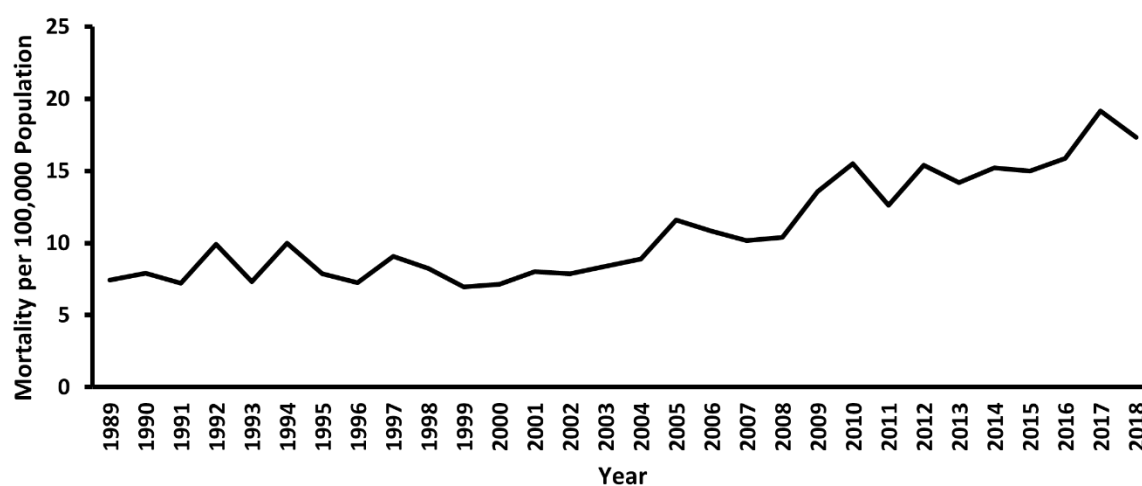
Malignant neoplasm of cervix uteri mortality (per 100,000 population):



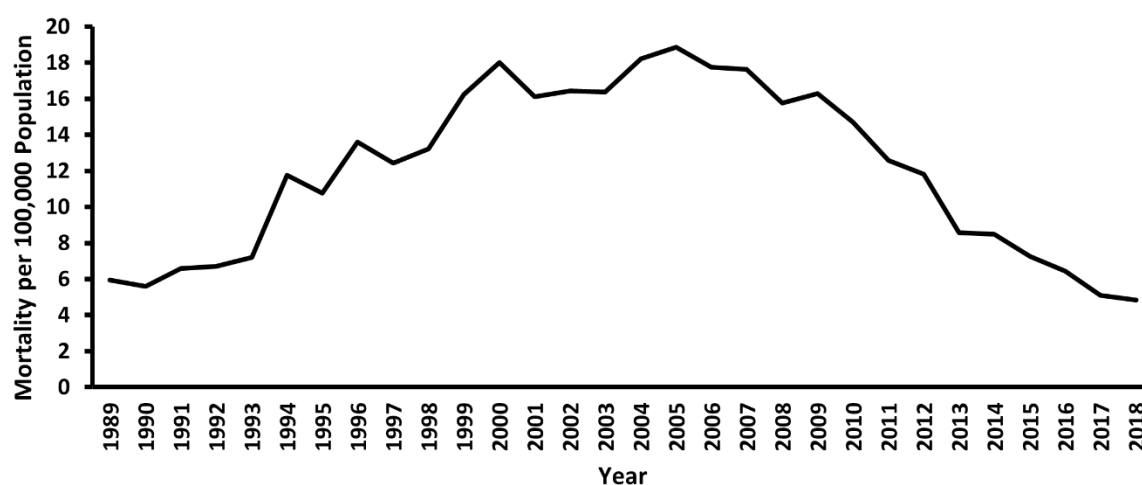
Malignant neoplasm of colon, rectum and anus mortality (per 100,000 population):



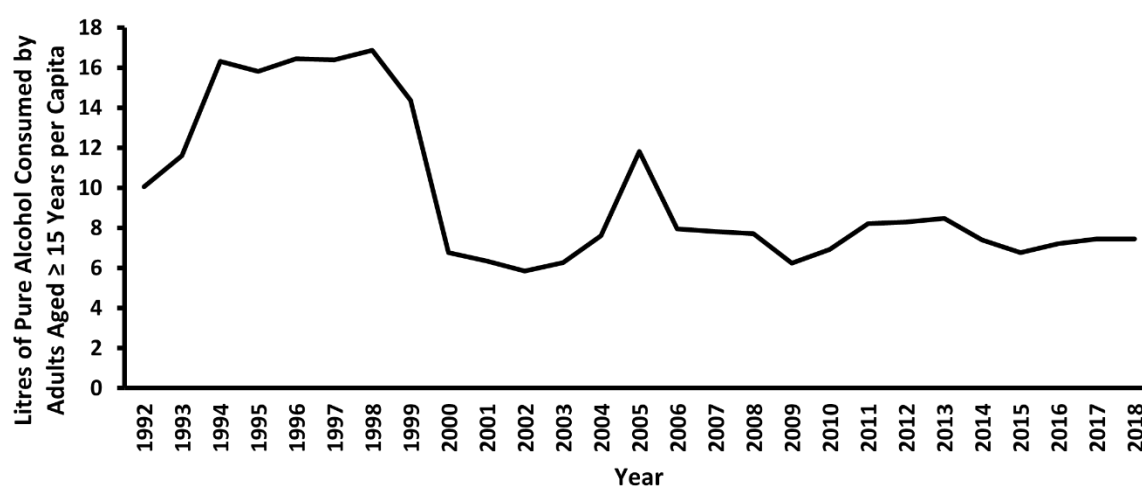
Malignant neoplasm of prostate mortality (per 100,000 population):



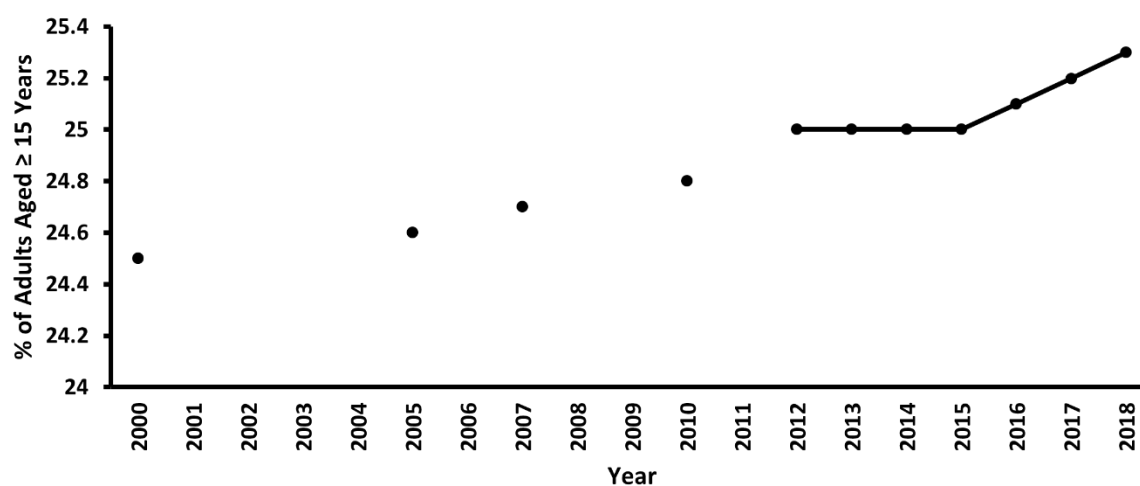
TB mortality (per 100,000 population):



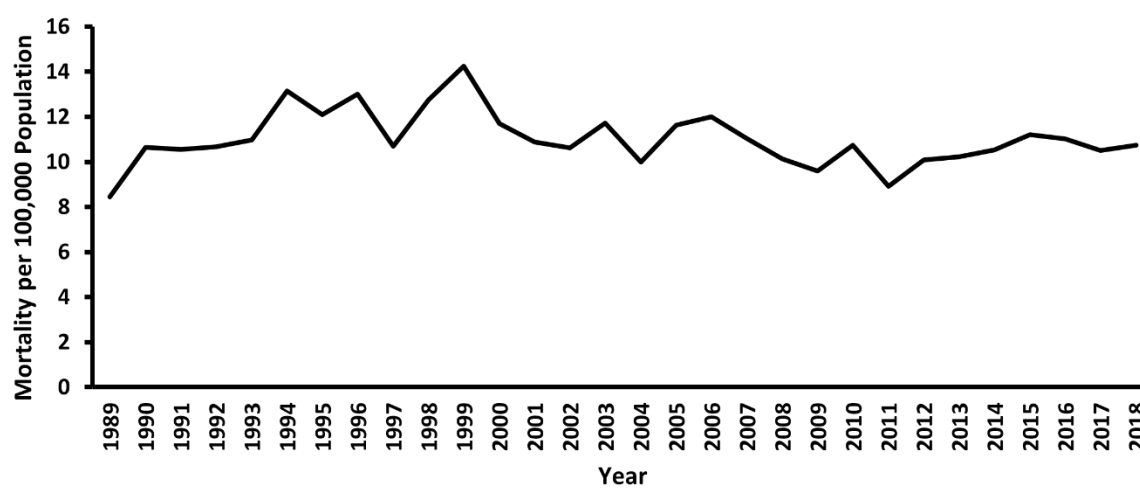
Alcohol consumption (litres of pure alcohol consumed by adults aged ≥ 15 years per capita):



Prevalence of current tobacco use (% adults aged ≥ 15 years):



Diabetes mortality (per 100,000 population):



Appendix K

Phase 2b: Case Report 1 – Post-Soviet Health System Development in Estonia

Introduction

Estonia is located in northern Europe, in the Baltic states' region. The country has a population of 1.3 million, as of 2019 [1]. Estonia gained independence in 1918, before it was annexed by the Soviet Union in 1940. Estonia regained sovereignty in 1991, with the collapse of the Soviet Union. Currently, the country is a member of the European Union (EU) and the Eurozone, the North Atlantic Treaty Organisation (NATO), and the Organisation for Economic Cooperation and Development (OECD). Estonia is categorised as a high-income country by the World Bank, though the country's gross domestic product (GDP) per capita remains below EU and European averages [1, 2].

Political and economic context

Estonia is a democratic parliamentary republic, a political system established by its fourth and current 1992 constitution. Under the system, the president is the head of state, elected by parliament (the Riigikogu) to a five-year term. The president holds no executive power, though is responsible for nominating the prime minister. The prime minister serves as head of government. The first post-independence elections took place in 1992, with Mart Laar of the nationalist Pro Patria party appointed Prime Minister. All parliamentary majorities in independent Estonia have been formed through coalition agreements. Estonian political parties tend towards the centre or right-wing of the political spectrum, though social democratic and conservative ideologies are also popular [3]. Estonia is divided into fifteen counties—the state administrative unit. The local government system is single-tiered, with 79 local governments as of the 2017 administrative reforms, including 15 cities and 64 municipalities [3].

Since independence, Estonia has entered an array of intergovernmental organisations and international agreements. In 1991, Estonia joined the United Nations (UN), signing a number of international conventions; and joined the World Trade Organisation in 1999. In 2004, Estonia acceded to the EU, having joined NATO earlier that year. In 2010, Estonia joined the OECD. Estonia became a member of the Eurozone in 2011, forgoing its national currency—the Estonian kroon—in favour of the euro. More recently, in 2019, Estonia was elected a non-permanent member of the UN Security Council. According to Pedersen et al., the reasons behind Estonia's Western alignment are multifaceted:

For the Estonian elites of the 1990s, the moral was clear: the country cannot rely on Russia remaining weak or suddenly becoming a permanently benevolent neighbour. Estonia and its elites must do all they can not only to insulate the country from Russia influence, but also to push cooperation and integration with Western partners in order to keep the inter-war scenario of merely temporary independence from repeating itself...Naturally, it would be wrong to paint a picture of Estonian leaders as obsessed with some kind of geopolitical fear or as suffering from psychological complexes. The drive for a Western-oriented and developed Estonia had a lot to do with a very basic desire to improve the living standards and wellbeing of Estonia society. But the tempo or zeal with which this effort was undertaken belies a likelihood that more profound stimuli were under the surface [4].

Estonia implemented economic reforms shortly after independence, aimed at reversing the country's negative GDP trend. In 1992, the kroon was reintroduced as Estonia's national currency, replacing the Soviet ruble. Meanwhile, the government adopted a "radical" fiscal strategy, cutting spending and taxes, and building the foundation for further reforms [4]. In 1993, a large-scale privatisation programme was initiated. Later that year, import and export tariffs were reduced with the aim of expanding trade. And in 1994, Estonia ramped up efforts to attract foreign investment [4]. Such policies succeeded in stabilising Estonia's economy. According to Habicht et al., since then:

Conservative fiscal policy combined with liberal economic policy and a simple taxation system...have remained cornerstones of a favourable and stable environment for economic development complemented by the rather strict policy of balanced state budget and low government debt [3].

After joining the EU in 2004, Estonia experienced positive economic growth. However, this was stymied by the 2007-2008 global financial crisis, which severely impacted Estonia's small and open economy [3]. In response, the government introduced massive budget cuts. The economy has since recovered, further buoyed by Estonia's entry into the Eurozone in 2011 [3]. In 2016, Estonia was classified as a high-income country by the World Bank [3].

Health system overview

The current Estonian health system is organised under the Ministry of Social Affairs (MoSA). The Ministry of Social Affairs supervises several agencies with various responsibilities within the health system, including the State Agency of Medicines

(SAM), the National Institute for Health Development (NIHD), the Health Board (HCB), and the Centre of Health and Welfare Information Systems (CeHWIS) [3]. The health system is financed by social health insurance (SHI) (75%), and private health expenditure (25%)—primarily in the form of co-payments (24%) [3, 5]. The SHI system is funded by mandatory payroll contributions, organised under an independent central fund: the Estonian Health Insurance Fund (EHIF). The EHIF is the main purchasing agency for the insured, and covers approximately 94% of the Estonian population [3].

Estonia is widely considered the “vanguard” of post-Soviet health reform [6], having significantly improved population health since 1991 [3]. From 2000, Estonia has achieved the largest reduction in amenable mortality rates of any EU country, suggesting health systems strengthening has played an important role in life expectancy gains [3]. Among the Baltic states, Estonia is the only country to sustain progress in population health measures [6, 7]. According to Jasilionis et al., the divergence between the three Baltic countries “may be attributable to their varying degrees of success in implementing structural care reforms and specific health policy measures,” where Estonia is deemed the best performer [8].

Organisation and Governance

Estonia adopted a new constitution in 1992, which established the “right to the protection of health” [9], and urged a new approach to universal health coverage through primary health care (PHC) and financial protection [6, 10]. To this purpose, the Estonian health system underwent “radical” reform from the early 1990s to the mid-2000s, in two successive waves [3, 11, 12]. The first wave of reforms, from 1989 to 1995, focused on creating the health insurance system, decentralising health planning, and regulating the pharmaceutical sector [11]. From 1996 to 2004, the second wave centred on corrective legislation, recentralising planning, improving service delivery, and defining funding responsibilities [11]. Five major pieces of legislation were introduced across the two waves (three of which were updated within the same period), establishing the organisational and regulatory framework for the current Estonian health system.

Decentralisation and recentralisation

Decentralisation was an important feature of early post-Soviet health reform in Estonia, due to both the legacy of decentralisation in the pre-Soviet health system and as a reaction against the centralised Soviet model [3, 13]. Per van Ginneken et al., for the Baltic countries, “with their deep-rooted distrust of government, a system in which organisational and health financing arrangements lay largely outside the state sector was an attractive prospect” [14]. The 1991 Health Insurance Act established regional sickness funds, thus devolving responsibility for SHI to counties and large cities [11]. With the adoption of the 1994 Health Services Organisation Act, municipalities became responsible for the planning and organisation of primary and secondary care [11]. The Act also initiated the transfer of health facility ownership to the municipalities [11]. According to Habicht, however, “some functions were decentralised to levels that were unable to ensure efficient performance—most municipalities were small and lacked financial resources, and counties had difficulties in finding appropriately qualified personnel” [3].

The Estonian government started to recentralise activities in the mid to late 1990s. Recentralisation occurred in three phases: first, MoSA gained responsibility for overall health planning; second, the EHIF and Health Protection Inspectorate (later the HCB) were accorded coverage of multiple counties; and third, more responsibilities were delegated to providers and to the managerial level of the EHIF [3]. A fourth phase was implemented more recently, with the transfer of PHC administrative functions from county governors to the HCB, beginning in 2013 [3].

Privatisation

The Estonian health system is predominantly publicly funded; however, privatisation has played an important role in post-Soviet health reform. The 2001 Health Services Organisation Act requires all hospitals to incorporate under company or foundation law [15]. According to Fidler et al., incorporation “allows hospitals to earn market revenue versus relying only on line-item budgets,” while “market exposure gives managers powerful incentives for increasing efficiency and quality while maintaining access” [16]. While in the Estonian Soviet Socialist Republic, all health workers were public employees; in the pre-Soviet health system, outpatient services had been mainly provided by private practitioners [13]. In the early post-Soviet era, Estonia prioritised the re-establishment of a cadre of private practitioners, based on this heritage [17]. By 2002, all health care providers “obtained the legal status of private entities operating under private law” [3].

Financing

Upon regaining independence, Estonia prioritised health financing reform. The 1991 Health Insurance Act, the first major health reform of the post-Soviet era, established a universal system of wage-based SHI [11, 13]. The Act created 22 regional sickness funds; however, with no central pooling or interfund transfer mechanisms, regional inequalities in

funding developed by the mid-1990s [14]. The government introduced the Central Sickness Fund (CSF) in 1994, a central collection and pooling entity subordinate to MoSA. Regional funds were allocated through the CSF [3, 14]. In 2000, the EHIF was established, an independent public legal body formed by merging the CSF with the remaining 17 regional sickness funds [3, 14]. The EHIF was given both pooling and purchasing responsibilities, with the authority to contract with health providers, pay for health services, reimburse pharmaceutical expenditures, and pay for sick leave and maternity benefits [3]. To account for the introduction of the EHIF, a new Health Insurance Act was passed in 2002. The Act updated several health financing regulations, including “validity periods, benefits, reimbursement lists and levels for health services and drugs, maximum levels of cost sharing for insured people and contractual relationships between the EHIF and providers” [11].

The first major challenge to the new health financing system came in 2007, with the advent of the global financial crisis. The Estonian economy fell into a recession, as wages decreased and unemployment rose from 3.9% in 2007 to 19.8% in 2010 [14]. Because of the SHI system’s exclusive reliance on wage-based contributions for revenue, public funding for health declined [14, 18]. However, Estonia was better prepared than most post-Soviet countries to weather the crisis [19]. Beforehand, Estonia had committed to the prioritisation of health spending in the event of an economic downturn, allowing for the accrual of reserve funds in the EHIF [19]. As the crisis began, an austerity package was introduced “involving some cuts in benefits and prices, increase cost-sharing for certain services...[and] increased value added tax on medications (from 5% to 9%)” [14]. As a member of the EU, Estonia benefitted from EU structural funds during the crisis. The Estonian government invested these funds in health infrastructure and public health, alleviating pressure on health spending [14].

In 2009, towards the end of the economic crisis, the EHIF, MoSA, and the World Health Organisation Regional Office for Europe conducted an in-depth analysis of the medium- to long-term sustainability of Estonia’s health financing system, concluding that the “public revenue base needs to be broadened for the health sector to achieve its objectives” [3]. A structural deficit in the EHIF budget from 2013 highlighted the need for diversified revenue sources [20]. In 2017, the Estonian government passed a “landmark” reform, broadening the EHIF revenue base by including funding from general tax revenue [20]. The reform, adopted in 2018, introduced state contributions to the EHIF for non-working pensioners, through earmarked budget transfers [20].

Physical and Human Resources

Physical resources

Estonia engaged in broad-scale health system reform in the 1990s; however, reform of physical infrastructure was neglected, despite medical and technological advances [21]. Even in the early to mid-2000s, most hospitals in active use were built during the Soviet era, and were “technically outdated or even unsuitable to provide hospital services” [21]. The Hospital Master Plan (HMP) 2015 was approved in 2000, aiming to improve specialised and inpatient services. An update to the HMP was approved in 2003—the Hospital Network Development Plan (HNDP) [21]. In 2004, the Estonian government launched the National Development Plan (NDP) for the Implementation of EU Structural Funds, in collaboration with the EU. The NDP included provisions for hospital renovations, in line with the HMP 2015 and HNDP [21]. By 2009, Estonia’s physical health system infrastructure had been “improved considerably” [22].

The Medicinal Products Act was introduced in 1995, establishing regulations for all medicinal products, including medical devices [11]. The Act allocated regulatory power to the SAM. In 1999, the SAM opened the Medical Devices Department, responsible for ensuring quality control of medical devices entering the Estonian market [21]. The Medicinal Products Act was updated in 2004 to comply with European Commission (EC) directives on medical devices [21].

Following independence, the “underdeveloped” information technology (IT) sector grew rapidly: “society believed in IT and started using IT in all domains, including healthcare” [23]. The Ministry of Social Affairs established the Estonian eHealth Foundation in 2005, launching four major eHealth projects with funding from EU structural funds: electronic health records (EHR), digital images, digital registration, and digital prescription [21, 23]. The Foundation developed the Estonian Health Information System (EHIS), operational since 2008 [23]. The EHIS contains health data for every Estonian resident, with secure online access to medical data, prescriptions, and medical images [23]. Other eHealth projects include e-ambulance, digital stamping of data submitted to CeHWIS, digital immunisation passports, and dental service archives [3].

Human resources

Health workforce planning in the early 1990s assumed an oversupply of doctors. According to Habicht et al., “this was true in a historic perspective and for certain specialties, but not for the total number of doctors active in clinical practice” [3]. The decline in the number of doctors in the decade following independence is attributable to three main factors: first, the

overall 7% decrease in the population; second, movement from clinical medicine to other health-related fields, such as health administration, or other sectors; and third, a reduction in the number of admissions at the University of Tartu—Estonia’s only public medical training institution [21].

In 2002, MoSA established an Advisory Committee on the training of health professionals to “improve human resources for health planning and collaboration” [21]. As a follow-up, MoSA developed a new health workforce planning model in 2005 to determine annual admissions quotas [21]. In 1995, the admissions quota was only 70, down from 200 in the 1980s [21]. In 2002–2003, the quota was increased to 100, with further increases to 140 from 2006, and 185 from 2018 [3, 22].

Medical and dental training standards were initially set in 1997, following EC directives. In 2002, the EC evaluated and approved both training programmes. The nursing profession was incorporated in 2001, establishing 16 different nursing specialties and training periods ranging from 2–8 months [21]. With a 2004 amendment to the 1995 Universities Act, MoSA revamped nurse training in 2006, consolidating nursing specialties into four types: PHC nursing, clinical nursing, intensive care nursing, and mental health nursing [21]. Admissions quotas for nurses increased, from 350 in 2014 to 400 in 2016; though this falls short of the projected annual need for 700–800 new nurses [3].

As of 2002, the HCB is the medical licensing authority in Estonia. All health professionals, including physicians, dentists, midwives, nurses, and pharmacists are required to register with the HCB. The HCB registration procedure is regulated by the Health Services Organisation Act, the Medicinal Products Act, and MoSA regulations. Since 2001, health worker accreditation is voluntary; however, professional advancement is dependent on the annual completion of at least 60 hours of continuous education [21].

Provision of Services

Public health

Estonia inherited the centralised sanitary-epidemiological model of public health, organised around enforcement of laws and disease control. In 1995, the Estonian government passed the Public Health Act, which established the legislative framework for “a more decentralised multi-stakeholder [public health] system” aimed at disease prevention and health promotion [3, 21]. According to the Act, public health services are organised under MoSA, with assistance from counties and municipalities [21]. Other national entities involved in the public health system include the HCB, the NIHD, the EHIF, the Labour Inspectorate, the Ministry of the Environment, and the Ministry of Rural Affairs [3]. To comply with EU accession requirements, health protection and occupational health were enhanced through subsequent amendments to the Act [11, 24].

Since 1995, Estonia has launched several programmes targeting specific public health threats [21]. In the post-Soviet era, Estonia has struggled with human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS) and tuberculosis (TB), including drug-resistant strains. To address this, Estonia adopted the National Programme on the Prevention of HIV/AIDS and Other Sexually Transmitted Diseases 1997–2001, and the National TB Programme 1998–2003 [3]. In the early 2000s, Estonia had the highest HIV incidence rate in Europe [17]. Rates decreased following the implementation of the 2002 National HIV/AIDS Prevention Programme 2002–2006, and the 2005 National HIV and AIDS Strategy 2006–2015 [3, 14]. Estonia has also launched programmes targeting noncommunicable diseases, including cardiovascular diseases and cancer; and broader public health themes, such as alcohol and drug abuse, immunisation, and child and adolescent health [3, 21].

Primary health care

Family medicine held an important role in the pre-Soviet Estonian health system [11, 25]. While the Soviet model reshaped PHC, traces of the former tradition endured in the Estonian Soviet Socialist Republic. In rural areas, district doctors—general practitioners (GPs) by education—and general paediatricians acted as “the sole first-line doctors” during the Soviet era [25]. Drawing on these historical roots, Estonia introduced PHC reforms within a year of regaining independence. The reforms had two main objectives: first, the establishment of a family medicine specialty; and second, appropriate changes to the provider payment mechanism for GPs [25]. The first reform, in 1991, introduced re-specialisation training for GPs [3, 26], and by 1992, re-specialisation courses were underway at the University of Tartu—Estonia’s only medical school [3]. In 1993, family medicine became an official medical specialty, and a new three-year postgraduate programme was developed [3].

The basic framework for PHC was created by the 1994 Health Services Organisation Act [21]. This was followed by the 1997 and 1998 ministerial regulations establishing the legal status of GPs, the remuneration system for GPs, and the package of services to be provided by GPs [13, 26]. The Health Services Organisation Act was renewed in 2001, and defined

independent GPs as the primary gatekeepers of the health system—each responsible for an assigned service area [3, 6]. The new Act also established GPs as private practitioners, under contract by the EHIF [3]. Since the adoption of the 2001 Act, only minor adjustments have been made to PHC in Estonia, and the country is considered to have a “fully implemented” family medicine model [27]. According to van Ginneken et al., “patients and specialists have slowly come to understand the role of the family doctor and the reform is seen as a success” [14].

Specialised and inpatient services

Under the Soviet model of care, funding structures incentivised development of the hospital sector. This resulted in a large number of hospitals, an overcapacity of hospital beds, and excessive lengths of stay across the Soviet Union. In Estonia, these figures were especially high due to the “Soviet expectation that the republic might bear the brunt of a military confrontation with the West” [17]. At independence, Estonia had 120 hospitals and over 17,000 beds to serve a population of only 1.5 million [1, 15]. This amounted to approximately 122 beds per 100,000 individuals, compared to the 1991 OECD average of five beds [16]. During the early 1990s, several reforms were implemented to address this extreme overcapacity: hospitals were accorded semiautonomous status, giving management full control over personnel decisions; new licensing requirements were adopted, leading to the closure of many small rural hospitals; and various financial incentives were introduced [15, 16]. By 1996, Estonia had reduced the number of hospitals to 78, with average length-of-stay decreasing by 30 percent from 1993 to 1998 [16].

Hospital inefficiencies worsened in 1998 when the Russian financial crisis hit [16]. The HMP 1999-2000 was developed in response. The HMP suggested a decrease in the number of acute care facilities. Hospitals selected to remain in-service were positioned to ensure that every citizen was within 70km of the closest facility [15, 17]. The remaining buildings were converted into nursing homes and long-term care facilities, improving services for the elderly and disabled, and “prevent[ing] bed blocking in acute care wards” [16, 17]. In 2001, the Health Services Organisation Act was passed, requiring hospitals to incorporate as foundations or joint-stock companies [16]. As publicly owned hospitals gained the rights to “full asset management, residual claimant status, and access to financial markets,” hospital networks began to emerge, improving quality and efficiency of health services [15, 16]. The strategic document Estonian Health Care Development Directions Until 2020 was approved by the Estonian government in 2014; the document advocates for continued prioritisation of hospital networking [3].

Health System Performance Assessment

Over the past three decades, Estonia has demonstrated improvements in population health indicators, as divided into three types: ‘good health at low cost’ (GHLC) indicators (see Figure 1), amenable mortality indicators (see Figure 2), and contextual indicators (see Figure 3).

The GHLC indicators have improved since 1991. The infant mortality rate (per 1,000 live births) decreased from 13.9 in 1991 to 1.9 in 2019; the country has also seen a reduction in under-5 mortality (per 1,000 live births), from 17.5 in 1991 to 2.4 in 2019. Maternal mortality (per 100,000 live births) fluctuated over the 1990s, though has shown a consistent downwards trend from 29 in 2000 to 9 in 2017, compared an initial figure of 31 in 1991. Births attended by skilled health personnel has been above 99% since independence, most recently recorded at 99.4% in 2016. Estonia’s life expectancy (years, at birth) decreased for a brief period in the 1990s, but has since progressed from a low of 66.5 in 1994 to 78.2 in 2018, compared to an initial 1991 figure of 69.4.

Overall, amenable mortality in Estonia has decreased since 1991. Between 1991 and 2016, deaths from cerebrovascular and cardiovascular diseases declined from 208.0 to 37.7 and 665.4 to 310.5, respectively. Cancer-related mortality has fluctuated, with deaths increasing or decreasing depending on cancer type. Breast, cervical and colorectal cancer mortalities have decreased between 1991 and 2016, from 14.9 to 11.8, 10.2 to 6.0, and 22.09 to 6.0, respectively; deaths from prostate cancer has increased, however, from 21.4 to 34.0. HIV/AIDS-related mortality has increased from 0.1 in 1996 to 3.2 in 2016, peaking at 4.5 in 2011.

Alcohol and tobacco consumption are both contributors to disease and mortality rates in the post-Soviet region. In 2000, the prevalence of current tobacco use among Estonian adults (≥ 15 years) was 41.1%, decreasing to 30.5% by 2018. Alcohol consumption among Estonian adults (≥ 15 years) has increased since independence, however, from 9.1 litres of alcohol per capita in 1991 to 11.2 in 2018, peaking at 17.9 in 2006. Meanwhile, TB mortality has decreased, from 4.4 in 1991 to 1.5 in 2016, with a maximum of 10.2 in 1998. Finally, diabetes mortality increased between 1991 and 2016, from 6.3 to 8.4, reaching a high of 15.5 in 2004.

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Appendix L

Phase 2b: Case Report 2 – Post-Soviet Health System Development in Moldova

Introduction

Moldova is located in eastern Europe, between Ukraine and Romania. The country has a population of 2.6 million [1]. Moldova was formerly the Bessarabian region of Romania before it was annexed by the Soviet Union in 1940. After the Soviet Union dissolved, Moldova declared independence in August 1991. Moldova is a member of the Commonwealth of Independent States (CIS). The country is not a European Union (EU) member state, but does have formal relations with the EU through the European Neighbourhood Policy (ENP). Moldova is categorised as a low- and middle-income country (LMIC) by the World Bank [2], and is the poorest country in Europe in terms of gross domestic product (GDP) per capita [3].

Political and economic context

Moldova is a democratic parliamentary republic. The country adopted a new constitution in 1994, establishing the governmental framework. Under the framework, parliament is the country's main legislative body. It is unicameral, and members of parliament are elected by popular vote to four-year terms. The president is the head of state [4]. From 2001 to 2015, the president was elected by parliament, based on legislation passed in 2000 aimed at limiting executive authority [5]. However, this legislation was overturned by the independent Constitutional Court in 2016, restoring direct presidential elections [6]. The prime minister is the head of government, and is nominated by the president on approval from parliament [4]. Since independence, Moldova has undergone two major administrative reorganisations. In 1998, Moldova was reorganised from 40 districts and 10 towns to 12 administrative regions—10 counties, the metropolitan area of Chisinau, and the autonomous region of Gagauz-Yeri [4]. In 2003, a new law was passed reorganising the country into 32 local districts (rayons), three municipalities, and two autonomous regions—Gagauz-Yeri and Transnistria.

Moldova political parties tend towards the centre or left-wing of the political spectrum, with far-left politics continuing to hold sway. However, the main poles of Moldovan politics are pro-EU and pro-Russia [7]. Moldova is a country “torn between West and East;” the result of its Latin-based Romanian roots and Soviet past [8]. While Moldova has promoted EU cooperation, and even integration, since independence—largely due to the EU's economic wealth [8]—strong links to Russia complicate the ‘Europeanisation’ [9] process, including:

An evident Soviet mentality and nostalgia, economic dependency on Russia, Russian-speaking minorities constituting 20-30% of Moldova's population, and the existence of the Russian-oriented breakaway region of Transnistria where Russian troops are stationed [8].

Moldova joined the CIS in 1991, a pro-Russia conglomeration of post-Soviet states. Shortly after, in 1992, Moldova became a member of the United Nations, signing onto several international treaties [4]. In 1995, Moldova joined the Council of Europe, becoming one of the first post-Soviet countries to do so. Moldova also joined the World Trade Organisation, in 2001. Following the accession of 10 new EU member states in 2004, the EU created the ENP as an alternative to further expansion. Moldova signed the ENP Action Plan later that year, aiming to improve bilateral relations, resolve the Transnistrian conflict, promote economic growth, and reduce poverty [4]. However, Moldova continues to hold the “principle aim of EU accession, while the EU is not ready to offer them any clear perspective for membership” [8]. Certainly, Russia is not interested in this either, perceiving all countries in the post-Soviet fold as its sphere of influence [8, 10]. According to Flenley et al., Moldovan political elites prioritise staying in power:

This has encouraged successive governments to use pro-European rhetoric and implement some EU originating reforms for electoral purposes. However, a desire to stay in power has simultaneously prevented the introduction of many other EU required reforms, especially with regard to the judiciary and curbing corruption [8].

Hagemann supports this assertion, arguing that despite “solid cooperation” between the EU and Moldova, “evidence...underlines that these achievements were rather based on strategic calculations by the Moldovan government, and not a real change of mind in its external allegiance” [7].

Moldova instituted a number of economic reforms shortly after independence, aimed at market liberalisation and stabilisation. These early reforms were hailed as a success, and earned Moldova a reputation as one of the leading post-Soviet reformers [11]. Despite this, standard of living fell dramatically, due largely to hyperinflation, unemployment, and the near collapse of the social security system [4]. The country introduced the Moldovan lei as its national currency in 1993, replacing the Russian ruble. However, this did not protect Moldova from the severe impacts of the Russian financial crisis in 1997, the result of deep economic ties with Russia—a legacy of high integration with the Soviet economy [4, 11].

By 1999, GDP had fallen 60%, compared to 1993 [4]. Only in 2000 did Moldova begin to experience positive economic growth. Mass labour emigration and the resultant remittances play a substantial role in Moldova economy, with remittances making up 30% of GDP in 2008 [4]. Although the economy contracted during the late 2000s global financial crisis, Moldova began posting positive GDP growth rates from 2010 [12, 13].

Health system overview

The current Moldovan health system is organised under the Ministry of Health, Labour and Social Protection (MoH), which oversees several subordinate institutions [4]. These include the National Centre of Health Management, the National Centre of Public Health (NCPH), the Medicines Agency, the Transplant Agency, the National Scientific and Practical Centre of Emergency Medicine, and the National Council for Evaluation and Accreditation in Health [4]. The health system is financed by government expenditure (51%), primarily through mandatory health insurance (MHI); and private health expenditure (49%), mainly from out-of-pocket (OOP) payments (44%) [4, 14]. MHI is funded by payroll contributions, budget transfers from general taxation, and direct insurance payments from the self-employed [4]. According to 2011 figures, MHI covers approximately 80% of the population [4, 15]. The National Health Insurance Company (NHIC), a state entity, is the central pooling and purchasing agency for MHI [4].

Moldova is one of the only CIS countries, along with Kyrgyzstan, to engage in “successful whole-system health care reform” [16]. As a result, Moldova has achieved sustained, albeit gradual, improvements in life expectancy since 1997, following an initial fall in life expectancy post-independence [17]. The country’s reform process is touted as a model for post-Soviet health system development in an LMIC context, demonstrating the capacity for health systems strengthening in more fiscally constrained post-Soviet states [18].

Organisation and Governance

Moldova adopted its first Constitution in 1994, declaring in Article 36 that the “right to health protection shall be guaranteed” and the “minimum health insurance provided by the state shall be free” [19]. The post-Soviet Moldovan government committed to universal health coverage and “Health for All” objectives, as inherited from the Soviet model [20]. To this end, reforms aimed at developing “an efficient, effective, responsive and equitable” health system were initiated in the early 1990s, though macroeconomic challenges delayed implementation by several years [21, 22]. Reform processes were revitalised in the early to mid-2000s, after an “unbearable” fiscal period in the late 1990s [22, 23]. From 1995 to 2010, various pieces of legislation were introduced to establish the health system framework.

Decentralisation and recentralisation

Through the 1990s, the organisational structure of the Moldovan health system remained “broadly” the same as during the Soviet era [20]. Although the Moldovan government engaged in “thinking on local autonomy and the desirability of devolving authority to institutions,” in practice, resource constraints made large-scale decentralisation difficult [20]. System-wide decentralisation began in 1999, with the passing of the Law on Local Public Administration [24]. The Law divided Moldova into 11 regional administrative units, made up of 10 counties (judets) and one major city, Chisinau. The Law provided the legal basis for the health regionalisation plan [24, 25]. The plan established 11 regional health administrations, organised under the MoH. Each administration was responsible for managing “national and locally raised funding, [and] programmes and contracts for health services” in their region [24].

In 2003, a new Public Administration Law was approved. The Law abolished the judet structure, and divided the country into 32 districts (rayons), three municipalities, and two territorial autonomous units [25]. In each district, local health services were reorganised into a single legal entity, headed by the rayon chief doctor. The rayon chief doctor was assigned responsibility for “budgetary planning and budgetary control, execution of contracts with the NHIC..., service design, procurement of equipment and employment of staff” [25]. Since the 2003 Law, however, the responsibilities of local authorities are increasingly “limited and unclear” [4]. Further laws on local public administration and administrative-territorial reorganisation were adopted, “reversing the trend for decentralisation” [16]. A key example of this reversal is the recentralisation of pharmaceutical procurement, which has led to lower drug costs through economies of scale [29]. Overall, the MoH maintains full responsibility over the “organisation, functioning and regulation” of health services in the country, while the local authorities’ level of power is ambiguous [4].

Privatisation

The Soviet model provided free-of-charge universal coverage to the population. Such a system was difficult to fund in the newly independent Moldova, which suffered from rapidly deteriorating socioeconomic conditions [20, 30]. To help offset costs and increase responsiveness, the government engaged in private sector development, part of a broader health sector

reform strategy [20]. By the mid-1990s, Moldova had 260 private medical consultancies, mainly licenced for diagnostic services; and, following major privatisation of the pharmaceutical sector in 1994, over 400 pharmacies [20, 24].

At this stage, the private sector was “largely unplanned and...consist[ed] of opportunistic undertakings” [20]. With the adoption of the 1995 Basic Law on Health Care, some allowances were made for the privatisation of outpatient and inpatient health facilities [24]. By 2002, approximately 6% of hospitals and 54% of outpatient providers were private [31]. The majority of the latter were contracted by the NHIC to deliver primary health care (PHC) services, in accordance with the family medicine model (FMM). As decided by the 1999 Law on Privatisation, almost all pharmacies and dental clinics are private—though the state is a shareholder in some pharmacies [24]. Private health services at the secondary and tertiary levels remained limited during the 2000s, although private rooms and some additional services were available for purchase in public facilities [25]. This trend has generally continued, though amendments to national legislation in 2009 opened the health sector to private investment [4]. To drive down public health spending, the MoH has explored public-private partnership opportunities since the late 2000s [25].

Financing

In the decade following independence, Moldova experienced a severe economic crisis. From 1990 to 1998, the country suffered the largest decrease in GDP of any post-Soviet state [32]. From the outset, the economic situation threatened the availability of health system funding, motivating health financing reform [21]. As a first step towards an insurance-based system, Moldova adopted the Law on Health Assistance through Health Insurance in 1992 [20]. The 1994 Government Decision on the Organisation of the Health Insurance Experiment set up voluntary health insurance funds in four pilot districts, including the central district of Chisinau [20]. The Law on MHI was approved in 1998; however, an economic downturn resulting from the Russian financial crisis delayed implementation [4]. Until MHI was instituted, Moldova relied exclusively on government revenue transfers funded by general taxation [24, 33]. The 1999 Law on the Minimum Package of Free-of-Charge Health Care Guaranteed by the State specified the package of health services the state is responsible for funding, replacing the blanket coverage inherited from the Soviet model [24]. The benefits package is updated annually, based on affordability and population health goals [22].

The Moldovan government created the NHIC in 2001 [4]. In 2004, the MHI system was introduced, aiming to “achieve sustainable health care financing while improved access to services for poorer sections of the population” [22]. The NHIC is responsible for administering MHI, and collecting payroll tax contributions and government budget transfers. The latter covers non-employed groups, including pensioners, students, registered disabled, and registered unemployed [22]. The self-employed are not automatically covered by MHI, but are expected to purchase into the scheme [22].

The 2008 economic crisis led to a sudden reduction in health system funding. While overall health expenditure decreased, the government managed to minimise the negative impacts of the crisis [4]. From 2004 to 2009, the Moldovan government accumulated reserves through the Reserve Fund. During the crisis, the government increased budget transfers to the NHIC by 7% to compensate for reduced revenues from payroll tax, in addition to other counter-cyclical measures [4, 34]. After the crisis, the Moldovan government approved the 2009 and 2010 amendments to the Law on MHI, expanding access to health services. The 2009 amendment provided insurance coverage to families living below the poverty line, irrespective of employment status [28]. The amendment adopted in 2010 granted universal access to PHC services, regardless of employment status or income level [28].

Moldova has struggled with high OOP payments since independence, even though the country has no formal cost-sharing mechanisms [4]. OOP payments in Moldova derive from both direct and informal payments [4]. Informal payments—a cultural relic of the Soviet era—appear to be in decline [28]. Direct payments constitute a significant proportion of health expenditure, mainly driven by pharmaceutical costs [28]. This has continued under MHI, which is relatively limited in scope and coverage: “the insured pay directly for those services and goods that fall outside the benefits package while the uninsured pay directly the whole cost of service provided by either public or private institutions” [4]. Since 2020, health sector reforms have sought to reduce OOP payments [28]. Such reforms target health worker salaries, provider payment mechanisms, and pharmaceutical budgets and pricing policies [28].

Physical and Human Resources

Physical Resources

From the Soviet era, Moldova inherited “one of the most extensive” health networks in the world [25]. Since independence, the government has attempted to reduce the infrastructure surplus and address overcapacity [25]. Economic difficulties triggered by the 1998 Russian financial crisis created further pressure: “severe economic constraints meant that the Moldovan government had to reduce surplus capacity in the health sector in order to contain costs” [25].

Hospital rationalisation and restructuring policies were implemented in the late 1990s and early 2000s, focusing on the closure of rural hospitals, and reducing overall costs and capacity [25]. By 2006, Moldova had 80 hospitals, following “dramatic cuts” to the number of hospital facilities [4].

Health infrastructure in Moldova is generally poor. Since the mid-1990s, capital stock investment has targeted the development of new PHC centres, neglecting routine maintenance of existing infrastructure. The World Bank Health Investment Fund Project and other international agencies have assisted in infrastructure refurbishment over the years. In the early 2010s, the World Bank and the EU pledged over €14 million to capital investment in the Republican Clinical Hospital—one of the largest teaching hospitals in the country, located in Chisinau [4].

Procurement and maintenance of medical equipment were of low priority in the 1990s. Even in the 2000s, medical equipment at a “significant proportion” of health facilities was obsolete, with much equipment dating back to the Soviet era [25]. In the late 2000s, the government issued two Government Decisions on the procurement of medical equipment: On the Setting of Conditions for the Marketing and Use of Medical Devices, in 2007; and On Approving Regulation for the Procurement of Medicines and Other Products with Medical Destination, in 2009 [4]. Further, parliament approved the MoH-developed Law on Medical Devices in 2012, allowing for the creation of a health technologies regulatory unit in line with international/EU standards [4]. According to Moldovan law, the Medicines Agency is responsible for centralised procurement targeting national and special programmes (e.g., the tuberculosis (TB) programme); health facilities can purchase their own equipment, with MoH approval [4]. In addition, international humanitarian and development agencies have donated large amounts of equipment [4, 25].

In Moldova, eHealth is in the early stages of development. Health-related software remains limited, and is a key area for future reform [25]. OpenMEDIS was launched in 2009 as a health technology management system, managing over 4,500 medical devices in 37 facilities by 2012 [4]. Shortly after, MEDEX 2.0 was implemented—an automated PHC information system. MEDEX 2.0 was developed as part of the Support to the Health Reform: Strengthening PHC in Moldova project, in collaboration with the EU [4]. In 2011, the Republican Diagnostic Centre in Chisinau introduced online appointments for consultations. And in 2012, the government announced plans to develop an integrated medical information system for hospitals [4]. Overall, the Moldovan government aims to expand eHealth as part of a broader “Governance e-Transformation” project [4].

Human Resources

The MoH Department for Human Resources is responsible for health workforce planning [25]. The number of health workers in Moldova declined following the major health reforms of the late 1990s and early 2000s [25]. However, there continues to be an oversupply of specialists, as compared to family physicians [25]—a legacy of the Soviet specialisation model.

Physicians are trained at one of five state-certified medical colleges and through the official State Medical University. In 1993, the State Medical University introduced family physician training, under the Faculty of Family Medicine. From 1993-2000, two model family practices were established in Chisinau as training practices for the University. The World Bank Health Investment Fund Project has since supported the refurbishment of one of these practices, the University Family Practice Training Centre, and the establishment of several other regional Family Medicine Training Centres across the country [25].

The Development Programme of the Medical and Pharmaceutical Education in the Republic of Moldova for 2011-2020 was approved in 2010, alongside the Development Strategy of the State University of Medical and Pharmacy “Nicolae Testemițanu” for 2011-2020. According to Turcanu et al., these strategic documents aim to “modernise the medical education system and adjust it to EU and World Federation for Medical Education standards and practices” [4].

Physicians are accredited through the State Medical University, and are required to pass state medical examinations prior to residency [25]. In 2005, the Law on the Exercise of Medical Profession was approved, requiring every physician to undergo continuous education and pass an examination every five years—either to confirm a previous qualification or advance towards a new qualification [4, 25]. However, Moldova has no formal licensing or registration system for health workers [25].

Provision of Services

Public Health

For the first two decades after independence, the Moldovan government preserved the general structure and functions of the inherited sanitary-epidemiological (san-epid) system, though some areas did undergo reform and expansion [24, 35].

The system maintained its focus on environmental health and communicable disease, with an additional emphasis on health promotion and education [20, 24]. The National Centre of Preventive Medicine (NCPM) carried out san-epid services from independence. In 2007, the National Centre for Health Management (NCHM) was established. The NCHM was given responsibility for strategic planning, and the collection and analysis of national health data [24, 35]. Both centres were subordinate to the MoH and operated separately from the health care delivery system [24].

An integrated national immunisation programme was introduced in 1994 [24]. The programme provided vaccination coverage for eight target diseases (tetanus, diphtheria, polio, measles, TB, pertussis, hepatitis B, and mumps), free-of-charge for all children [20, 24]. In 1995, the 'Healthy Lifestyles' centre was developed under the NCPM, and in 1998, the centre launched health education programmes targeting HIV prevention, smoking cessation, and mental health [24]. Since then, the MoH has introduced several national public health programmes, including the National TB Control Programme and the National AIDS Programme [25]. The Moldovan government has also introduced public health-related legislation, including laws on consumer protection, food, nuclear safety, tobacco control, and occupational health [27].

In 2009, the Law on State Surveillance of Public Health was approved, reorganising the san-epid service to the State Surveillance of Public Health Service (SSPHS) [4, 27]. The SSPHS is headed by the chief sanitary doctor, who is also the deputy minister of health [4]. Since the SSPHS was established, the government has engaged in further reorganisation of the public health system, in line with the National Public Health Strategy 2014-2020 [27]. The reorganisation aims to "strengthen organisational and operational management, introduce new functions, such as the epidemiology of noncommunicable diseases, and create conditions for the development of noncommunicable disease control" [27]. The shift in focus from communicable to noncommunicable diseases (NCDs) is evident in recent national health policy [31]—for example, in 2012, parliament approved the NCD Prevention and Control Strategy 2012-2020 [31]. Health promotion activities continue to be of low priority, however; even within the PHC system, general practitioners (GPs) are more focused on curative versus preventive health services [31].

Primary health care

Through the early 1990s, the Moldovan government continued to follow the Soviet approach to PHC. The PHC network consisted of health posts in lower populated districts, and polyclinics in more highly populated areas [20]. Health posts were staffed by a feldsher, nurse, and midwife, who provided basic PHC services [20]. Polyclinics were staffed by many of the same specialists as during the Soviet era, including internists, paediatricians, gynaecologists, and dentists [20, 36].

From the mid to late 1990s, the Moldovan government implemented several reforms aimed at strengthening PHC [26, 31]. This began with the 1995 Basic Law on Health Care, which established the basis for the FMM [26]. The 1997 Government Decree on PHC introduced the family medicine specialty and requisite training programmes, budgetary increases for the PHC sector, changes to the GP payment mechanism, and patient choice in GP selection [24, 25]. The Moldovan government designed the Health Investment Fund Project in 1998, in collaboration with the World Bank. The project aimed to strengthen the PHC sector through redistribution of resources from higher levels of care [25].

The overarching goal of the reform process was to transition primary care providers "from being mainly referral offices to providing a range of basic services to the community...[and] to be the cornerstone for the provision of the minimum package," as defined in the 1999 Law on the Minimum Package of Free-of-Charge Health Care [24]. The old polyclinic system was dismantled and replaced by four categories of primary care provider: family medicine centres for district polyclinics, health centres for larger rural medical points, family doctor offices for single-physician rural medical points, and health posts operated by GP assistants in small areas of less than 1,000 people [16, 25]. After MHI was implemented, the NHIC began to contract private health providers to deliver PHC services [31].

In 2010, the Order on PHC was approved, revising the organisation of primary care. Under the Order, both public and private providers could offer PHC services, divided into basic primary care services and additional medical services [4]. In 2018, an updated version of the 1997 Government Decree on PHC was approved, the Government Decision for the Approval of the Rules for the Organisation of PHC [37].

Specialised and inpatient services

The publicly owned hospital system inherited from the Soviet era underwent minimal reform in the 1990s. Moldova's expansive hospital network consisted of several republic-level hospitals, almost all in Chisinau; a central district hospital with an attached polyclinic in every district or municipality; and extra, smaller hospitals in the larger districts, located primarily in rural areas [20]. In 1994, Moldova had 305 hospitals, and service provision rates of over fourteen beds and four doctors per 1,000 people, "calculated at around five times the level sustainable by an economy the size of...Moldova" [24].

The 1995 Basic Law on Health Care contained provisions for privatisation of some health facilities; though by 2002, only 6% of hospitals were fully private [24].

The 1998 economic crisis resulted in significant funding hits for the health sector. This triggered a more concentrated reform effort towards addressing overcapacity [24]. Initially, the government focused on reducing bed numbers within hospitals. When this failed to produce the desired impact, the government began closing entire hospitals, including the majority of rural hospitals [4, 24]. By 2002, the number of hospitals had decreased to 65 [25]. With the introduction of MHI in 2004, all public hospitals became state enterprises. The new status gave hospitals increased autonomy and the ability to generate their own income [24, 25]. In 2009, the HMP was developed in collaboration with the World Bank [4, 38]. The HMP was a strategy for improving the hospital sector; for various reasons, however, it was never implemented [4]. In 2010, the Programme for the Development of Hospital Health Care for 2010-2012 was approved, with aims to modernise and increase the efficiency of hospital care [4].

Health System Performance Assessment

Moldova has seen improvements in population health outcomes in the three decades since independence, as divided into three categories: 'good health at low cost' (GHLC) indicators (see Figure 1), amenable mortality indicators (see Figure 2), and contextual indicators (see Figure 3).

The GHLC indicators broadly improved. The infant mortality rate (per 1,000 live births) decreased from 27.7 in 1991 to 12.4 in 2019, with a reduction in under-5 mortality (per 1,000 live births) from 33.6 in 1991 to 14.4 in 2019. Maternal mortality (per 100,000 live births) varied in the 1990s, since decreasing from 44.0 in 2000 to 19.0 in 2017, compared to an initial figure of 47.0 in 1991. Births attended by skilled health personnel has stayed at or near 100% since 1991, recorded most recently at 99.7% in 2014. Moldova's life expectancy (years, at birth) decreased from 67.6 in 1991 to a low of 66.7 in 1997, before improving to 71.8 by 2018.

Overall mortality has decreased since 1991. From 1991 to 2018, deaths from cerebrovascular diseases and CVD declined from 188.6 to 134.0 and 601.5 to 551.7, respectively. Cancer-related mortality is varied, with deaths increasing or decreasing depending on cancer type. Cervical cancer mortality decreased between 1991 and 2018, from 9.9 to 7.4; however, deaths from breast, colorectal, and prostate cancers have increased, from 12.7 to 13.2, 17.7 to 22.2, and 7.2 to 17.3, respectively. Human immunodeficiency virus/acquired immune deficiency syndrome-related mortality has increased from 0.1 in 1997 to 2.5 in 2019, reaching a maximum of 2.6 in 2014. Between 1991 and 2018, TB mortality has decreased from 6.6 to 4.8, peaking at 18.9 in 2005. Lastly, diabetes mortality has remained fairly constant, increasing slightly from 10.6 in 1991 to 10.7 in 2018, with a maximum of 14.2 in 1999.

Alcohol and tobacco consumption contribute to disease and mortality rates in the post-Soviet region. In 2000, the prevalence of current tobacco use among Moldovan adults (≥ 15 years) was 24.5% in 2000, increasing to 25.3% by 2018. However, alcohol consumption among Moldovan adults (≥ 15 years) has decreased from 10.1 litres of alcohol per capita in 1992 to 7.5 in 2018, reaching a high of 16.9 in 1998.

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Appendix M

BMC Health Services Research

Journal Style and Formatting Guidelines: Research Article

Criteria

Research articles should report on original primary research, but may report on systematic reviews of published research provided they adhere to the appropriate reporting guidelines which are detailed in our editorial policies. Please note that non-commissioned pooled analyses of selected published research will not be considered. Studies reporting descriptive results from a single institution or region will only be considered if analogous data have not been previously published in a peer reviewed journal and the conclusions provide distinct insights that are of relevance to a regional or international audience.

BMC Health Services Research strongly encourages that all datasets on which the conclusions of the paper rely should be available to readers. We encourage authors to ensure that their datasets are either deposited in publicly available repositories (where available and appropriate) or presented in the main manuscript or additional supporting files whenever possible. Please see Springer Nature's information on recommended repositories. Where a widely established research community expectation for data archiving in public repositories exists, submission to a community-endorsed, public repository is mandatory. A list of data where deposition is required, with the appropriate repositories, can be found on the Editorial Policies Page.

Preparing Your Manuscript

The information below details the section headings that you should include in your manuscript and what information should be within each section. Please note that your manuscript must include a 'Declarations' section including all of the subheadings (please see below for more information).

Title Page

The title page should:

- present a title that includes, if appropriate, the study design e.g.:
 - "A versus B in the treatment of C: a randomized controlled trial", "X is a risk factor for Y: a case control study", "What is the impact of factor X on subject Y: A systematic review"
 - or for non-clinical or non-research studies a description of what the article reports
- list the full names and institutional addresses for all authors
 - if a collaboration group should be listed as an author, please list the Group name as an author. If you would like the names of the individual members of the Group to be searchable through their individual PubMed records, please include this information in the "Acknowledgements" section in accordance with the instructions below
- indicate the corresponding author

Abstract

The Abstract should not exceed 350 words. Please minimize the use of abbreviations and do not cite references in the abstract. Reports of randomized controlled trials should follow the CONSORT extension for abstracts. The abstract must include the following separate sections:

- **Background:** the context and purpose of the study
- **Methods:** how the study was performed and statistical tests used
- **Results:** the main findings
- **Conclusions:** brief summary and potential implications
- **Trial registration:** If your article reports the results of a health care intervention on human participants, it must be registered in an appropriate registry and the registration number and date of registration should be stated in this section. If it was not registered prospectively (before enrollment of the first participant), you should include the words 'retrospectively registered'. See our editorial policies for more information on trial registration

Keywords

Three to ten keywords representing the main content of the article.

Background

The Background section should explain the background to the study, its aims, a summary of the existing literature and why this study was necessary or its contribution to the field.

Methods

The methods section should include:

- the aim, design and setting of the study
- the characteristics of participants or description of materials

- a clear description of all processes, interventions and comparisons. Generic drug names should generally be used. When proprietary brands are used in research, include the brand names in parentheses
- the type of statistical analysis used, including a power calculation if appropriate

Results

This should include the findings of the study including, if appropriate, results of statistical analysis which must be included either in the text or as tables and figures.

Discussion

This section should discuss the implications of the findings in context of existing research and highlight limitations of the study.

Conclusions

This should state clearly the main conclusions and provide an explanation of the importance and relevance of the study reported.

List of Abbreviations

If abbreviations are used in the text they should be defined in the text at first use, and a list of abbreviations should be provided.

Declarations

All manuscripts must contain the following sections under the heading 'Declarations':

- Ethics approval and consent to participate
- Consent for publication
- Availability of data and materials
- Competing interests
- Funding
- Authors' contributions
- Acknowledgements
- Authors' information (optional)

Please see below for details on the information to be included in these sections.

If any of the sections are not relevant to your manuscript, please include the heading and write 'Not applicable' for that section.

Ethics Approval and Consent to Participate

Manuscripts reporting studies involving human participants, human data or human tissue must:

- include a statement on ethics approval and consent (even where the need for approval was waived)
- include the name of the ethics committee that approved the study and the committee's reference number if appropriate

Studies involving animals must include a statement on ethics approval and for experimental studies involving client-owned animals, authors must also include a statement on informed consent from the client or owner.

See our editorial policies for more information.

If your manuscript does not report on or involve the use of any animal or human data or tissue, please state 'Not applicable' in this section.

Consent for Publication

If your manuscript contains any individual person's data in any form (including any individual details, images or videos), consent for publication must be obtained from that person, or in the case of children, their parent or legal guardian. All presentations of case reports must have consent for publication.

You can use your institutional consent form or our consent form if you prefer. You should not send the form to us on submission, but we may request to see a copy at any stage (including after publication).

See our editorial policies for more information on consent for publication.

If your manuscript does not contain data from any individual person, please state "Not applicable" in this section.

Availability of Data and Materials

All manuscripts must include an 'Availability of data and materials' statement. Data availability statements should include information on where data supporting the results reported in the article can be found including, where applicable, hyperlinks to publicly archived datasets analysed or generated during the study. By data we mean the minimal dataset that would be necessary to interpret, replicate and build upon the findings reported in the article. We recognise it is not always possible to share research data publicly, for instance when individual privacy could be compromised, and in such instances data availability should still be stated in the manuscript along with any conditions for access.

Data availability statements can take one of the following forms (or a combination of more than one if required for multiple datasets):

- The datasets generated and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS]
- The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.
- All data generated or analysed during this study are included in this published article [and its supplementary information files].
- The datasets generated and/or analysed during the current study are not publicly available due [REASON WHY DATA ARE NOT PUBLIC] but are available from the corresponding author on reasonable request.
- Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.
- The data that support the findings of this study are available from [third party name] but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of [third party name].
- Not applicable. If your manuscript does not contain any data, please state 'Not applicable' in this section.

More examples of template data availability statements, which include examples of openly available and restricted access datasets, are available here.

BioMed Central also requires that authors cite any publicly available data on which the conclusions of the paper rely in the manuscript. Data citations should include a persistent identifier (such as a DOI) and should ideally be included in the reference list. Citations of datasets, when they appear in the reference list, should include the minimum information recommended by DataCite and follow journal style. Dataset identifiers including DOIs should be expressed as full URLs. For example:

Hao Z, AghaKouchak A, Nakhjiri N, Farahmand A. Global integrated drought monitoring and prediction system (GIDMaPS) data sets. figshare. 2014. <http://dx.doi.org/10.6084/m9.figshare.853801>

With the corresponding text in the Availability of data and materials statement:

The datasets generated during and/or analysed during the current study are available in the [NAME] repository, [PERSISTENT WEB LINK TO DATASETS].^[Reference number]

If you wish to co-submit a data note describing your data to be published in *BMC Research Notes*, you can do so by visiting our submission portal. Data notes support open data and help authors to comply with funder policies on data sharing. Co-published data notes will be linked to the research article the data support (example).

Competing Interests

All financial and non-financial competing interests must be declared in this section.

See our editorial policies for a full explanation of competing interests. If you are unsure whether you or any of your co-authors have a competing interest please contact the editorial office.

Please use the authors initials to refer to each authors' competing interests in this section.

If you do not have any competing interests, please state "The authors declare that they have no competing interests" in this section.

Funding

All sources of funding for the research reported should be declared. The role of the funding body in the design of the study and collection, analysis, and interpretation of data and in writing the manuscript should be declared.

Authors' Contributions

The individual contributions of authors to the manuscript should be specified in this section. Guidance and criteria for authorship can be found in our editorial policies.

Please use initials to refer to each author's contribution in this section, for example: "FC analyzed and interpreted the patient data regarding the hematological disease and the transplant. RH performed the histological examination of the kidney, and was a major contributor in writing the manuscript. All authors read and approved the final manuscript."

Acknowledgements

Please acknowledge anyone who contributed towards the article who does not meet the criteria for authorship including anyone who provided professional writing services or materials.

Authors should obtain permission to acknowledge from all those mentioned in the Acknowledgements section.

See our editorial policies for a full explanation of acknowledgements and authorship criteria.

If you do not have anyone to acknowledge, please write 'Not applicable' in this section.

Group authorship (for manuscripts involving a collaboration group): if you would like the names of the individual members of a collaboration Group to be searchable through their individual PubMed records, please ensure that the title of the

collaboration Group is included on the title page and in the submission system and also include collaborating author names as the last paragraph of the “Acknowledgements” section. Please add authors in the

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Please note that individual names may not be present in the PubMed record at the time a published article is initially included in PubMed as it takes PubMed additional time to code this information.

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This section is optional.

You may choose to use this section to include any relevant information about the author(s) that may aid the reader’s interpretation of the article, and understand the standpoint of the author(s). This may include details about the authors’ qualifications, current positions they hold at institutions or societies, or any other relevant background information. Please refer to authors using their initials. Note this section should not be used to describe any competing interests.

Footnotes

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

References

Examples of the Vancouver reference style are shown below.

See our editorial policies for author guidance on good citation practice.

Web Links and URLs: All web links and URLs, including links to the authors’ own websites, should be given a reference number and included in the reference list rather than within the text of the manuscript. They should be provided in full, including both the title of the site and the URL, as well as the date the site was accessed, in the following format: The Mouse Tumour Biology Database. <http://tumor.informatics.jax.org/mtbwi/index.do>. Accessed 20 May 2013. If an author or group of authors can clearly be associated with a web link, such as for weblogs, then they should be included in the reference.

Example Reference Style:

Article within a journal

Smith JJ. The world of science. *Am J Sci*. 1999;36:234-5.

Article within a journal (no page numbers)

Rohrmann S, Overvad K, Bueno-de-Mesquita HB, Jakobsen MU, Egeberg R, Tjønneland A, et al. Meat consumption and mortality - results from the European Prospective Investigation into Cancer and Nutrition. *BMC Medicine*. 2013;11:63.

Article within a journal by DOI

Slifka MK, Whitton JL. Clinical implications of dysregulated cytokine production. *Dig J Mol Med*. 2000; doi:10.1007/s801090000086.

Article within a journal supplement

Frumin AM, Nussbaum J, Esposito M. Functional asplenia: demonstration of splenic activity by bone marrow scan. *Blood* 1979;59 Suppl 1:26-32.

Book chapter, or an article within a book

Wyllie AH, Kerr JFR, Currie AR. Cell death: the significance of apoptosis. In: Bourne GH, Danielli JF, Jeon KW, editors. *International review of cytology*. London: Academic; 1980. p. 251-306.

OnlineFirst chapter in a series (without a volume designation but with a DOI)

Saito Y, Hyuga H. Rate equation approaches to amplification of enantiomeric excess and chiral symmetry breaking. *Top Curr Chem*. 2007. doi:10.1007/128_2006_108.

Complete book, authored

Blenkinsopp A, Paxton P. Symptoms in the pharmacy: a guide to the management of common illness. 3rd ed. Oxford: Blackwell Science; 1998.

Online document

Doe J. Title of subordinate document. In: The dictionary of substances and their effects. Royal Society of Chemistry. 1999. <http://www.rsc.org/dose/title of subordinate document>. Accessed 15 Jan 1999.

Online database

Healthwise Knowledgebase. US Pharmacopeia, Rockville. 1998. <http://www.healthwise.org>. Accessed 21 Sept 1998.

Supplementary material/private homepage

Doe J. Title of supplementary material. 2000. <http://www.privatehomepage.com>. Accessed 22 Feb 2000.

University site

Doe, J. Title of preprint. <http://www.uni-heidelberg.de/mydata.html> (1999). Accessed 25 Dec 1999.

FTP site

Doe, J. Trivial HTTP, RFC2169. <ftp://ftp.isi.edu/in-notes/rfc2169.txt> (1999). Accessed 12 Nov 1999.

Organization site

ISSN International Centre: The ISSN register. <http://www.issn.org> (2006). Accessed 20 Feb 2007.

Dataset with persistent identifier

Zheng L-Y, Guo X-S, He B, Sun L-J, Peng Y, Dong S-S, et al. Genome data from sweet and grain sorghum (*Sorghum bicolor*). GigaScience Database. 2011. <http://dx.doi.org/10.5524/100012>.

Figures, Tables and Additional Files**Preparing Figures:**

When preparing figures, please follow the formatting instructions below.

- Figures should be numbered in the order they are first mentioned in the text, and uploaded in this order. Multi-panel figures (those with parts a, b, c, d etc.) should be submitted as a single composite file that contains all parts of the figure.
- Figures should be uploaded in the correct orientation.
- Figure titles (max 15 words) and legends (max 300 words) should be provided in the main manuscript, not in the graphic file.
- Figure keys should be incorporated into the graphic, not into the legend of the figure.
- Each figure should be closely cropped to minimize the amount of white space surrounding the illustration.
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Figure File Types:

We accept the following file formats for figures:

- EPS (suitable for diagrams and/or images)
- PDF (suitable for diagrams and/or images)
- Microsoft Word (suitable for diagrams and/or images, figures must be a single page)
- PowerPoint (suitable for diagrams and/or images, figures must be a single page)
- TIFF (suitable for images)
- JPEG (suitable for photographic images, less suitable for graphical images)
- PNG (suitable for images)
- BMP (suitable for images)
- CDX (ChemDraw - suitable for molecular structures)

For information and suggestions of suitable file formats for specific figure types, please see our author academy.

Figure Size and Resolution:

Figures are resized during publication of the final full text and PDF versions to conform to the BioMed Central standard dimensions, which are detailed below.

Figures on the web:

- width of 600 pixels (standard), 1200 pixels (high resolution).

Figures in the final PDF version:

- width of 85 mm for half page width figure
- width of 170 mm for full page width figure
- maximum height of 225 mm for figure and legend
- image resolution of approximately 300 dpi (dots per inch) at the final size

Figures should be designed such that all information, including text, is legible at these dimensions. All lines should be wider than 0.25 pt when constrained to standard figure widths. All fonts must be embedded.

Figure File Compression:

- Vector figures should if possible be submitted as PDF files, which are usually more compact than EPS files.
- TIFF files should be saved with LZW compression, which is lossless (decreases file size without decreasing quality) in order to minimize upload time.
- JPEG files should be saved at maximum quality.
- Conversion of images between file types (especially lossy formats such as JPEG) should be kept to a minimum to avoid degradation of quality.

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When preparing tables, please follow the formatting instructions below.

- Tables should be numbered and cited in the text in sequence using Arabic numerals (i.e. Table 1, Table 2 etc.).
- Tables less than one A4 or Letter page in length can be placed in the appropriate location within the manuscript.
- Tables larger than one A4 or Letter page in length can be placed at the end of the document text file. Please cite and indicate where the table should appear at the relevant location in the text file so that the table can be added in the correct place during production.
- Larger datasets, or tables too wide for A4 or Letter landscape page can be uploaded as additional files. Please see [below] for more information.
- Tabular data provided as additional files can be uploaded as an Excel spreadsheet (.xls) or comma separated values (.csv). Please use the standard file extensions.
- Table titles (max 15 words) should be included above the table, and legends (max 300 words) should be included underneath the table.
- Tables should not be embedded as figures or spreadsheet files, but should be formatted using 'Table object' function in your word processing program.
- Color and shading may not be used. Parts of the table can be highlighted using superscript, numbering, lettering, symbols or bold text, the meaning of which should be explained in a table legend.
- Commas should not be used to indicate numerical values.

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Preparing Additional Files

As the length and quantity of data is not restricted for many article types, authors can provide datasets, tables, movies, or other information as additional files.

All Additional files will be published along with the accepted article. Do not include files such as patient consent forms, certificates of language editing, or revised versions of the main manuscript document with tracked changes. Such files, if requested, should be sent by email to the journal's editorial email address, quoting the manuscript reference number. Please do not send completed patient consent forms unless requested.

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- Title of data
- Description of data

Additional files should be named “Additional file 1” and so on and should be referenced explicitly by file name within the body of the article, e.g. ‘An additional movie file shows this in more detail [see Additional file 1]’.

For further guidance on how to use Additional files or recommendations on how to present particular types of data or information, please see How to use additional files.

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BioMed Central will not edit submitted manuscripts for style or language, so please ensure that inconsistencies in style, and incorrect grammar, spelling and punctuation have been addressed prior to submission.

Gene names should be in italic, but protein products should be in plain type.

Generic drug names should generally be used. When proprietary brands are used, include the brand names in parentheses.

There is no explicit limit on the length of articles submitted for publication in a supplement, unless otherwise instructed by the supplement organizers, but authors are encouraged to be concise. There is also no restriction on the number of figures or tables, but note that these should be limited to a reasonable number for the length of the article. Authors should include all relevant supporting data with each article.

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- Please use double line spacing.
- Type the text unjustified, without hyphenating words at line breaks.
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- Capitalise only the first word and proper nouns in the title and headings.
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- Genes, mutations, genotypes and alleles should be indicated in italics and authors are required to use approved gene symbols, names and formatting. Protein products should be in plain type.

Units:

SI units should be used throughout (litre and molar are permitted, however).
