

Global Shifts in Cardiovascular Disease, the Epidemiologic Transition, and Other Contributing Factors Toward a New Practice of Global Health Cardiology



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KEYWORDS

- Epidemiology • Demography • Health transitions • Developing countries • Cardiology
- Global health

KEY POINTS

- Developed countries had more than a century to double or triple their populations, whereas the same increases in population size in the developing world have occurred over decades.
- The epidemiologic transition theory is not perfect but has improved the understanding of the changing dynamics of epidemiologic profiles.
- Changes in population structures and disease profiles, cardiovascular conditions, and their associated comorbidities will continue to challenge health care systems.
- A focus on the most populated regions of the world will contribute to protecting the large gains in global survival and life expectancy accrued over the last decades.
- From a low-income and middle-income country perspective, current challenges provide an opportunity to redefine the agenda of global health cardiology and global cardiovascular research.

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INTRODUCTION

As the world changes, the practice of cardiology, clinical cardiology, global health cardiology, and cardiology research will follow suit. One of the major drivers of change in the practice of cardiology, in both developed and developing countries, is population change, whose dynamics can be expressed by secular epidemiologic and demographic trends, with increasing survival and life expectancy across all age strata. These population changes, at the macro level, are not static or isolated but occur together with many other individual-level changes and adaptations, including, but not limited to, access to and usage of technological changes¹; changes in health care delivery,^{2,3} in medical training,⁴ and in the practice of medicine⁵; or even changes within people; for example, changes in the height of populations over time,⁶ as well as changes within individuals, such as the recently shown link between microbiota and stroke outcomes.⁷ In this regard, over the last few years has become more common, and indeed necessary, to encourage interdisciplinary dialogues to better serve medical interventions at the individual and population levels.

A long trend in the mutual interaction of technologies, policies, and social movements; global demographic transition; and its epidemiologic correlates continues to increase population size across age groups, and since the early nineteenth century it has increased by 6 times. It is projected to further increase up to 10 times by the end of this century, and by then most countries will experience demographic aging. Life expectancy will continue to grow (it has doubled in last 2 centuries), whereas female fertility will continue to decline. By the early nineteenth century, 70% of women's adult life was dedicated to bearing children, a percentage that has now decreased to 14% because of lower fertility and longer and healthier living.⁸

Much of the transition in mortality and risk factors for noncommunicable diseases, including cardiovascular diseases, has been described in detail elsewhere,^{9–17} but few have been addressed to a clinical audience, and in particular what do such transitions mean for low-income and middle-income settings. This article describes current debates and analyzes the pertinence and relevance of the epidemiologic transition, paired with the demographic transition and other ongoing transitions with direct relevance to cardiovascular conditions. In doing so, this article emphasizes the challenges of this transition for low-income and middle-income settings undergoing rapid epidemiologic shifts. In addition, this analysis of trends and

context provides an entry point to delineate the need for a global health cardiology practice that aligns with the major challenges in the most populated regions of the world, which bear a growing burden of cardiovascular diseases and conditions.

THE EPIDEMIOLOGIC TRANSITION: ITS DEFINITION AND ITS PLACE IN HISTORY

The epidemiologic transition theory, or model, was coined in the early 1970s by Abdel Omran.¹⁸ Published at a time when development debates were influenced by fears of the so-called demographic explosion, in Omran's¹⁸ view the "key difference between epidemiologic transition and demographic transition theories was that the former unlike the latter allowed for multiple pathways to a low-mortality/low-fertility population regime."¹⁹ In short, Omran's¹⁸ theory identified the 3 phases of transition: pestilence and famine, receding pandemics, and degenerative and human created transition. These phases were later nuanced by Olshansky and Ault²⁰ who added a fourth stage: delayed degenerative or hybrid diseases (ie, influenced by individual behaviors and lifestyles).²¹ In relation to cardiovascular disease, **Table 1** shows the classic stages of the epidemiologic transition. More recently, given the increase in body mass index worldwide,²² some investigators propose a fifth stage in the transition: the age of obesity and inactivity.^{23,24}

However, from a historical point of view, Omran's¹⁸ was not the first to link population changes to epidemiologic and mortality patterns. Alternative explanations of the epidemiologic changes in patterns of mortality were described a few decades before Omran's¹⁸ views were published. Thomas McKeown described secular declines in England's mortality since the eighteenth century throughout the process of industrialization as a consequence of better nutrition and sanitation rather than of medical interventions.²⁵ In contrast, Omran's¹⁸ thesis was more optimistic about the benefits of technology in the developing world, claiming that mortality decline depended more on developing interventions oriented toward supporting national and international programs of health service provision and environmental control.²⁵ Subsequent analyses, based on new methods and sources, revealed some flaws in the McKeown assumptions,²⁶ as has also happened to some of Omran's¹⁸ claims, in relation to the double burden or overlapping of both communicable and noncommunicable diseases.²⁷

Importantly from a contextual point of view, such debates around patterns of mortality took place by the 1970s, after the dominance of a discourse

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