

# **Cardiovascular Disease Statistics From the European Atlas: Inequalities Between the High and Middle Income Member Countries of the ESC**

**Timmis A<sup>1</sup>, Gale CP<sup>2</sup>, Flather M<sup>3</sup>, Maniadakis N<sup>4</sup>, Vardas P<sup>4</sup>**

## **Affiliations:**

<sup>1</sup> Barts Heart Centre and Queen Mary University London, UK

<sup>2</sup> Research Council Bioinformatics Centre, Leeds Institute for Cardiovascular and Metabolic Medicine, University of Leeds, UK

<sup>3</sup> Norwich Medical School, University of East Anglia, Norwich, UK

<sup>4</sup> European Society of Cardiology Health Policy Unit, European Heart Health Institute, Brussels, BE

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The recent publication in the European Heart Journal (EHJ) of 2017 cardiovascular disease (CVD) statistics for the 56 member countries of the European Society of Cardiology (ESC) is a landmark event (1). The statistics are drawn from the Atlas compiled by the ESC's European Heart Agency in Brussels (2). For the first time, a comprehensive report has been developed for the ESC member countries with detailed, contemporary information about major CVD risk factors, population health behaviours, disease prevalence and outcomes. The Atlas also includes novel ESC sponsored survey data of health infrastructure and cardiovascular service provision provided by the national societies of ESC member countries. These data promise to generate interest beyond the EHJ's cardiac readership to include an extended audience of patient groups, the general public, policy makers and journalists.

A stand-out feature of the 2017 CVD statistics publication is its focus on health inequalities between ESC member countries, particularly those classified as high income compared with less prosperous middle income countries (Fig 1). This will heighten interest for policy makers by identifying regional targets for reducing the prevalence of CVD and improving its outcomes. For example, the Atlas data show that while smoking prevalence is in decline across ESC member countries, it remains a huge public health issue, particularly in middle income countries where >40% of men smoke compared with ~30% in high income countries. Hypertension too is more prevalent in middle income countries and it is possible to speculate that these unfavourable risk factor statistics contribute to the heightened prevalence of CVD. Indeed, just under half of the middle income ESC member countries have recorded an increase in disease prevalence the last 25 years unlike high income countries where there have been small but consistent declines. The inequalities in disease burden are further emphasised by a greater than three-fold excess of disability adjusted life years lost to ischaemic heart disease (IHD) in middle income compared with high income ESC member countries.

The total costs of CVD are greater than for any other diagnostic group, making the heightened prevalence of CVD in middle income ESC member countries an economic issue as well as a health issue (3,4). The costs - both direct, related to disease management, and indirect, related to absenteeism, lost productivity and mortality - provide middle income countries with an unassailable economic argument to protect

their populations against CVD. Smoking and hypertension present policy makers with the same targets for prevention that have contributed to the declines in CVD prevalence and mortality across many high income member countries. The cost implications of addressing these targets at a national level are inevitably more challenging for less prosperous member countries. However, the associations between GDP and the age-standardized prevalence of CVD across middle income countries are weak and the Russian Federation, for example, despite its considerable national resources, has one of the highest rates of CVD in the world. In summary, financial resource and health expenditure are not wholly sufficient to drive down the national prevalence of CVD without sound health policies that are backed up by effective implementation strategies.

More dramatic than the changes in CVD prevalence has been the decline in CVD mortality that has been recorded in many ESC member countries over the last 40 years. However, huge inequalities persist with CVD accounting for >50% of all deaths in many middle income countries compared with <30% in the high income countries of Western Europe. Declines in CVD mortality have been driven largely by reductions in the numbers of people presenting with myocardial infarction and stroke, with health gains, particularly in the more prosperous countries of Western Europe, tending to offset the effects of population ageing and growth (5). Whether the epidemic of obesity and type 2 diabetes currently rampant across ESC member countries will check this decline is uncertain but the omens are not good and already there are reports that cardiovascular mortality rates are no longer falling in younger adults (6). The Atlas reminds us that CVD is not only a problem for men by showing that more women, and a greater proportion of women, across ESC member countries are dying from CVD. This is largely driven by the excess of stroke and other non-IHD deaths in women, with IHD mortality more evenly balanced between the sexes. The huge strides that have been made in protection against CVD mortality have seen cancer overtaking CVD as the most common cause of death among men in a number of high income ESC member countries. The same is true for women aged <65 years for whom cancer is now the most common cause of premature death in countries across Europe. In these younger women, however, deaths from CVD remain considerably more common than deaths from breast cancer and, importantly, are largely preventable through risk factor modification of risk factors.

The novel ESC sponsored survey data of health infrastructure and cardiovascular service provision provided by the national societies of the ESC member countries add further interest to the 2017 CVD statistics publication. Health infrastructure, in terms of interventional, electrophysiological and surgical centres, for example, was better developed across high income compared with middle income countries. The provision of catheter procedures, percutaneous interventions, pacemaker insertions and bypass operations showed similar inequality. It could be argued that these cardiac service inequalities have contributed to the steeper decline in CVD mortality in high income compared with middle income ESC member countries but the paradox of greater service provision in those countries where need is manifestly less cannot be ignored. Resolution of the paradox is as much a question of national priority as national prosperity and the Atlas data make clear that inequitable healthcare delivery is not an inevitable consequence of limited economic resource. It is noteworthy that in some middle income ESC member countries interventional procedures and device implantations were comparable to those in wealthier high income member countries. Bulgaria, for example, reported rates of coronary angiography and percutaneous coronary intervention that competed with the best high income countries, while Turkey performed more coronary bypass graft operations per million people than any other ESC member country. Nevertheless, across the group of middle income ESC member countries much work is needed to reduce population risk and improve cardiovascular service provision in order to close the CVD mortality gap that divides middle income and high income ESC member countries. The task should not be under-estimated but some relatively simple initiatives have the potential to deliver quick wins. For example, enforcement of smoking legislation is variable across middle income member countries and stricter control will likely yield important reductions in the incidence of ST elevation myocardial infarction (STEMI) (7). The benefits of reperfusion therapy for treatment of STEMI are also well established and the failure of some middle income East European member countries to offer treatment to a large proportion of their patients demands action (8). Measures of this sort are relatively inexpensive and can deliver substantial improvements in health outcomes as evidenced by the impact of ESC quality indicators for acute myocardial infarction which a recent study found applicable to large health systems with the potential to improve care and reduce unwarranted variation in death (9).

The national CVD statistics curated within the Atlas are derived from a variety of sources including the World Health Organisation, the World Bank, the Institute for Health Metrics Evaluation and the Global Burden of Disease study. The ESC survey responses make a further contribution. Together these constitute the most credible available sources but, as the 2017 CVD statistics publication makes clear, the limitations that apply to the quality, precision and availability of the data demand cautious interpretation. These are country-level data that obscure regional variations in disease prevalence, healthcare delivery and outcomes (10). The national availability of interventional and catheter laboratories documented within the Atlas, for example, provides a snapshot of the quality of cardiovascular care that may not be reflected in national outcomes. This disconnect between resources and outcomes is best illustrated by the United States where the national health spend towers above high income European countries yet the amenable mortality (the number of deaths related to certain diseases that could have been prevented by accessible, timely, and effective health care) is substantially higher (11). A more nuanced understanding of national differences in the quality of healthcare would require regional-, hospital- or, best of all, patient-level data and some focused international comparisons using sources of this type are now available (12,13). However, we are a long way from being able to apply such patient-level comparisons at scale across a broad range of nation states. Meanwhile, the Atlas data presented in the 2017 CVD statistics publication represent a major step in our understanding of the variation in cardiovascular disease prevalence, healthcare delivery and outcomes across the ESC member countries that will play an important role in underpinning the ESC's ambitious mission "to reduce the burden of cardiovascular disease".

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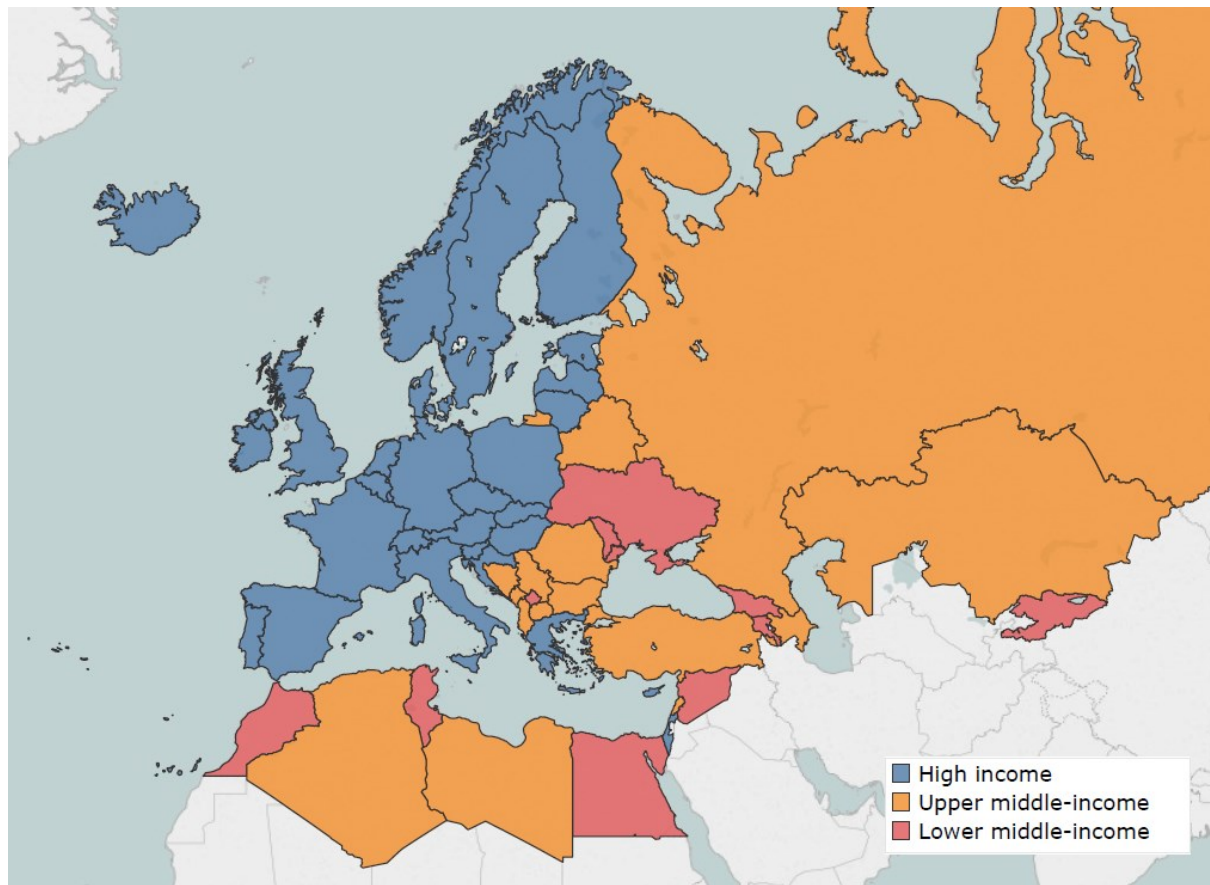
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Fig 1.



ESC Member Countries. The World Bank defines high-income countries are those in which 2016 gross national income per capita was US\$12,000 or more. In this editorial the term “middle-income countries” represents a composite of upper- and lower-middle income ESC member countries.