

## Annex 2A. Updated Estimates of the Burden of CVRD in 2015

Supplementary material for: Vamadevan, A., D.A. Watkins, and D. Prabhakaran. 2017. "Relationships Among Risk Factors and the Burden of Cardiovascular Diseases, Diabetes, and Chronic Lung Disease." In *Cardiovascular, Respiratory, and Related Disorders* edited by D. Prabhakaran, S. Anand, T.A. Gaziano, J-C. Mbanya, Y. Wu, and R. Nugent. Volume 5 of *Disease Control Priorities, third edition*. Washington, DC: World Bank.

This Annex contains updated estimates of the burden of cardiovascular and related disorders for Vamadevan, Watkins, and Prabhakaran 2017. The chapter contains data from the 2014 revision of Global Health Estimates (covering the years 2000-2012). The most recent Global Health Estimates (covering the years 2000-2015) were released after this chapter was in press and are included in this Annex.

All data in this Annex are taken from: Global Health Estimates 2015: Deaths by Cause, Age, Sex, by Country and by Region, 2000-2015. Geneva, World Health Organization; 2016. Data are available at [http://www.who.int/healthinfo/global\\_burden\\_disease/estimates/en/index1.html](http://www.who.int/healthinfo/global_burden_disease/estimates/en/index1.html).

### CONDITIONS ADDRESSED IN THIS CHAPTER

This report considers four subgroups of conditions within the broad grouping of cardiovascular, respiratory, and related disorders (CVRD). The specific causes are listed in Table 2A.1 and generally follow the WHO Global Health Estimates nosology.

**Table 2A.1** Specific causes of disease addressed in this chapter

Cause group	Specific cause
Cardiovascular diseases	Rheumatic heart disease
	Hypertensive heart disease
	Ischemic heart disease
	Ischemic stroke
	Hemorrhagic stroke
	Cardiomyopathy, myocarditis, and endocarditis
	Other circulatory diseases
Respiratory diseases	Chronic obstructive pulmonary disease
	Asthma
	Other respiratory diseases
Diabetes mellitus	Diabetes mellitus
Kidney diseases	Acute glomerulonephritis
	Chronic kidney disease due to diabetes
	Other chronic kidney disease

In addition to these specific causes of death and disability, Volume 5 of *Disease Control Priorities, 3<sup>rd</sup> Edition* (DCP3) focuses on specific risk factors that are shared across CVRD, including tobacco (Chapter 4), physical inactivity (Chapter 5), dietary risks (Chapter 6), and overweight and obesity (Chapter 7). Air pollution, an important risk factor for cardiovascular and respiratory diseases, is treated extensively in Volume 7 of DCP3, which covers environmental risks. Other important respiratory conditions are dealt with elsewhere DCP3, including bacterial

respiratory infections (Volumes 2 and 6), tuberculosis (Volume 6), and occupational pulmonary hazards (Volume 7).

## ABSOLUTE LEVELS OF MORTALITY

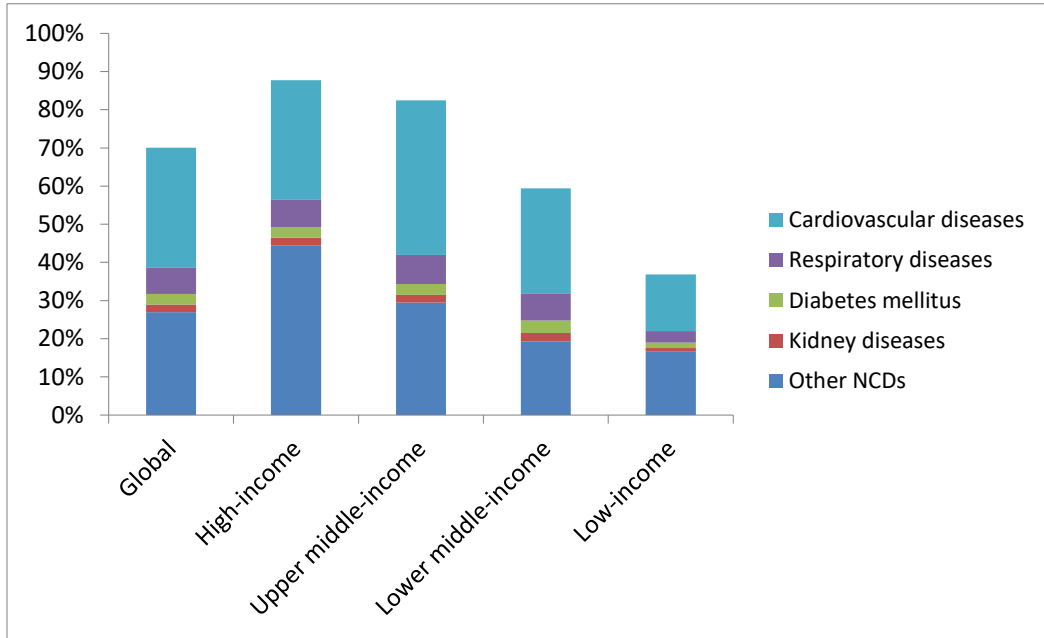
Of the 56 million deaths globally in 2015, 40 million were from NCDs. Of these, 24 million were from CVRD. A plurality of deaths (18 million) were from cardiovascular diseases, with respiratory diseases (3.9 million) being the second most frequent cause, followed by diabetes mellitus and kidney diseases (1.6 million and 1.1 million deaths, respectively). NCDs not covered in this volume constituted 38 percent of total NCD deaths. Annex table 2A.2 presents total deaths by cause and country income group.

**Table 2A.2** CVRD Deaths, by Cause and Country Income Group, for All Ages and Both Genders, 2012  
(thousands, unless otherwise noted)

	<i>Low-income</i>	<i>Lower middle-income</i>	<i>Upper middle-income</i>	<i>High-income</i>
Population	640,000	2,900,000	2,600,000	1,200,000
Total deaths	5,500	22,000	19,000	10,000
CVRD deaths	1,100	8,800	10,000	4,300
CVRD deaths as a percentage of total deaths	20	40	53	43
CVRD deaths by cause				
Cardiovascular diseases	810	6,000	7,700	3,100
Respiratory diseases	160	1,600	1,500	720
Diabetes mellitus	78	710	540	270
Kidney diseases	48	490	380	210

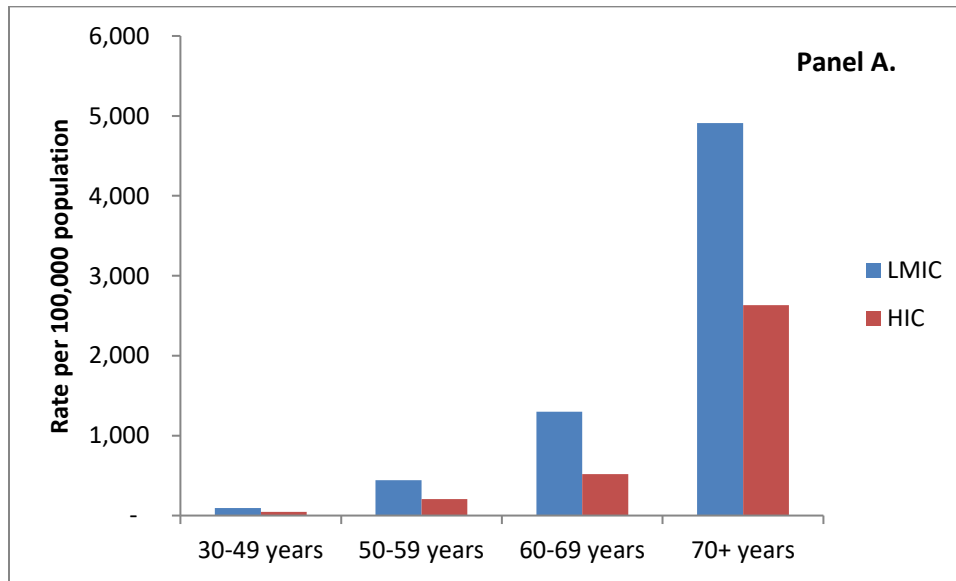
The vast majority of CVRD deaths (between 81 and 83 percent, according to cause) occurred in LMICs in 2015. Annex figure 2A.1 illustrates the proportion of total, NCD, and CVRD deaths by cause in each country income group.

**Figure 2A.1** Proportion of Total Deaths Caused by Cardiovascular, Respiratory, and Related Disorders and Other Noncommunicable Diseases, by Country Income Group, for All Ages and Both Genders, 2015

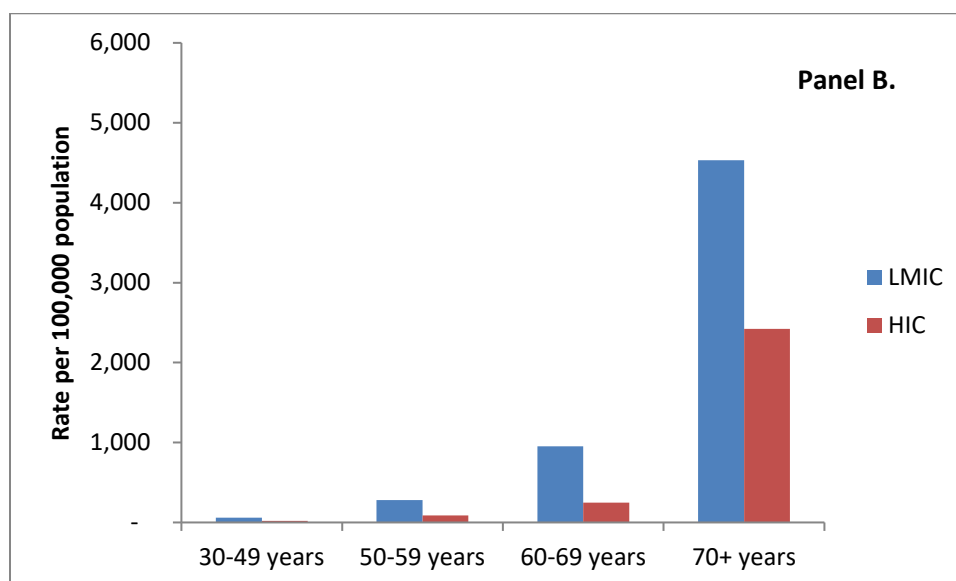


## MORTALITY RATES BY AGE AND SEX

Age-specific mortality rates in LMICs were significantly higher than in HICs in 2015. Rates among males were somewhat higher than rates among females (Figure 2A.2).



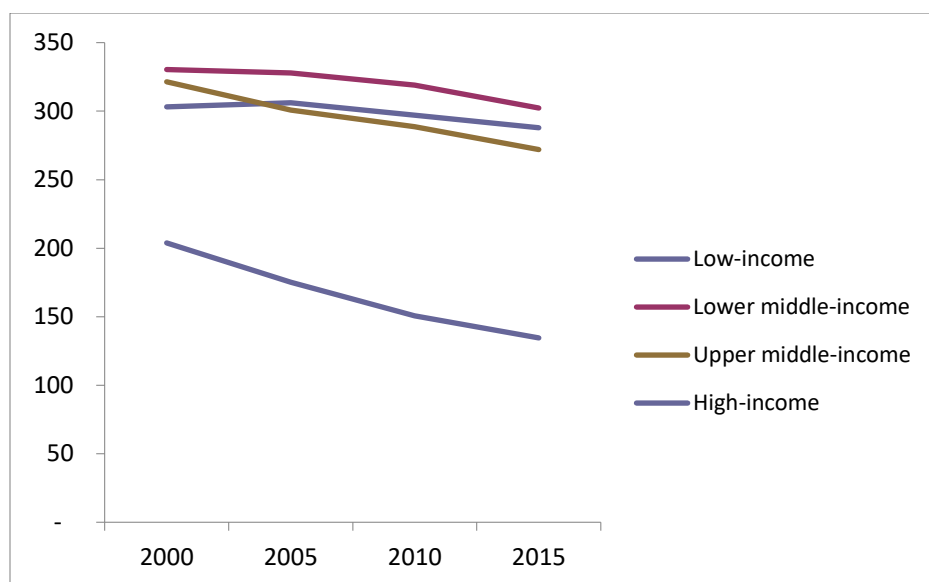
**Figure 2A.2** Age-Specific Mortality Rates from Cardiovascular, Respiratory, and Related Disorders, by Country Income Group, for Males (Panel A) and Females (Panel B), 2015



## AGE-STANDARDIZED MORTALITY RATES

Rapid demographic changes continued to drive the increase in deaths: the total population increased by 10 percent in HICs and by 22 percent in LMICs over 2000-2015. However, this increase was counterbalanced by a decline in age-specific mortality rates such that age-standardized mortality rates for CVRD declined overall. Notably, however, this trend was driven by progress on cardiovascular disease rates (Annex figure 2A.3). Unfortunately, rates of decline were much less dramatic for LMICs than for HICs, implying that many LMICs would struggle to meet the Sustainable Development Goal 3 target for NCDs if current trends continue.

**Figure 2A.3** Age-Standardized Mortality Rates from Cardiovascular Disease, by Country Income Group, for Both Genders, 2000–15



When changes in total deaths are compared to changes in age-standardized death rates by cause of death and country income group, these epidemiological changes and disparities between HICs and LMICs are apparent (Annex table 2A.3). The only cause for which there was a decrease in total deaths over 2000–2015 was cardiovascular diseases, and only in HICs. The total number of deaths from other causes increased in all income groups. Furthermore, in terms of age-standardized death rates, there was a lack of progress on kidney disease in all country income groups, and there was a lack of progress on respiratory diseases in LMICs.

**Table 2A.3** Changes in Total Deaths and Age-Standardized Mortality Rates from Cardiovascular, Respiratory, and Related Disorders, by Country Income Group, for Both Genders, 2000–15

Cause of death	Change in total deaths (%)		Change in age-standardized rates (%)	
	LMIC	HIC	LMIC	HIC
Cardiovascular diseases	+33	-10	-10	-34
Diabetes mellitus	+3	+26	-26	-9
Respiratory diseases	+81	+17	+20	-13
Kidney diseases	+63	+46	+10	+5