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Challenges program, which started in 2004, poses big, open-ended challenges in health and development and provides funding for innovators from multiple fields and all over the world to develop creative solutions. This will be our first Grand Challenge on gender inequity and women's empowerment, and it is intended to mark the beginning of our concerted push in putting women and girls at the center of our work.

I come to work every day because I believe that our foundation has a role to play, along with our thousands of partners, in making the world a more equitable place. A necessary element of that role is helping women and girls realize their own power to advance the well-being of their families, their communities, and their societies.

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PERSPECTIVE

The state of global health in 2014

Jaime Sepúlveda^{1*} and Christopher Murray²

The global health landscape looks more promising than ever, although progress has been uneven. Here, we describe the current global burden of disease throughout the life cycle, highlighting regional differences in the unfinished agenda of communicable diseases and reproductive, maternal, and child health and the additive burden of emerging noncommunicable diseases and injuries. Understanding this changing landscape is an essential starting point for effective allocation of both domestic and international resources for health.

The turn of this century coincided with a reinvigorated energy to improve the state of global health. New institutions (such as the GAVI Alliance and the Global Fund to Fight AIDS, Tuberculosis, and Malaria), more and better funding (such as the Bill and Melinda Gates Foundation), and renovated political will [such as United Nations Millennium Development Goals (MDGs)] have already made an impact by reducing mortality among children and mothers and accelerating declines in HIV/AIDS, tuberculosis, and malaria in low-income countries. Despite the welcome news about rapid declines in childhood mortality almost everywhere, there are persisting health inequalities, emerging conditions, and important regional variations in causes of death that require closer scrutiny.

This paper focuses on the state of global health from the perspective of the population and not of the governance or financial architecture. We use the results of the annual assessment of the Global Burden of Disease (GBD) Study (1), which provides a methodologically consistent assessment of levels and trends in prevalence and mortality by cause for 188 countries since 1990. The recent GBD 2013 Study is based on the work of a scientific collaborative with more than 1050 investigators from 106 countries (2). Our intention is to present data in a high-level descriptive way. In short, we illustrate the following:

1) There is an unfinished agenda regarding communicable diseases and reproductive, maternal, and child health, mostly concentrated in sub-Saharan Africa and South and South-east Asia.

2) The well-recognized epidemiological transition (from high burden of communicable diseases to noncommunicable diseases, injuries, and violence) is well under way in low- and middle-income countries, with increasing probability of death from these factors in some age groups.

3) There is a mismatch between needs and development assistance for health (DAH), which warrants a broader discussion, especially in geographical areas where resources can be most catalytic.

The burden of disease across the life cycle

As context, it is important to remember current population dynamics. The world has reached a population of 7.2 billion, with 138.8 million births and 54.9 million deaths taking place in 2013. Fertility rates are declining steadily almost everywhere, with the exception of sub-Saharan Africa, where rates are high and declining more slowly. By 2030, it is estimated that there will be 8.3 billion people on this planet, with 13% over the age of 65 years—the fastest-growing age group (3). Life expectancies at birth in 2013 show great inequalities, from 45.6 for males born in Lesotho to 86.4 years for females born in Japan (1).

The probability of dying is not constant in life; it has variations in the human life cycle, with higher risks in the extremes of the age spectrum: the first few days after birth and after 70 years of age (4). In addition to age, there are huge disparities in the probability of dying because of differences in sex, country, and cause (Fig. 1). Risk factors—such as high blood pressure, smoking, alcohol abuse, inadequate nutrition, and poor diet—are associated with specific causes of death and exhibit regional variation (5). It is critical not only to understand when and where important health outcomes occur but also to identify the underlying risk factors.

Newborns and children under the age of 5

MDG 4 aims to reduce by two-thirds the under-5 mortality rate (U5MR) between 1990 and 2015. By 2013, global U5MR had decreased by 48%; only 27 of 138 developing countries are likely to achieve the MDG target. Last year, 6.3 million children died before their fifth birthday; 41.6% (2.6 million) of those deaths occurred within the first 28 days of life (6).

Today, the 10 countries with the highest child mortality are all in sub-Saharan Africa. This region not only has the highest burden of

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communicable, neonatal, and nutritional diseases, it also has the highest burden due to noncommunicable diseases in young children (e.g., sickle cell disorders, congenital anomalies, epilepsy, and asthma). A child born in western sub-Saharan Africa is almost 30 times more likely to die by the age of 5 than a child born in Western Europe (U5MR of 114.3 versus 3.9 per 1000 live births) (6). Although malaria is a substantial cause of death (9.3%), lower respiratory infections and diarrhea are also key contributors, accounting for 14.4 and 8.3% of total childhood deaths in 2013, respectively. Many of these lives could be saved with affordable interventions, such as exclusive breastfeeding up to 6 months, oral rehydration salts, vaccination, and insecticide-treated bed nets. Additionally, because income growth and maternal education are key contributing factors to the reduction in child mortality (6), continued investments in these areas, as well as family planning and contraceptive programs, are critical.

Over the past decade, the proportion of neonatal deaths has increased as a share of total under-5 deaths in many countries (6). The leading cause of neonatal death is preterm birth, or being born before 37 weeks of pregnancy are complete. Each year, an estimated 15 million babies are born too soon (7). In 2013, nearly 12% (742,381) of under-5 deaths were due to preterm birth complications, with the highest years of potential life lost (YLL) among neonates in South Asia and sub-Saharan Africa. It has been estimated that up to three-quarters of babies born

too soon without access to intensive care units could be saved with affordable interventions, such as early and exclusive breastfeeding and skin-to-skin contact to improve thermal regulation (7). Scale-up of these newborn care interventions and strategies to improve access to quality antenatal care and obstetric services are needed.

Maternal health

Pregnant women comprise a special group within the early adulthood life-cycle period. Maternal mortality accounts for 9.1% of all deaths among 15- to 49-year-old women. MDG 5 has mothers as an explicit priority, with the target goal of a 75% reduction in maternal mortality ratio (MMR; the number of women who die during pregnancy and childbirth per 100,000 live births). The global MMR has only decreased by 26.2% since 1990, with 376,034 maternal deaths in 1990 and 292,982 in 2013. Clearly, maternal mortality has not shown sufficient progress. This means that only 16 countries are expected to achieve the MDG 5 goal; seven of these are developing countries (8).

Regional differences in maternal mortality are striking. In 2013, less than 2000 maternal deaths occurred in developed regions (MMR of 12.1), in contrast to developing regions, which accounted for the vast majority (291,171 deaths; MMR of 232.8). Sub-Saharan Africa accounted for almost half of all maternal deaths, and two countries accounted for more than one-third: India (71,792) and Nigeria (36,698) (8). Inequalities in access to quality care are an im-

portant driver of these striking disparities. For instance, in developing regions, only half of pregnant women receive the World Health Organization (WHO)-recommended minimum of four antenatal care visits. Of the 135 million births in 2011, an estimated 46 million women delivered alone or without adequate care (9).

Early adulthood: 15 to 49 years

The general pattern of the epidemiological transition from communicable disease toward noncommunicable disease has occurred in many regions. Since 1990, the number of deaths resulting from communicable, maternal, neonatal, and nutritional causes has decreased by more than a quarter, whereas deaths from noncommunicable diseases and injuries increased by about 41.8 and 10.7%, respectively (1, 2). The exception is the unfinished agenda of maternal and child health, as illustrated above, and infectious diseases in many parts of Africa and Asia. Among 15- to 49-year-old adults in developing settings, HIV/AIDS and tuberculosis are major contributors to YLL. In 2013, more than 1.4 million 15- to 49-year-old individuals died from HIV/AIDS and tuberculosis worldwide; about two-thirds of these deaths occurred in sub-Saharan Africa (10).

Although there is a shift toward a larger fraction of deaths in early adulthood from noncommunicable diseases and injuries, it is critical to note that the age-standardized YLL rates for these conditions are higher in low-income countries as compared with middle-income and

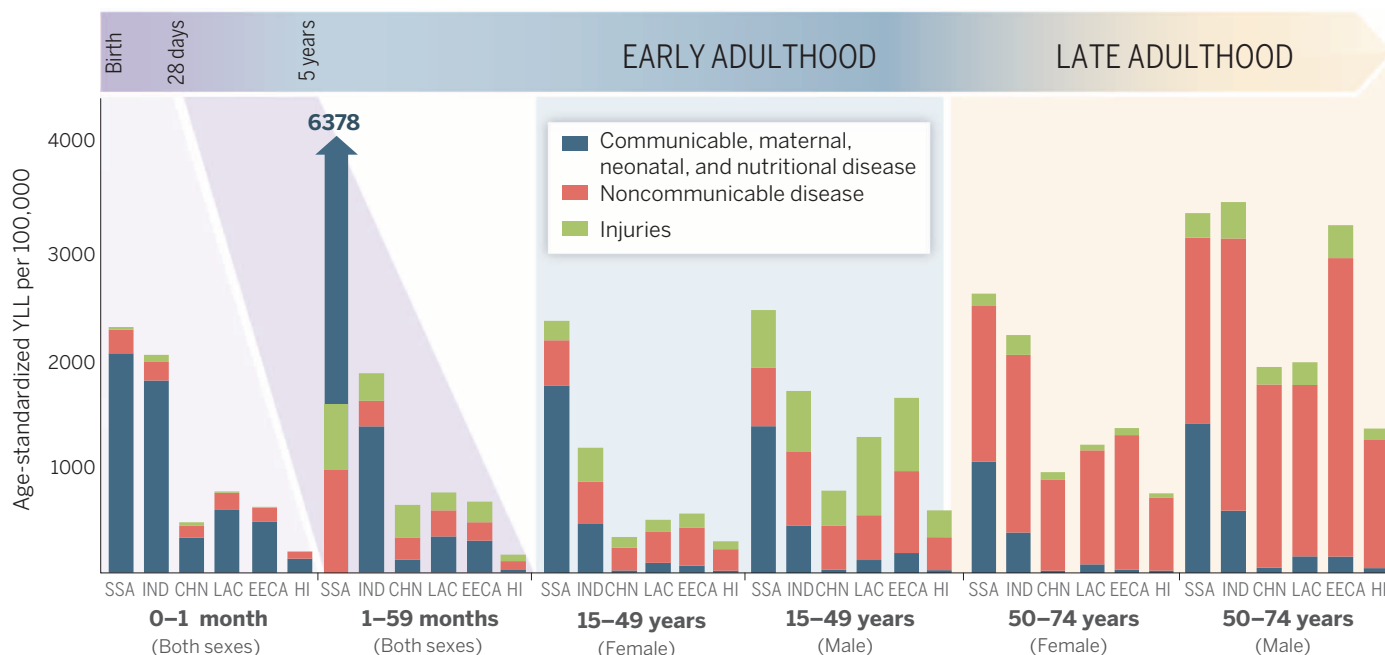


Fig. 1. The burden of disease across various life stages and regions due to specific cause categories, depicted as age-standardized YLL per 100,000. These six geographical regions cover most but not all of the world's population, and their selection is intended to show important regional variations: sub-Saharan Africa (SSA); India (IND); China (CHN); Latin America and Caribbean (LAC); Central Europe, Eastern Europe, and Central Asia (EECA); and high income (HI). The burden of communicable, maternal, neonatal, and nutritional diseases in SSA exceeds the YLL scale, and ages 5 to 15 and 75+ years are not shown.

Age-standardized YLL due to interpersonal violence (per 100,000)

Males aged 15-49 in 2013

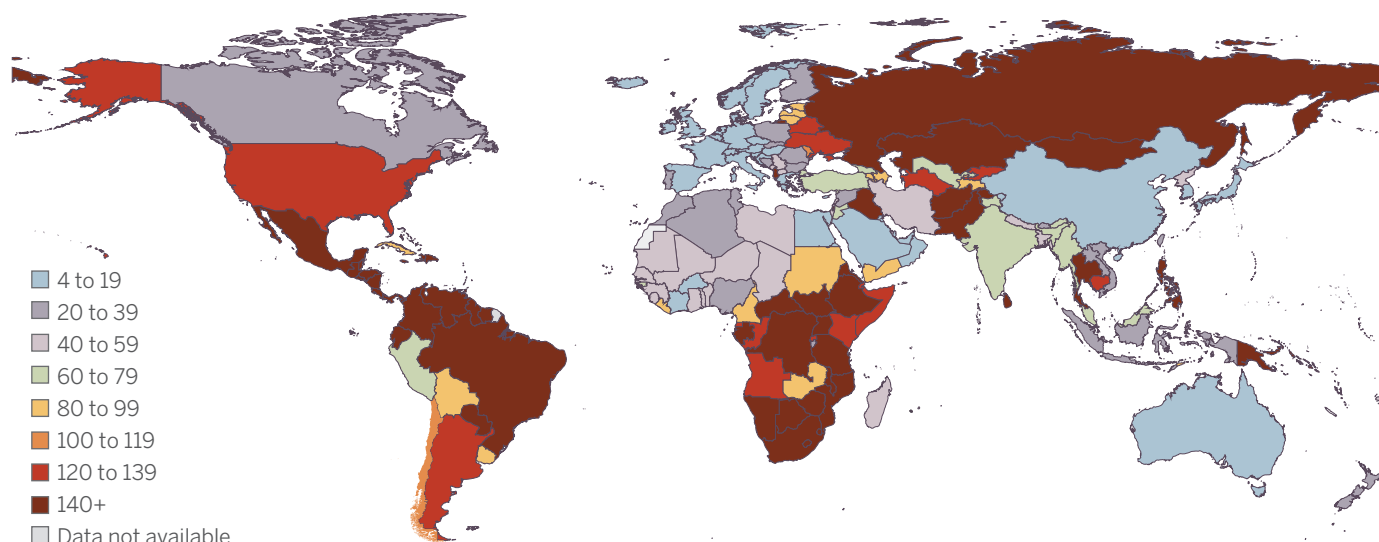


Fig. 2. Age-standardized YLL due to interpersonal violence (per 100,000) among males aged 15 to 49 in 2013.

Age-standardized YLL due to diabetes mellitus and prevalence of obesity

Individuals 20 years and older

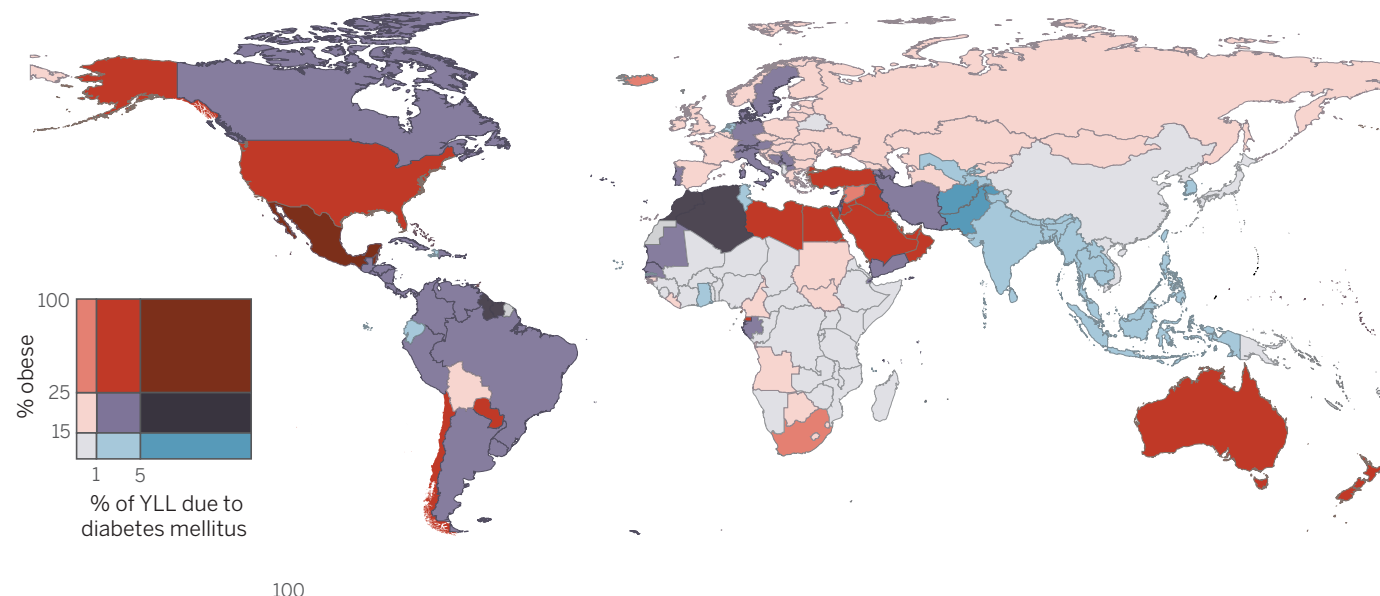


Fig. 3. The percent of age-standardized YLL due to diabetes mellitus and prevalence of obesity among individuals aged 20 years and older. Obesity among adults is defined as a body mass index >30 kg/m². The legend is not drawn to scale.

high-income countries. The pattern of this shift toward noncommunicable diseases and injuries has marked regional variations. For example, injuries were the second leading cause of YLL among males aged 15 to 49 years across five geography clusters we examined and the lead-

ing cause in Latin America. Among women aged 15 to 49 years, injuries were second to noncommunicable diseases, except in sub-Saharan Africa and India, where the burdens of communicable diseases and maternal mortality are high. Upon analyzing 2013 data by more detailed

cause and country, we observed specific regional foci. Road traffic deaths were highly concentrated in West and Central Africa, the Middle East, and Southeast Asia. Deaths resulting from interpersonal violence were highest in Central and South America, South Africa, and Eastern

Table 1. Disease burden in YLL as compared with DAH. Country income levels are classified by the World Bank on the basis of estimates of gross national income, whereas DAH data are from 2010 (13).

	Low income		Lower middle income		Upper middle income	
	YLL	DAH	YLL	DAH	YLL	DAH
HIV/AIDS	7.6%	41.6%	3.7%	32.0%	4.8%	41.1%
Malaria	11.2%	14.3%	4.8%	9.6%	0.0%	2.2%
Tuberculosis	3.1%	3.3%	3.5%	6.6%	1.0%	7.0%
Maternal, newborn, and child health	37.8%	17.1%	32.1%	23.7%	8.1%	7.0%
Noncommunicable diseases	20.7%	0.2%	34.0%	1.0%	65.3%	2.9%
Other	19.7%	23.5%	21.9%	27.1%	20.8%	39.8%

Europe (Fig. 2). Contributing to these regional concentrations, alcohol use was the leading risk factor for violence and injuries in Eastern Europe, most of Latin America, and southern sub-Saharan Africa (5).

Late adulthood: 50 to 74 years

From 1970 to 2010, life expectancy has increased globally from 56.4 to 67.5 and 61.2 to 73.3 years for males and females, respectively (11). With this capacity to live longer and the prolonged exposure to various risk factors, the fraction of deaths from noncommunicable diseases is on the rise. Age-specific rates, however, are tending to decline. In 2013, more than two-thirds of global deaths were attributable to noncommunicable diseases: 8 million deaths were due to cancer; 17.3 million due to cardiovascular and circulatory diseases; 1.3 million due to diabetes mellitus.

After disaggregating the data in the 50-to-74 age group across the six geographic clusters, we again observed regional variation for these noncommunicable conditions. Overall, YLL rates are lower in high-income countries as compared with low- and middle-income countries. Cancer and cardiovascular disease were most prominent in Central Asia and Eastern and Central Europe, although several countries in sub-Saharan Africa, Oceania, and the Middle East also had high burdens of cardiovascular disease. Diabetes among older adults was most concentrated in Oceania, Latin America, North Africa, and the Middle East. These regional hot spots align with findings that high blood pressure is a key risk factor in Central and Eastern Europe, whereas high body mass index is important in Latin America, Oceania, North Africa, and the Middle East (5). As the epidemic of obesity continues to spread across the globe, the burden resulting from associated health outcomes (e.g., diabetes) will also continue to rise (Fig. 3). Of the 671 million obese individuals worldwide, 62% live in developing countries (12).

Setting priorities in global health

An understanding of the broad trends in local and global health is an important input into

the assessment of health priorities. For instance, on a country-by-country basis, it can serve as a critical starting point for national debates on domestic resource allocation and policy-making. However, many other factors should feed into this discussion, such as the availability of effective and affordable technologies, priorities for the most disadvantaged, and the tradeoffs between DAH and national resources (13). Ideally, health investments (both domestic and external) should be focused on explicit priorities, defined by local authorities and based on epidemiological and economic evidence.

To stimulate reflection on priorities for DAH, it is useful to compare where DAH goes compared to the burden of disease in countries classified by economic status (Table 1). In 2013, DAH reached \$31.3 billion, a 5.5-fold increase from 1990 (14). Most DAH has gone to infectious diseases and maternal mortality in low- and middle-income countries. However, although noncommunicable diseases and injuries account for a substantial burden of disease, targeted DAH to these conditions is low.

The allocation of DAH may be the best use of resources to improve health of the poor; however, it may also be influenced by under-recognition of the epidemiological transition in many regions. Some global risks are becoming highly prevalent and will have consequences for generations to come. For instance, nearly a quarter of children and adolescents in developed countries are overweight or obese; in developing countries, this proportion has increased from 8.2 to 13% since 1980 (12). Because overweight and obesity are clear risk factors for cardiovascular disease and diabetes, this rising global epidemic demands collective action. More research and development of affordable strategies and improved scale-up of proven interventions are needed to tackle risk exposure or adoption. The promotion of healthier lifestyles and stricter fiscal policies for tobacco, sugar, and alcohol are measures that could be more widely implemented.

Descriptive epidemiology is not the only input into setting global and national priorities, but it is an essential starting point. Rec-

ognizing regional themes that play out on top of a more universal pattern of the epidemiological transition is important for understanding variation in the epidemiology of disease and for informing the delivery of effective health interventions. Moreover, reliable and updated metrics on the local, regional, and global burden of disease are unique instruments for galvanizing change through evidence-based political commitment. As we transition to the post-MDG era and the new goals to be agreed upon by the United Nations General Assembly (now defined as Sustainable Development Goals), it will be important to understand regional health patterns and to implement policies for sustainable change across the life cycle.

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