# EPC 2024 Extended Abstract

# Beyond the Crisis: Mortality Trends in Post-Communist Countries, 1989 – 2019.

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## Abstract (150 words)

The Soviet Union's breakup in 1991 precipitated a significant health crisis in post-communist countries. Although there has been extensive research on the early 1990s mortality crisis in the region, knowledge about subsequent life expectancy trajectories is limited. Using the WHO Mortality Database, life tables, and Arriaga decomposition, this study assesses life expectancy trends from 1989 to 2019 in 20 post-communist countries (11 former Soviet republics and 9 Satellite states) and the causes of death underpinning these trends. Initial findings indicate consistent life expectancy improvements in former Satellite states. In contrast, former Soviet republics displayed diverse trends, with Estonia nearing Western standards while countries like Russia and Ukraine lagged, experiencing life expectancy reversals beyond the 1990s crisis. Decomposition results suggest that shifts in infant mortality, external and circulatory mortality in the working-age population, and neoplasms and circulatory issues in older age groups were key contributors.

## Extended Abstract
## Introduction

The Soviet Union, which once occupied nearly one-sixth of the Earth's landmass and was the largest country in human history, collapsed in 1991. This collapse had multiple ramifications: it marked the end of the Cold War, introduced a new geopolitical order, led to economic turmoil, and caused a severe mortality crisis that affected post-communist countries in the early 1990s. However, the severity of this crisis was not consistent across all regions of the former Soviet Union. Early in the transition, it became evident that, despite their shared histories and societal legacies, post-communist countries were on different mortality trajectories. For instance, Russia's life expectancy declined by five years between 1991 and 1994, while Poland and Croatia saw improvements in the same period (Stuckler, 2009).

The direct causes of this crisis remain a topic of debate, but there's agreement that factors such as rising alcohol consumption, stress from the erosion of social safety nets, and the rate of economic transition played significant roles in the mortality fluctuations (Leon et al., 1997; Stuckler, King, McKee, 2009; Azarova et al., 2017). Consequently, the surge in mortality was primarily due to so-called diseases of despair, such as homicides, suicides, and alcohol poisonings, as well as cardiovascular events. This increase was especially pronounced among the working-age population, particularly among men. For example, in Russia, mortality rates rose by 45% for those aged 15-24, over 90% for ages 25-39, 70% for ages 40-59, and 30% for those over 60. However, mortality rates for children under 15 remained stable or even decreased (Stuckler et al., 2012).

Given its scale, the post-communist mortality crisis of the early 1990s garnered significant research attention. However, less is known about life expectancy and cause-specific mortality in the decades that followed. Most existing studies either focus on individual countries, cover multiple countries only up to the early 2000s (Meslé, 2004; Mackenbach et al., 2015), or analyze a more recent period but for a limited subset of post-communist countries, mainly in Central and Eastern Europe (Gerry, Raskina & Tsyplakova, 2017; Aburto & van Raalte, 2018; Mackenbach et al., 2018). This inconsistency in the geographic and temporal scope of existing studies hinders a comprehensive ‘big picture’ and comparative understanding of long-term mortality trends in the region.

To address this knowledge gap, we aim to conduct an exhaustive analysis of long-term life expectancy trends in post-communist countries over the last three decades. Our study will focus on three primary research questions:

Q1) How has life expectancy in post-communist countries changed since the fall of the Soviet Union?

Q2) Is life expectancy in post-communist countries approaching that of Western nations?

Q3) Which specific causes of death account for the significant fluctuations in life expectancy over the years? Can reductions in external and cardiovascular mortality in midlife explain gains in life expectancy?

## Data and Methods

Cause-specific mortality and population counts data come from the WHO Mortality Database (https://rb.gy/8owz2). We divided post-communist countries into two groups: former Soviet Union republics (FSU) and Satellite states (non-FSU). The FSU group consists of the following countries: Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Ukraine, and Uzbekistan. The non-FSU group includes Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Poland, Romania, Slovakia, and Slovenia.

Using the life table method, we computed life expectancy for each country from 1989 until 2019. To compare life expectancy in the region with Western counterparts, we also calculated life expectancy for the United States and a mean life expectancy for a set of Western European countries (Austria, Belgium, Denmark, France, Finland, Germany, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, and the United Kingdom).

To understand the mechanisms of life expectancy changes in the region, we applied the Arriaga method (Arriaga, 1984) and decomposed changes in life expectancy between 1989 and 2004 and between 2005 and 2019 for each country. This was done based on 7 mutually exclusive causes of death: (i) infectious and parasitic, (ii) neoplasms, (iii) circulatory, (iv) respiratory, (v) digestive, (vi) external, and (vii) a residual category, capturing all other causes of death.

## Preliminary Results

*Life expectancy*

Figure 1 shows trends in male (panel A) and female (panel B) life expectancy at birth ($e_0$) for 21 countries between 1989 and 2019. Former Satellite countries have consistently enjoyed improvements in $e_0$ since 1989, converging towards the Western European average and that

of the US. On the other hand, $e_0$ in the former Soviet republics has not followed the same linear trajectory. The majority of these countries experienced reversals, not only in the early 1990s but also in the late 1990s and 2000s. There is significant variation in life expectancy among the former Soviet republics. For instance, Estonia has caught up with the Satellite states, nearing the Western European average. In contrast, countries like Ukraine and Russia have observed the lowest male $e_0$ and some of the lowest female $e_0$ throughout the period. Panel C summarizes changes in $e_0$ between 1989 and 2019 for each country and sex separately. The most significant improvements in life expectancy were observed in satellite states such as Slovenia, the Czech Republic, Poland, Croatia, and Slovakia, as well as in Estonia, a former Soviet republic. These countries also had the highest levels of both female and male $e_0$ in 2019. Among the former Soviet republics, Estonia, Uzbekistan, Kyrgyzstan, Latvia, and Lithuania witnessed the most notable increases in $e_0$. Conversely, Russia, Belarus, Bulgaria, and Ukraine saw only minor enhancements in their $e_0$. In 2019, these countries recorded the lowest male $e_0$. The lowest female $e_0$ in 2019 was found in Macedonia, Kazakhstan, Moldova, Kyrgyzstan, and Russia.

*Changes in life expectancy by cause of death*

To better understand shifts in life expectancy between 1989 and 2019, we first decomposed changes in life expectancy at birth ($e_0$) from 1989 to 2004 and then from 2005 to 2019. During the first period (figure 2), the largest improvements were observed in Poland (4.83 years), Czech Republic (4.42 years), and Slovenia (4.19 years). In the majority of Satellite countries, these improvements were predominantly attributed to reductions in infant mortality, midlife mortality from external causes, and mortality from circulatory issues in older age groups. Regarding neoplasms, some countries saw this cause of death negatively impact life expectancy gains in older age groups (Croatia, Romania, Slovakia, Slovenia) but positively in younger age groups (Czech Republic, Poland, Slovakia, Slovenia). This may indicate a cohort effect of smoking—higher smoking rates among older cohorts and positive effects of cessation campaigns among the younger ones.

Between 1989 and 2004, former Soviet republics either saw declines in male $e_0$ or minor increases (less than 1 year). A notable exception is Uzbekistan, which experienced a 2.6-year increase during this period. The most significant declines were recorded in Russia (-5.18), Ukraine (-4.17), Belarus (-4.1), and Kazakhstan (-3.21). These declines were primarily driven by external mortality in the working-age population and circulatory mortality.

For changes in female $e_0$ between 1989 and 2004, patterns similar to those for men were observed, but the magnitude of changes was smaller (figure 3). The most significant declines in $e_0$ were seen in Russia (-2.37), Belarus (-1.72), and Ukraine (-1.6). The most significant increases, of over 3 years, were noted in the Czech Republic, Poland, Hungary, Croatia, and Slovenia. Among FSU countries, the largest increase was in Estonia (2.32). For women, changes in $e_0$ were mainly influenced by circulatory causes in older midlife and older age groups, and much less by external causes compared to men. The significant exceptions are Russia and Ukraine, where large negative contributions from external causes and digestive mortality in working-age groups were observed.

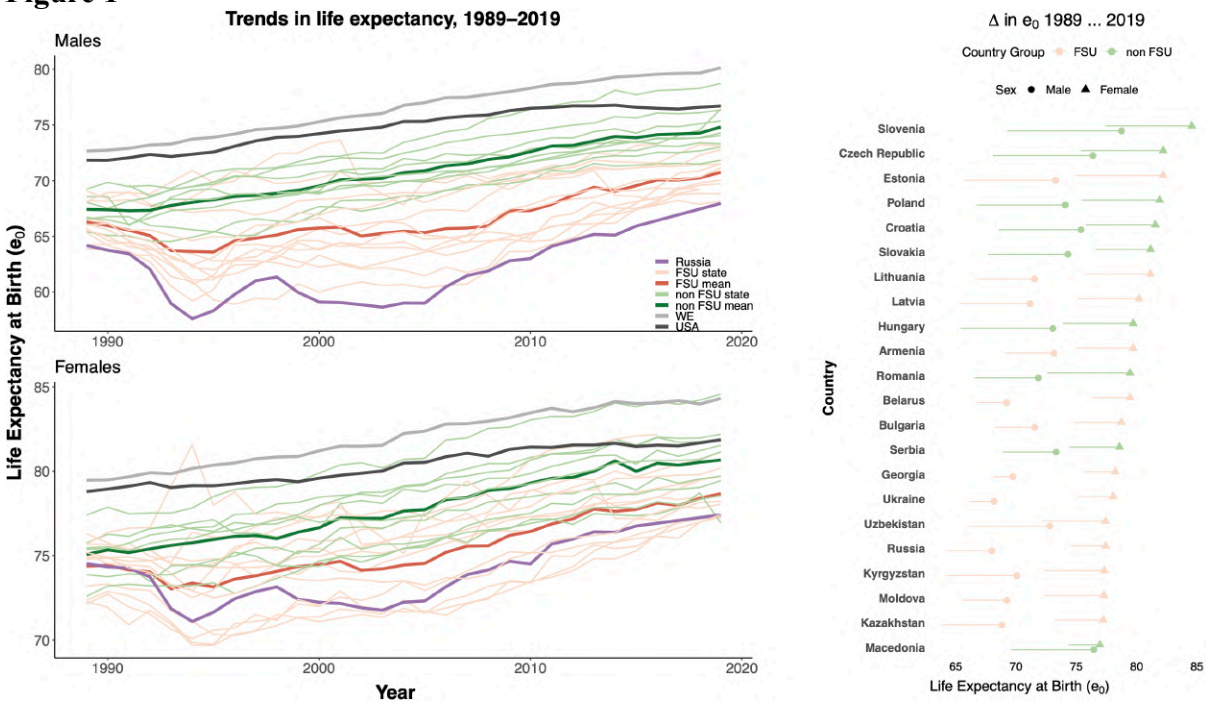
In the subsequent period, between 2005 and 2019, male $e_0$ improved in all countries, with the exception of Georgia (-0.28) (figure 4). The most substantial improvements were seen in the FSU group, but Satellite states also recorded progress during this timeframe. In both groups, significant positive contributions were seen from external causes, predominantly among working-age populations. In FSU countries, these positive contributions were particularly pronounced. In Satellite countries, while the positive impact of external causes was less, there were notably large positive contributions from cancer in older midlife and older age groups. Both country groups also benefitted from reductions in circulatory mortality, primarily in midlife and older age groups.

Female $e_0$ also rose between 2005 and 2019 (figure 5), mainly due to the positive impact of reduced circulatory mortality in older age groups. Notable exceptions include Russia, Ukraine, Lithuania, and Moldova, where significant positive contributions came from external causes among working-age populations.

In the full paper, we will review and synthesize results in greater detail, and discuss the mortality trends in the region more broadly. Our next steps include 1) extending the timeline to 1980-2019 to better illustrate the magnitude of the 1990s mortality crisis in comparison to earlier periods, and 2) incorporating an additional data source on cause-specific mortality: the Human Mortality Database (HMD, https://www.mortality.org). The HMD database gives us an opportunity to examine more granular causes of death, including ‘deaths of despair’, that the post-communist region is known for (i.e. alcohol poisonings, homicides, suicides). The data on these causes are not available for former Soviet republics in the WHO mortality database, which we are currently using.

# Selected Figures

## Figure 1




## Figure 2

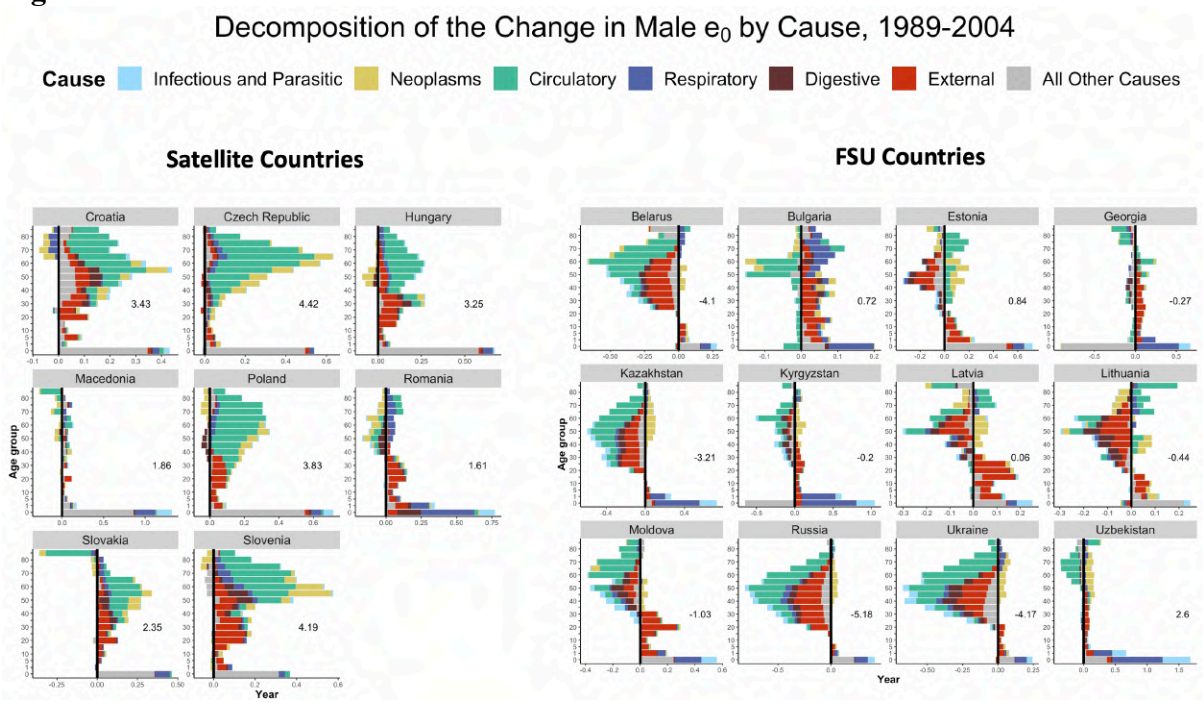


**Figure 3**

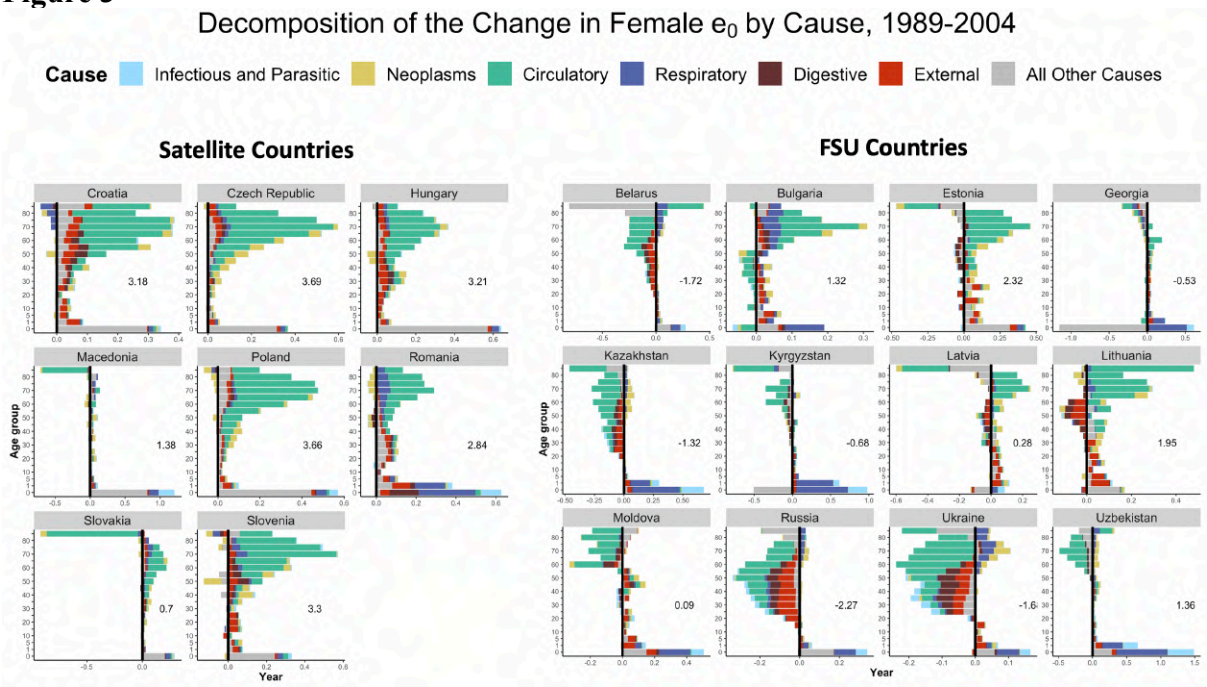



**Figure 4**

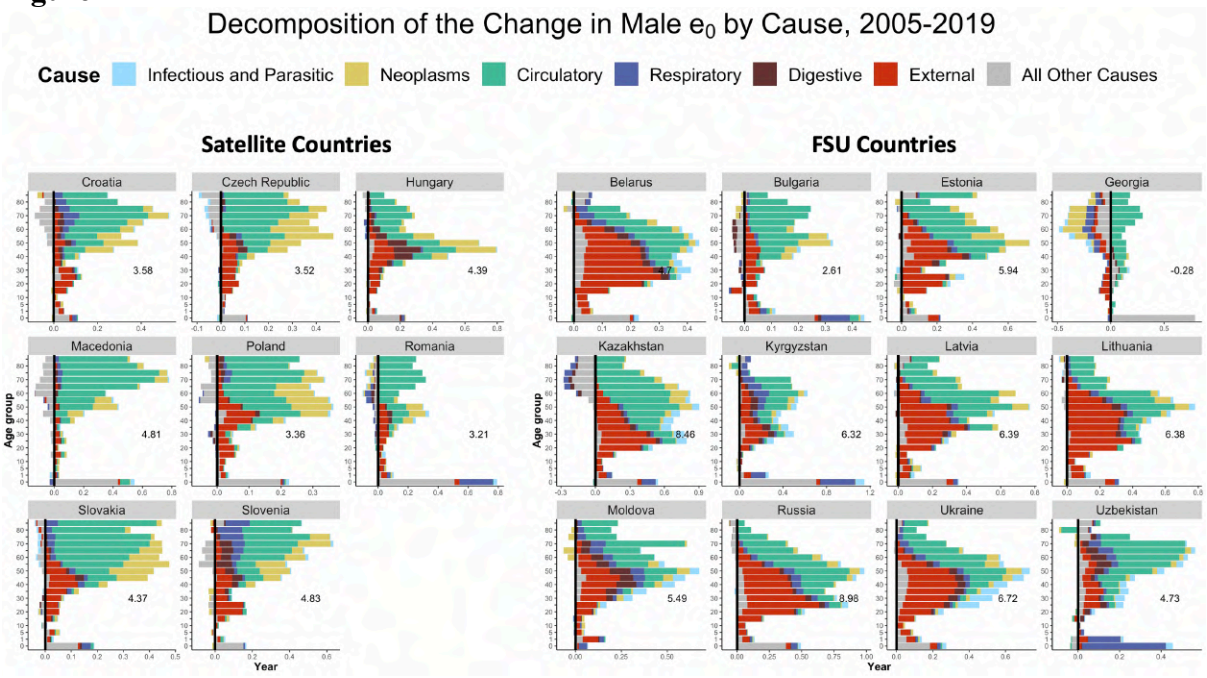
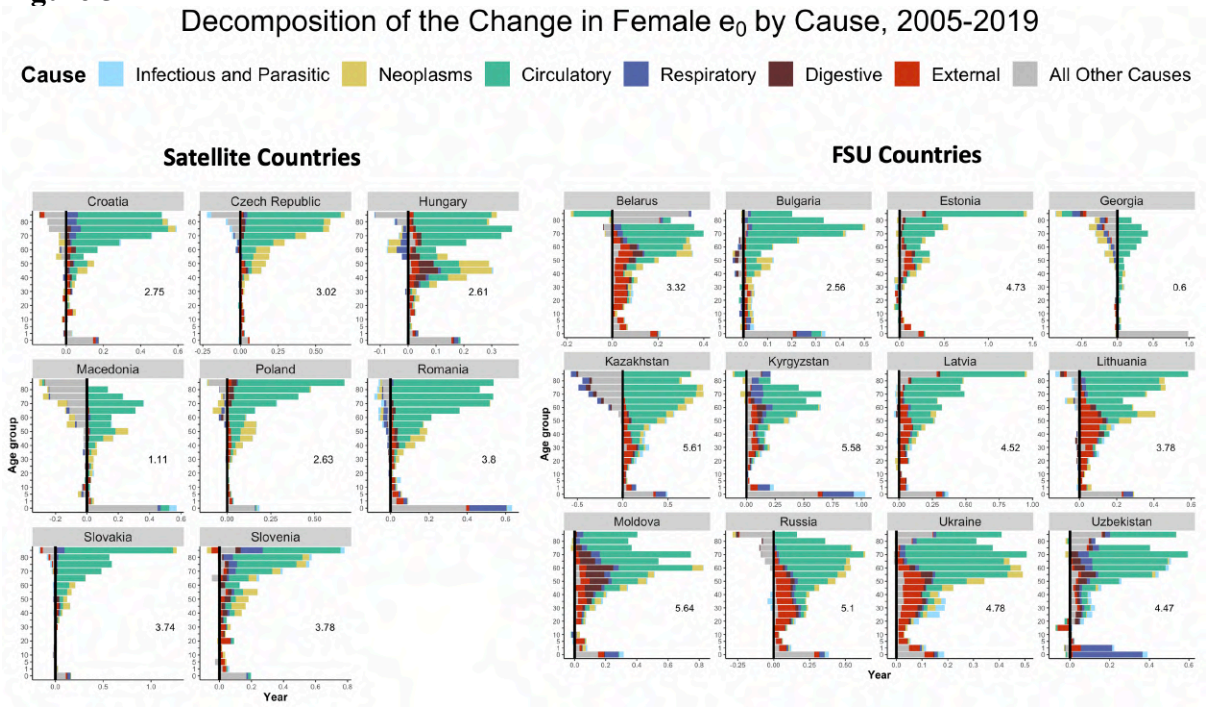


**Figure 5**

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