Global Public Health: An International Journal for Research, Policy and Practice

Changing care and prevention needs for global public health: In pursuit of a comprehensive perspective

Carlos F. Cáceres & Walter Mendoza

Available online: 13 Feb 2012

To cite this article: Carlos F. Cáceres & Walter Mendoza (2012): Changing care and prevention needs for global public health: In pursuit of a comprehensive perspective, Global Public Health: An International Journal for Research, Policy and Practice, DOI:10.1080/17441692.2012.657664

To link to this article: http://dx.doi.org/10.1080/17441692.2012.657664

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.tandfonline.com/page/terms-and-conditions

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.
Changing care and prevention needs for global public health: In pursuit of a comprehensive perspective

Carlos F. Cáceres* and Walter Mendoza

Unit of Health, Sexuality and Human Development, Cayetano Heredia University School of Public Health, Lima, Peru; United Nations Population Fund, Peru Country Office, Lima, Peru

(Received 11 April 2011; final version received 17 October 2011)

An assessment of changing care and prevention needs in the framework of global public health should not be just a technical exercise of ‘standard’ demographic and epidemiological analysis; rather, it should also involve a reflection on the conditions of the production of such knowledge. In this article, we start by outlining some key dimensions of change in demographic and epidemiological patterns as well as their drivers; second, we address in more depth the question of whether current scientific practice is generating all the questions needed to improve global health in the coming years, and define potentially effective strategies for positive change. Significant demographic changes (i.e., reductions in earlier mortality and fertility; ageing and urbanisation) are leading to the emergence of chronic diseases in the Global South, as well, although patterns are very diverse, and early mortality and disability will still remain high for a few decades in certain areas. Such inequality in health patterns seems to parallel globalisation processes, and results from the effects of social and structural determinants. To better understand those relationships, we must improve our thinking about causality as well as our standard views of what constitutes ‘good evidence’.

Keywords: epidemiology; demography; health systems; development; social change

Introduction

The emergence of Global Health or, more appropriately, Global Public Health as a new, integrated field bridging across other disciplines has legitimately created a debate concerning its boundaries, reach and, particularly, focus of interest. While many uses of the term seem to suggest that global health is just re-branding of older concepts such as tropical medicine and international health in a context of diversified players, an increasing consensus relates the term with the evolving patterns of health and disease and their determinants in an international context framed by globalisation, where the effects of global economic flows and political processes are recognised as key elements (Brown et al. 2006).

In consequence, it is relevant to ask whether the present approaches to demographic and epidemiological analysis will allow for a nuanced assessment of the changing care and prevention needs in the framework of global public health. Kuhn (1962) described standard scientific practice within a discipline at a certain time as a scientific paradigm (also interpreted as time-bound ‘normal’ science), which
was said to remain dominant until it failed to provide plausible responses to new questions. So it may be asked whether or not substantially evolving needs apparent in a rapidly changing world may lead to more consistent calls for a ‘paradigm shift’ in epidemiology and demography, where some currently peripheral approaches might become more important. For example, while social epidemiology is a recognised approach within academic epidemiology with the potential for trans-disciplinary bridging, its role in mainstream epidemiologic practice is still incipient, particularly in its epistemological implications, for a variety of reasons (Krieger 2001, Oakes 2004).

In the limited space available, we will describe an outline of some key dimensions of change in demographic and epidemiological patterns as well as their drivers, looking a few decades back and in some cases reproducing projections made by others. Second, a more in-depth analysis will be presented regarding whether present scientific practice allows for the possibility of raising the questions needed to understand those processes that really matter in any serious attempt to ensure a trend towards health for all in the years to come, and define potentially effective strategies for positive change.

Evolving populations and societies, and emerging prevention needs

Departing from the recognition that assessments based on national (not to mention regional) average figures and goals for unequal societies are not sufficiently informative of the kinds of problems we are dealing with, a thorough analysis of trends should imply measuring not only the magnitude of change over time, but also the direction and characteristics of changing trends and their determinants, differences within and between countries, and factors potentially related to those changes. Since this is impossible in the limited space we have, we will address a few key indicators in demography and epidemiology and discuss their trends to start a line of discussion that should continue in more comprehensive ways.

It is a well-acknowledged fact that demographic change is a major driver of global health trends (Omran 1971). In the decades to come, demographic changes are expected to become one of the major drivers of global change in several domains, obviously including health (National Intelligence Council 2008); their most significant implications were far from being foreseen just a few decades ago, at least in the Global South. Only four decades ago, while Northern development thinking was dominated by the paradigm of a demographic explosion in the South (Ehrlich 1968), the landmark study by Omran established a novel approach by describing how demographic change could also be explained in terms of changing epidemiologic patterns, particularly mortality (Omran 1971). According to Omran, one of the first to claim with clarity the complex interactions among various social processes, ‘…(there is a) complex change in patterns of health and disease and on the interactions between these patterns and their demographic, economic and sociologic determinants and consequences. An epidemiologic transition has paralleled the demographic and technologic transitions in the now developed countries of the world and is still underway in less-developed societies (510)’.

Twenty years later, stressing the role of morbidity with more emphasis than the role of mortality, Frenk et al. (1991) analysed how the rise in life expectancy implied less mortality yet increased morbidity, which, rather than an acute event, became
more a long-lasting and chronic process. In so doing, Frenk et al. depicted how at least certain resource-limited countries, such as those in Latin America, could show a protracted-polarised model, i.e., the increasing coexistence of two epidemiological patterns in relation to both non-communicable and communicable infectious diseases.

**Ageing**

Among effects of the decline in premature mortality and fertility and increasing urbanisation in developing countries, we now face a situation in which higher survival at all ages has increased the relative proportion of people aged 60 and above. As Figure 1 shows, even in the least developed countries, life expectancy past that age is increasing. Remaining survival past 60 years of age is now about 17 years, on average 5 years less than that in more developed countries. Also, as we see, the pace of this trend is likely to remain steady in coming decades. We should also take into account that the survival of males is lower than that of females, which raises questions about gender implications of these changes (Tabloski 2004). The situation is similar when we observe survival at ages 80 and older. Not only people are living longer, but those reaching older ages will continue to do so, stressing the need to consider the so-called oldest old, people living over 85 years (Campion 1994). Are health policies taking this new reality into account? Are we heading towards a situation where inadequate responses might set back those very achievements from the last decades? If so, what can be done to prevent health systems from collapsing in coming decades? In the event we succeed in offering youths appropriate preventive interventions, what might work to render the rest of their lifespan healthy?

![Figure 1. Life expectancy at age 60 in major regions, both sexes, 1950–2050.](image)

Note: More developed regions comprise Europe, Northern America, Australia/New Zealand and Japan. Less developed regions comprise all regions of Africa, Asia (excluding Japan), Latin America and the Caribbean plus Melanesia, Micronesia and Polynesia. The least developed countries are 49 countries, 33 in Africa, 10 in Asia, 5 in Oceania plus 1 in Latin America and the Caribbean. Other less developed countries comprise the less developed regions excluding the least developed countries. Source: World Population Prospects: The 2008 Revision.
Clearly then, as survival is increasing, it seems legitimate to cast the notion that mortality is postponed to older ages, and it has been reported that the prevalence of most diseases has increased in the older population as people survive longer with disease. Interestingly, however, having a disease appears to be less disabling than in the past (i.e., functional limitations are also postponed to the years close to death) (Crimmins 2004), which will require ongoing adjustment of parameters in the burden of disease model. If this is occurring in more developed countries now, would these effects also be seen in the increasingly older population of less developed countries in the years to come? Clearly, the disabling effect of disease at older ages depends in part on the health system’s capacity to respond. If significant differences emerge between higher and lower income countries concerning such response capacity, the impact of disease burden at older ages will reflect such differences.

While overall reductions in fertility and early mortality in the Global South represent important achievements, significant diversity is still observed, both within and across countries, reflecting pervasive disparity in quality of life and access to services. For example, the curves of observed and projected total deaths between 1950 and 2050 across two greatly contrasting regions of the world (i.e., more developed regions and sub-Saharan Africa) show a very diverse global mortality picture (see Figure 2). According to these projections, even in 2050, deaths in sub-Saharan Africa will occur predominantly among those aged 65 or less, and will still occur among children under 5. In contrast, in the more developed regions, deaths among people less than 65-years-old will represent less than 20% of all deaths, of which virtually all will be among people aged 15–64.

**Emerging disease burden**

Longer survival in developing countries will determine the emergence of substantive health care needs of ageing populations in those countries as well. For a number of lower and middle income countries, for the first time in their history, the largest
proportion of their populations – about 30% – is in the 15–29 age range (also referred to as demographic dividend). Investing in good prevention, care and education for this growing population would be a proactive way to adapt public services to a rapidly changing reality, support the ability to meet future health needs and ensure that longer survival does not compromise quality of life or result in a morbidity compression\(^2\) (Fries 1980). While these trends in lower-middle income countries have been acknowledged since the mid-1990s, structural factors, including political and economic instability, prevented programmatic interventions that would have helped support future needs.

In less than half a century, economic development and resulting migration from rural to urban areas led to the establishment of new patterns of living, food intake and risk factors, causing an unforeseen rise in conditions such as cardiovascular diseases, diabetes and obesity (Gao et al. 1999, Adamo et al. 2010, Bernabe-Ortiz et al. 2010). Moreover, since all cohorts are increasingly extending their lifespan, cancer is an emerging cause of morbidity, mortality and disability, mostly affecting the elderly in less developed countries (Kachroo and Etzel 2009).

Clearly, shifts in urban health profiles cannot be understood outside the framework of economic globalisation and trade liberalisation, which are influencing dietary habits, leading to emerging changes in epidemiological and risk profiles (Raschke and Cheema 2008, Corvalán et al. 2009). The most relevant of such risk factors have been assessed by the World Health Organization (WHO) Comparative Risk Assessment Collaborating Group, yielding informative studies that have provided not only global or regional estimates, but also figures for national and sub-national units (Stevens et al. 2008).

As a recent study has shown, the global prevalence of diabetes among adults aged 20–79 years will be 6.4% in 2010, affecting 285 million adults and will increase to 7.7% and 439 million adults by 2030. Between 2010 and 2030, there will be a 69% increase in absolute numbers of adults with diabetes in developing countries and a 20% increase in developed countries, mostly due to the increasing total population and survival at older ages, while total adult populations are expected to increase by 36% and 2%, respectively (Shaw et al. 2010) (see Figure 3, stratified by age group).

Figure 3. Number of adults with diabetes in developed and developing countries in 2010 and 2030.
Likewise, as of 2010 diabetes has been a considerable cause of premature mortality, a situation that is likely to worsen, particularly in low- and middle-income countries where diabetes prevalence is increasing. The distribution of diabetes in males and females is also unequal, as it is responsible for a higher proportion of deaths in females over 49 years of age than males of the same age in all world regions (Roglic and Unwin 2010).

Efforts to reduce future disease burden should take into account that some major trends are already being observed, and that changes to those trends are unlikely to be dramatic. Furthermore, in many lower- and middle-income countries, disease burden is expected to continue being compounded by both communicable and non-communicable disease, the so-called double burden for health systems (Boutayeb 2006). Also, as we have seen before for diabetes, the situation for other metabolic and cardiovascular diseases will worsen, since the long-term trends of their risk factors, i.e., cholesterol (Farzadfar et al. 2011), body mass index (Finucane et al. 2011) and systolic blood pressure (Danaei et al. 2011) raise concern, particularly in low- and middle-income countries. Hence, preventive and care interventions are warranted, at least to mitigate their effects.

Major drivers of health trends operate through changes in age-specific disease and injury mortality risks, demographic changes that alter the population’s size and age composition or both. For various diseases, demographic and epidemiological factors seem to be operating in opposing directions in determining mortality projections for 2030; an exception is HIV/AIDS, for which mortality is expected to remain stable in Africa, where population growth will stay high (Lopez and Mathers 2006, Mathers and Loncar 2006). Table 1 summarises the changes in rank order of causes of deaths between 2002 and 2030 for the 15 leading causes. Interestingly, the

Table 1. Changes in rank order of causes of deaths between 2002 and 2030, for the 15 leading causes.

<table>
<thead>
<tr>
<th>Category</th>
<th>Disease or injury</th>
<th>2002 Rank</th>
<th>2030 Ranks</th>
<th>Change in rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within top 15</td>
<td>Ischaemic heart disease</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Cerebrovascular disease</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Lower respiratory infections</td>
<td>3</td>
<td>5</td>
<td>−2</td>
</tr>
<tr>
<td></td>
<td>HIV/AIDS</td>
<td>4</td>
<td>3</td>
<td>+1</td>
</tr>
<tr>
<td></td>
<td>COPD</td>
<td>5</td>
<td>4</td>
<td>+1</td>
</tr>
<tr>
<td></td>
<td>Perinatal conditions</td>
<td>6</td>
<td>9</td>
<td>−3</td>
</tr>
<tr>
<td></td>
<td>Diarrhoeal diseases</td>
<td>7</td>
<td>16</td>
<td>−9</td>
</tr>
<tr>
<td></td>
<td>Tuberculosis</td>
<td>8</td>
<td>23</td>
<td>−15</td>
</tr>
<tr>
<td></td>
<td>Trachea, bronchus, lung cancers</td>
<td>9</td>
<td>6</td>
<td>+3</td>
</tr>
<tr>
<td></td>
<td>Road traffic accidents</td>
<td>10</td>
<td>8</td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>Diabetes mellitus</td>
<td>11</td>
<td>7</td>
<td>+4</td>
</tr>
<tr>
<td></td>
<td>Malaria</td>
<td>12</td>
<td>22</td>
<td>−10</td>
</tr>
<tr>
<td></td>
<td>Hypertensive heart disease</td>
<td>13</td>
<td>11</td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>Self-inflicted injuries</td>
<td>14</td>
<td>12</td>
<td>+2</td>
</tr>
<tr>
<td></td>
<td>Stomach cancer</td>
<td>15</td>
<td>10</td>
<td>+5</td>
</tr>
<tr>
<td>Outside top 15</td>
<td>Nephritis and nephrosis</td>
<td>17</td>
<td>13</td>
<td>+4</td>
</tr>
<tr>
<td></td>
<td>Colon and rectum cancers</td>
<td>18</td>
<td>15</td>
<td>+3</td>
</tr>
<tr>
<td></td>
<td>Liver cancers</td>
<td>19</td>
<td>14</td>
<td>+5</td>
</tr>
</tbody>
</table>

top two leading causes of death, ischaemic heart disease and cerebrovascular disease, are predicted to remain the same. Moreover, HIV is expected to increase in relative importance (i.e., going from 4 to 3), as well as injuries and a number of chronic diseases and cancers. The opposite will occur with most infectious diseases.

**Gender**

Gender relations play a complex role in these changing trends. As indicated for diabetes, disease patterns may differ importantly by gender. While women have always been more frequent users of health services than men, this was importantly related to reproductive cycle events. Due to decreased fertility and maternal morbidity as well as ageing, over time, women will be seen less often for sexual and reproductive health services and more often for chronic diseases. By contrast, demands for men’s health care, secularly invisible at health services, are increasing quickly, posing the need to develop sensible services that address concerns such as the prevention and treatment of prostate cancer, erectile dysfunction and mental health issues (James 2007). The traditional focus on maternal and child health will have to change rapidly in parts of the Global South.

**Domestic and international migration**

One trend increasingly acknowledged as a major driver of global transformation and economic development is the increasing settlement of populations in cities (United Nations Population Fund [UNFPA] 2007, World Bank 2009). Global urbanisation trends show that rural populations will soon start to decline steadily, particularly in less developed regions, while urban populations will continue to grow rapidly. As Figure 4 shows, by the year 2020 urban populations will start outpacing rural populations, a change that occurred about 50 years ago in more developed regions.

![Figure 4](image.png)

Likewise, Figure 5 shows projected changes in the distribution of the world’s urban population between 1950 and 2050. While in 1950 more than 50% of the world urban population was located in Europe and North America, with 35% in Africa and Asia, by 2050 Europe and North America will represent only 15% of the urban population, while the latter will contribute 74% (see Figure 5). It is predictable that, due to the declining trends of early mortality and increasing urbanisation – more than 50% of the global population now lives in urban areas (United Nations Population Fund [UNFPA] 2007) – the health infrastructure in lower-middle income countries is not prepared to meet increasing health care demands (Carolina and Gustavo 2003, Huicho et al. 2009). Health achievements in the last decades might be reversed if new preventive and treatment services are not put in place.

Internationally, migration flows from the South to the North are (and have always been, perhaps with different sources and targets) a key element of global demographic dynamics. Such flows have a number of implications for health, including the spread of different infectious and non-infectious diseases and changes in dietary patterns and health-related practices. Also, as seen in within-country migration flows (Bernabe-Ortiz et al. 2010), new patterns of living, feeding and health services availability may have both positive and negative effects for South–North migrants (Maffla 2008, Lasseter and Callister 2009). Importantly, recent South–North migration flows have included a substantial number of health professionals who, sometimes trained under subsidised education systems in their countries, will usually take the most challenging health care jobs in Northern countries (Arah 2006).

Figure 5. Distribution of the world urban population by major area, 1950, 2009 and 2050. Source: United Nations (2010b).
New dimensions of change

The need to identify new demographic variables (beyond traditional analytical categories such as age, gender, ethnicity, educational attainment and income/class) is still becoming recognised by researchers and programmers and will not be reflected in data for some time. Nevertheless, changes are taking place in peoples’ lives with potential impact on health and prevention needs, and they should be taken into account in demographic and epidemiologic analyses. One obvious example is the changes happening in the sexual and reproductive aspects of peoples’ lives. Reductions in fertility observed across the world have run parallel with changes in the social organisation of sexuality, with more people getting married later or not at all or getting divorced more often. More importantly, the last 30 years have seen the official acceptance of non-heterosexual sexualities and identities, and more recently the emerging recognition in parts of the world of new forms of family arrangements, including same-sex unions within the legal definition of marriage, often with adoption rights. Even the binary category of gender has been challenged, and transgender identities are just being recognised as part of the new social landscape. Indeed, this is not a homogenous picture – levels of change concerning these issues across the world are remarkably diverse, and they have become international human rights issues in addition to global health issues from the point of view of tackling vulnerability to the HIV epidemic (Sinclair 2005).

Another significant change is the increasing agency of individuals regarding their health, particularly for chronic conditions such as cancer, HIV infection, neurological disorders, disability, chronic renal failure and others. While the path for this evolvement may have been established by the HIV movement during the 1980s, communications efforts have facilitated the expansion of this process to other conditions that are becoming associated with specific identities and giving rise to social movements. Demands from such movements are often not limited to access to services; conversely, they increasingly focus on contesting stigma and discrimination, and on defending the right to health (O’Leary and Wolitski 2009). Similarly, technological changes, particularly in relation to communication, have defined new methods of social networking and new virtual communities focused on endless topics of interest and mobilisation. From political views to religion to entertainment and just meeting people, virtual social networks are playing an increasingly important role in modern societies. Moreover, the Internet is also a relevant source of information and decisions on health concerns that were unthinkable two decades ago, and constitutes a potential source of programmatic action (Kamel Boulos and Wheeler 2007, Pujazon-Zazik and Park 2010). In this context, demography and epidemiology, in collaboration with other disciplines, from anthropology to communication sciences to economics, should attempt not only to describe these changes but also to account, in studies of populations and health, for the new practices and patterns of interaction they generate. By so doing, and supported by multi-disciplinary focus on the interplay between physical and social environments and human practices (Marmot et al. 1995), demographic/epidemiologic analysis can comprehensively inform policy-making (Leone 2010).
Drivers

Drivers of demographic and epidemiologic change are likely multi-causal and diverse across the globe. One way of approaching this multi-causality and diversity is by asking whether the demographic transition experienced in European countries during the nineteenth and early twentieth centuries was analogous to what we are observing several decades later in parts of the Global South. Are the factors related to both transitions the same, or is the recent transition in the South associated at least in part to different processes? Such analysis should lead then to an assessment of policy implications of those changes.

While comparisons could in theory be attempted, they are very difficult to make given that contexts are not comparable: population sizes are different; social and economic processes behind these changes are likely important but non-commensurable, with present processes largely marked by economic globalisation; health technologies have evolved significantly (while the focus and reach of such technological development also needs thorough analysis); and new diseases have emerged. Like mortality, however, burden of disease is highly variable across sub-regions in North and South. Nevertheless, it is almost consensual that a major, if not the most important, driver of health disparities across the world is the difference in access to essential goods: food, sanitation, electricity, health services and basic living conditions, not to mention education and rights. Figure 6 shows how diverse levels of access were to basic services across regions of the world in 2003.

This line of thinking has been thoroughly addressed by the WHO’s Commission on Social Determinants of Health (CSDH), which over a number of years produced a very important analysis of the relationship between health status and living conditions. As the Commission pointed out, ‘avoidable health inequalities arise

Figure 6. Households lacking piped water, flush toilet and electricity by size of urban area and geographic region.
because of the circumstances in which people grow, live, work, and age, and the systems put in place to deal with illness. The conditions in which people live and die are, in turn, shaped by political, social, and economic forces’ (WHO CSDH 2008). Unfortunately, given the report’s breadth, its focus on additive health indicators (rather than specific diseases) and the complexity of vested interests (i.e., essentially most forces defining the present global economic order), plans for implementing serious programmes to tackle such determinants may not follow as quickly as they should. To the extent that we continue to predominantly focus on diseases, we will likely lose track of structural factors and emphasise short-term palliative responses rather than longer-term comprehensive health programmes.

The millennium development goals (MDGs) are key benchmarks guiding global efforts to make, by 2015, significant steps in development in areas that are deemed crucial (United Nations [UN] 2010a). Evidence has shown that the unequal progress in achieving health-related MDGs in low-income countries is significantly related to burdens of HIV and non-communicable diseases (NCDs) in a population (Daar et al. 2007). Indeed, as suggested in Table 2, the separation between NCDs, child mortality and infectious syndromes in the design and conduct of development programmes may obscure interrelationships of illness affecting those living in poor households – whether economic (e.g., as money spent on tobacco is lost from child health expenditures) or biological (e.g., as diabetes or HIV enhance the risk of tuberculosis) (Stuckler et al. 2010). Such double burden among the global poor is a major threat to health systems in those countries (Gwatkin et al. 1999).

Table 2. Effects of non-communicable diseases and their risk factors on health-related MDGs.

<table>
<thead>
<tr>
<th>Health MDG</th>
<th>Type of pathway</th>
<th>Effect of NCD and NCD risk factors on health MDG</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDG #4. Reduce child mortality</td>
<td>Biological</td>
<td>Tobacco increases probability of low birthweight (61, 64)</td>
</tr>
<tr>
<td></td>
<td>Social</td>
<td>Alcohol, tobacco and out-of-pocket long-term chronic disease care household expenditures displace spending on nutrition (up to 500 calories per child per day) (26, 28, 65)</td>
</tr>
<tr>
<td>MDG #5. Improve maternal health</td>
<td>Biological</td>
<td>Tobacco, obesity and diabetes create high-risk childbirth conditions (66)</td>
</tr>
<tr>
<td>MDG #6. Combat HIV/AIDS, malaria and other diseases [including tuberculosis]</td>
<td>Biological</td>
<td>Tobacco increases risk of tuberculosis by about twofold (11, 25)</td>
</tr>
<tr>
<td></td>
<td>Biological</td>
<td>Diabetes increases risk of tuberculosis and MDR by about threefold estimated to be attributable for 10% of TB in India and China and 15% globally (23, 67)</td>
</tr>
<tr>
<td></td>
<td>Biological</td>
<td>Tobacco increases risks for HIV infection Furber et al. (2007)</td>
</tr>
</tbody>
</table>

Source: Stuckler et al. (2010).
Reassessing our analytic frameworks – the quest for ‘evidence’

The last point brings us back to even more basic questions: what do we define as cause, what is change or what do we define as an outcome of interest? Furthermore, by whom and for whom are these questions asked? What counts as evidence in what context? The answers will be reflected in what outcomes we look for and how and where we measure change. Moreover, our causal paradigms will define the factors we investigate as potential causes of these changes – epidemiological research will only ‘demonstrate’ the associations it ascertains. For example, if we assess the role of potential metabolic risk factors for certain cancers, but do not consider dietary, environmental and even global economic factors (think, for example, of the multiple effects of Free Trade Agreements on the lives of individuals in less developed countries), then our studies will not be able to identify and address them. Arguably, the distance in specificity between metabolic factors and macroeconomic ones is so large that it may be unfeasible or even incorrect to study them in a single model, as we will discuss below. However, the practical decision should not be the restriction of this analysis to only factors at a proximal level; rather, it might be the establishment of separate research questions that look more broadly at distal levels (which can potentially be addressed by other disciplines, as well). Only through adequate analysis of programmatic data and collaboration across disciplines – epidemiology, demography, economics and political science, for example – will patterns of health and disease be described and analysed in more integrated ways.

Epidemiology has, for a long time, been defined as ‘the Science of Public Health’, stressing its goal to set strong methodological standards in the investigation of the magnitude, distribution and determinants of health and disease. While the field has made enormous contributions to global public health in both the study of determinants of disease and evaluation of interventions, some concerns remain regarding the extent to which epidemiology can actually measure health and its determinants. In other words, one initial question is about the actual contribution of present-day epidemiological enquiry to the realisation of health, which depends on previous achievements in the operationalisation of, for example, the WHO definition of health.³⁴ This is increasingly important if we recognise that health is not just the absence of disease, and reference to its positive dimensions (e.g., well-being, quality of life, happiness) remains conceptually underexplored. It is likely that significant progress in global public health, which is still largely measured through disease indicators, implies the development of a stronger framework to understand and assess health.

The study of determinants, not only of health but also of disease, is also constrained by our still limited causal models. Again, this has conceptual and methodological dimensions. Conceptually, the articulation of clinical and social factors was always difficult to define in quantitative causal models, and this has become even more complex in the past few years with the increasing inclusion of categories derived from molecular biology (e.g., genes, biomarkers) in those causal models. Since it can be argued that causal models imply some level of commensurability across factors, regardless of the use of multi-variate analysis in the testing of epidemiological hypotheses, then the simultaneous study of causal roles of elements at extremely diverse levels of specificity (e.g., in a hypothetical study simultaneously assessing the role of a genetic factor, clinical depression and exposure to stigma in
lethality related to a disease) raises validity concerns, not to mention interpretive difficulties. In part as a result of this, causal models used in epidemiology tend to be more restricted, and the study of social determinants is usually left aside. This is perhaps the reason that one of the main efforts of social epidemiology has been the development of a conceptual framework that can reasonably account for multi-level causality (Krieger 2001, Beckfield and Krieger 2009).

A related problem is the limitation in existing epidemiological study designs to evaluate the efficacy of public health interventions. The gold standard design, assigned the highest level of legitimacy in producing ‘evidence’, continues to be defined by experimental research (i.e., randomised controlled trials), with assumptions of random allocation of interventions and measurement at the individual level. There are many shortcomings in the conceptualisation of outcome measures at a level different from the individual, and practical considerations and cost limit follow-up to studies in relatively short term. This all leads to difficulties in identifying, assessing and/or ‘demonstrating’ the effects of more distal social level interventions in public health, as the field of HIV is profusely demonstrating (Essack et al. 2010).

In short, there is great difficulty in advancing comprehensive perspectives that simultaneously account for complexity in a convincing and practical way, which might allow for the elaboration of broader evidence-informed intervention strategies to replace many palliative policies in place today, where the problem roots, often broader social factors, remain unaddressed (Cohen et al. 2009). The situation is highly relevant as health interventions that are shown to be effective in the specific context of a western industrialised setting may not necessarily work in the developing world. Certainly, efforts to overcome the dominance of the randomised controlled trial are coming in various ways, both from social epidemiologists trying to develop tools consistent with multi-level causality models, and from biostatisticians who recognise the frequent diversion of real-life conditions from assumptions of statistical models. Alternative methodological approaches, which attempt to recognise the influence of the social context at various levels, include ecological analysis, the use of randomised cluster designs and the use of mixed methods (Santos et al. 2007, Trickett 2009).

The definition of what counts as ‘evidence’ in health implies, beyond the issues pointed out earlier, a more fundamental discussion about science as a social practice. There are many structured traditions of knowledge across the world apart from ‘normal’ (dominant) science. Also, as sociologists of knowledge showed decades ago, practices within the sciences are not necessarily governed by consensual principles of ‘excellence’ (Berger and Luckmann 1966). Rather than the ‘best thinking’, dominant science often produces the thinking that caused the conditions to be produced.

A critical ‘global public health’ should recognise this and aim to facilitate a more democratic participation of scientific communities across the world in debates around health needs and priorities, including those distant from the dominant centres. It should also explore in more depth health-related thinking and practices that are not part of the western conceptualisation of health. While an analysis of this kind of process is beyond the scope of this article, we have addressed it elsewhere (Caceres and Mendoza 2009), and progress in the democratisation of science will likely enrich the frameworks and tools of global public health.
Conclusion

In conclusion, an assessment of changing health and prevention needs in the framework of global public health should not be just a technical exercise of ‘standard’ demographic and epidemiological analysis; rather, it should also involve a reflection on the conditions of production of such knowledge, and efforts to improve our ways of assessing ‘reality’.

In this article, we started by outlining some key dimensions of change in patterns; second, we considered their epidemiological correlates; third, we focused on drivers of those changes; finally, we addressed more in depth the question of whether current scientific practice is asking all the questions needed to understand those processes that really matter in any serious attempt to ensure a trend towards health for all in the years to come, and define potentially effective strategies for positive change.

Significant demographic changes (i.e., reductions in earlier mortality and fertility; ageing and urbanisation), already apparent decades ago in the North, are leading to the emergence of chronic diseases in the South, although patterns are very diverse, and childhood mortality will still remain high for a few decades in certain areas. Such pervasive inequality in health patterns seems to parallel globalisation processes, and likely results from social/structural determinants (including local and global dynamics). While some cumulative evidence of the role of such determinants exists, a much more specific understanding of those causal relationships is needed, although our present research practices are likely insufficient to generate the right kinds of ‘evidence’. To better understand those relationships, we need to improve our thinking about causality as well as our standard views of what constitutes ‘good evidence’; we also must learn to work collaboratively with other professionals in order to address various levels of specificity in health research; and return to a view of health as a comprehensive human experience that must be promoted and enhanced, rather than remain focused on the proximal, and hopelessly limited, control of specific diseases.

Notes

1. The demographic dividend represents an opportunity derived from changes in the population’s age structure, by which the rate of economic growth might be influenced by the increasing share of working age people in a population. During demographic transitions, low fertility initially leads to low youth dependency and a high ratio of working age individuals compared to the total population. However, in order to become an actual opportunity, proper interventions in health and education of younger age groups are required (Bloom et al. 2003).

2. The term compression of morbidity was coined by Fries (1980). According to his hypothesis, the onset of disabling diseases of elders might be postponed until they are quite close to death. ‘The compression of morbidity occurs if the age at first appearance of ageing manifestations and chronic disease symptoms can increase more rapidly than life expectancy... Absolute compression of morbidity occurs if age-specific morbidity rates decrease more rapidly than age-specific mortality rates. Relative compression of morbidity occurs if the amount of life after first chronic morbidity decreases as a percentage of life expectancy’ (Fries 2005, pp. 810–811).


4. ‘Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity’.
References


