

## Review

# The Burden of Cardiovascular Disease in Low- and Middle-Income Countries: Epidemiology and Management

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### ABSTRACT

Cardiovascular disease (CVD) is the second leading cause of mortality worldwide, accounting for 17 million deaths in 2013. More than 80% of these cases were in low- and middle-income countries (LMICs). Although the risk factors for the development of CVD are similar throughout the world, the evolving change in lifestyle and health behaviours in LMICs—including tobacco use, decreased physical activity, and obesity—are contributing to the escalating presence of CVD and mortality. Although CVD mortality is falling in high-income settings because of more effective preventive and management programs, access to evidence-based interventions for combating CVD in resource-limited settings is variable. The existing pressures on both human and financial resources impact the efforts of controlling CVD. The implementation of emerging innovative interventions to improve medication adherence, introducing m-health programs, and decentralizing the management of chronic diseases are promising methods to reduce the burden of chronic disease management on such fragile health care systems.

### RÉSUMÉ

Deuxième cause de mortalité à l'échelle mondiale, la maladie cardiovasculaire (MCV) a occasionné 17 millions de décès en 2013. Plus de 80 % de ces décès se sont produits dans des pays à revenu faible ou intermédiaire. Même si les facteurs de risque de la MCV sont similaires partout dans le monde, les changements observés dans les pays à revenu faible ou intermédiaire au chapitre du mode de vie et des comportements liés à la santé, notamment l'usage du tabac, la diminution de l'activité physique et l'obésité, contribuent à la hausse de la prévalence de la MCV et de la mortalité. Bien que la mortalité par MCV soit en baisse dans les milieux à revenu élevé en raison de programmes de prévention et de prise en charge plus efficaces, l'accessibilité à des interventions fondées sur des preuves pour combattre la MCV dans les milieux où les ressources sont limitées demeure inégale. Les pressions exercées actuellement sur les ressources tant humaines que financières nuisent aux efforts visant à réduire l'incidence de la MCV. La mise en place de nouveaux programmes novateurs visant à améliorer l'observance thérapeutique, l'implantation de services de santé mobiles et la décentralisation de la prise en charge des maladies chroniques sont des avenues prometteuses qui pourraient réduire le fardeau que représentent les maladies chroniques pour les systèmes de santé fragilisés.

After cancer, cardiovascular disease (CVD) is the second most common cause of death worldwide (Fig. 1), accounting for > 17 million deaths. There was a 7% increase in global cardiovascular deaths in all age groups between 1990 and 2013. Of this number, ischemic heart disease (IHD) and

stroke are the main contributors, reflected by a 40% increase in deaths from IHD during this period.

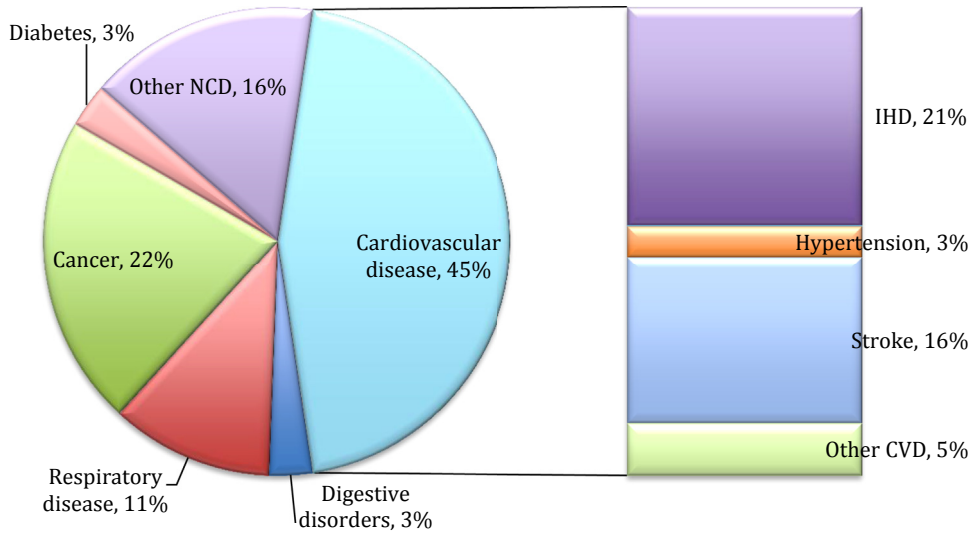
The greatest burden of CVD is in low- and middle-income countries (LMICs), with approximately 80% of cardiovascular deaths occurring in LMICs.<sup>1</sup> The patterns of CVD in LMICs are distinct from higher-income countries (HICs), where the majority of CVD deaths are reported in individuals aged > 60 years and mortality from IHD is decreasing. The World Health Organization (WHO) suggests that 3 times as many deaths from cardiovascular causes are occurring in LMICs, affecting males and females equally, but occurring in working-age groups (Fig. 2).<sup>2</sup> The number of deaths caused by non-communicable diseases is expected to increase by 15% by 2020. Further, the economic burden generated by CVD is

Received for publication February 2, 2015. Accepted June 8, 2015.

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**Figure 1.** Global burden of noncommunicable disease in 2013.<sup>6</sup> CVD, cardiovascular disease; IHD, ischemic heart disease; NCD, noncommunicable disease.

estimated to reduce gross domestic product (GDP) by up to 7% in LMICs.<sup>3</sup> This suggests a growing social and economic burden on health care systems in LMICs, many of which do not have the adequate health infrastructure to sustain these pressures.<sup>4</sup>

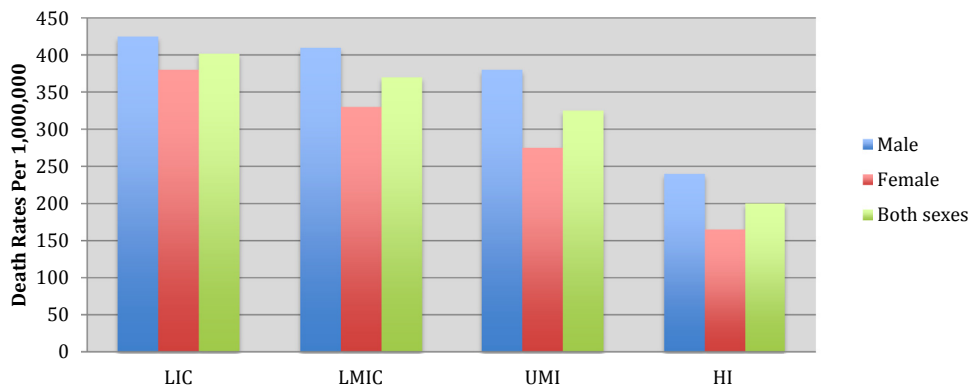
Morbidity and mortality from CVD is largely preventable. Increasing awareness of this growing burden of CVD in LMICs, as well as focused national and international strategies to reduce risk factors and address the disparities in health care access, are of key importance to address CVD mortality in these regions.<sup>3</sup>

In this article, we review the burden of CVD and the distribution of cardiac risk factors in LMICs. We also discuss potential reasons for these evolving patterns and present an overview of both established and innovative interventions to decrease the burden of CVD in this setting.

**Definitions**

In broad terms, CVD is classified as IHD, cerebrovascular disease, hypertensive heart disease, peripheral vascular disease, and structural abnormalities. For the purposes of this review, emphasis has been placed on the first 4 diseases listed.

The World Bank identifies 6 main geographic regions that are categorized as LMICs, which is a subgroup of the middle-income countries: East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, the Middle East and North Africa, South Asia and Sub-Saharan Africa (Fig. 3). This distribution differs from the WHO regions and stratifies each region by income.<sup>5</sup> Low-income countries are defined as reporting a gross national income (GNI) per capita of ≤ \$1045 (USD), whereas middle-income countries report a GNI between \$1045 and \$12,746. Within these regions, however, there is significant variation in reported GNI.



**Figure 2.** Cardiovascular disease mortality rates across different economic regions in 2010. HI, high income; LIC, lower-income countries; LMIC, low- to middle-income countries; UMI, upper-middle income. Modified from Mendis et al.<sup>26</sup> with permission from the World Health Organization. Copyright © 2011.

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