Trends in Ischaemic Heart Disease and Cerebrovascular Disease Mortality in Europe: an Observational Study 1990-2017

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Ethical approval: This was a purely observational study, therefore ethical approval was not required

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Abbreviations
ASDR – Age-standardised death rate
CVD – cardiovascular disease
CeVD – Cerebrovascular disease
COVID-19 – Coronavirus disease 2019CVD – Cardiovascular disease
ICD – International Classification of Diseases
IHD – Ischaemic heart disease
WHO – World Health Organization

Despite improvements in CVD mortality, variable geographical and temporal trends have been observed (1). Previously, we highlighted growing disparities in IHD and CeVD mortality across Europe between 1980-2009, with Eastern European countries generally reporting higher mortality rates (2). Observation of these trends is important to guide public health policy, resource allocation and improve health at the population level. The objective of this study was to re-examine updated European IHD and CeVD mortality data between 1990-2017.

IHD and CeVD ASDRs (calculated using the WHO World Standard Population) for European countries between 1990-2017 were extracted from the WHO Mortality Database, using ICD 9th and 10th Edition codes. For analyses comparing the start and end of the observation period, the average of the first and last three years were used where data were available. Denmark, France and Slovakia were excluded due to lack of available data at the start or end of the observation period. Countries with poor quality data or a population less than one million citizens were excluded from our analyses. These methods and potential limitations have previously been fully described (2). As this was a purely observational study, ethical approval was not required.

Between 1990-2017, IHD mortality declined in all countries except Croatia (Figure 1a). The largest mortality reductions were seen the Netherlands, Estonia and UK, with greater than 65% improvements for both sexes. Most recently, Lithuania had the highest mortality rates in both men and women (279.4/100,000 and 157/100,000, respectively), whilst the Netherlands had the lowest mortality in men and women (32.6/100,000 and 15.3/100,000, respectively).

Mortality from CeVD fell for men and women in all included countries (Figure 1b). Over the 28-year observation period, Estonia saw the greatest reduction in CeVD mortality in both men and women (-80.8% and -84.9%, respectively), followed by Austria (-74.9% and -75.7%, respectively). The smallest improvements in CeVD mortality were seen in Lithuania (-16.9% in men, -23.5% in women) and Bulgaria (-22.1% in men, -25.7% in women). Most recently, Bulgaria had the highest CeVD mortality rates in both men and women (149.9/100,000 and 113.1/100,000, respectively), whilst the lowest mortality rates were observed in Austria for men and women (21.8/100,000 and 19.5/100,000, respectively).

Between 1980-2017 improvements in IHD mortality were observed across Europe, with the exception of Croatia. However, marked international variation persists, including the East-West mortality gap, with Romania, Hungary, Latvia and Lithuania reporting the highest ASDRs at the end of the observation period. There was an approximately 8.5-fold difference in IHD mortality in men and a 10-fold difference in women persisting between the countries with the lowest (Netherlands) and highest (Lithuania) mortality rates. Similar findings were observed with CeVD mortality, with Lithuania, Romania, Latvia and Bulgaria demonstrating the highest mortality at the end of the observation period. There was an approximately 7-fold difference in CeVD mortality in men and 6-fold difference in women between the countries with the lowest (Austria) and highest (Bulgaria) ASDRs.

Estonia was a notable exception, with large reductions in IHD and CeVD mortality. Estonia has seen greater reductions in traditional CVD risk factor prevalence than the majority of Eastern European countries (3), and could potentially serve as a useful model to improve mortality in the region as a whole.

Improvements in European mortality rates have decelerated over the last decade, in keeping with similar findings in the USA (4). Growing rates of obesity and diabetes have likely contributed to this. Furthermore, the COVID-19 pandemic has the potential to have a significant adverse effect on cardiovascular health (5); proactive steps are needed to ensure this is minimised where possible. Over the coming 20-year period, sustained effort will be required to at least maintain, or ideally accelerate, improvements in CVD mortality across Europe.

References

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Figure 1. Percentage change in ASDR (between 1990-2017) per 100 000 population by baseline ASDR in men and women in European Countries for (a) IHD and (b) CeVD.

Filled circles indicate men; clear circles indicate women. Country codes: AUS: Austria, BEL: Belgium, BUL: Bulgaria, CRO: Croatia, CZE: Czech Republic, EST: Estonia, FIN: Finland, GER: Germany, GRE: Greece, HUN: Hungary, IRE: Ireland, ITA: Italy, LAT: Latvia, LIT: Lithuania, NET: Netherlands, POL: Poland, POR: Portugal, ROM: Romania, SLE: Slovenia, SPA: Spain, SWE: Sweden, UK: United Kingdom.