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Non-Communicable Diseases in the Global Health Agenda

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1. Introduction

For a long time non-communicable diseases (NCDs) have been a major cause of death and disability worldwide. However, the profile of this health challenge is changing: Having dominated the epidemiologic contour of high-income countries in the 20th century, it is now increasingly affecting the developing regions of our planet. Unless we start implementing measures to reduce the burden of NCDs in low- and middle-income countries, the pressure on their health systems will be unbearable and will limit the prospects for economic development.[1]

In this chapter we discuss the need to confront this emerging challenge through a change in the orientation of global health. The central message is that it is necessary to incorporate NCDs into the global agenda and deploy comprehensive strategies in developing countries to address them. Such strategies should include both prevention services and cost-effective treatments.

In the first part of the chapter we discuss the present situation of NCDs in low- and middle-income countries, with emphasis on cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes, along with a major risk related to most of them, obesity. Part two is devoted to the discussion of four myths that have hindered the incorporation of NCDs to the global health agenda and a set of proposals to strengthen the battle against them, using as an example several initiatives implemented in Mexico as part of a comprehensive health reform. The chapter concludes with a call to mobilize international collective action in the pursuit of shared goals around NCDs.

2. The global burden of NCDs

During the past half-century the world witnessed a fundamental transformation in the field of health: a shift in the dominant patterns of disease and death towards higher age groups and towards chronic conditions.

Improvements in nutrition, access to water and sanitation, and expanded coverage of public health interventions such as immunizations and oral rehydration therapy reduced the burden of disease attributed to under-nutrition, common infections and reproductive

problems, and produced major gains in child survival beyond age 5. Recently, the expansion of the global coverage of immunizations, for example, produced a 74% drop of measles deaths between 2000 and 2007.[2] The number of global deaths due to malaria declined from almost one million in 2000 to 780 thousand in 2009.[3] Annual maternal deaths also fell from more than a half a million in 1980 to less than 350 thousand in 2008.[4]

The gains made against infectious diseases and advances in child survival rendered huge improvements in life expectancy. In fact, during the 20th century the world as a whole experienced a larger gain in life expectancy than in all the previously accumulated history of humankind. Life expectancy was only 30 years in 1900. By 1985 it had more than doubled to 62 years. In 2010 the average estimate for the world reached 70 years, but with huge regional differences, ranging from 83 years in Japan to scarcely 47 years in Zimbabwe.[5]

Today growing proportions of the world population are living long enough to experience the effects of the exposure to health risks related to modern living such as lack of physical activity, consumption of unhealthy diets and products (tobacco, alcohol and illicit drugs), stress and social isolation, all of which increased the prevalence of NCDs to the point of turning them into the leading cause of death worldwide. According to a recent World Health Organization (WHO) report, two thirds (36 million) of the total annual deaths are attributed to these diseases and 80% of them occur in low- and middle-income countries.[6]

The most common NCDs are cardiovascular diseases, cancer, chronic respiratory diseases, and diabetes. Heart diseases are the main cause of death worldwide. They produce 17 million deaths annually, 80% of which occur in low- and middle-income countries.[6] In fact, deaths due to heart diseases today are more numerous in China and India than in all the developed world.

Cancer is another major challenge. According to WHO, there are 7.6 million cancer deaths annually worldwide, which represent around 21 percent of all NCD deaths.[6] Two thirds of them occur in low- and middle income countries.

The most common cancers among women in developing nations are breast, cervical, stomach, lung, and colorectal cancer.[7] Every year more than half a million new cases of breast cancer occur in this part of the world.[8] In Latin America, Uruguay (83 per 100,000 women) and Argentina (75 per 100,000 million) have already reached breast cancer incidence rates similar to that of Canada (96 per 100,000 women), which is one of the highest in the world.[9] Cervical cancer, which has become a rare disease in rich nations, produces more than 200,000 deaths annually in developing countries.[10]

Among men, the most common neoplasms in developing nations are lung, stomach, liver, esophageal, and colorectal cancer.[7] While rich countries are witnessing a decline in new cases of lung cancer as a result of broad anti-smoking campaigns, many low- and middle-income nations are experiencing the opposite trend. Liver cancer is also increasing among men in poor countries. More than 80% of the new cases of this disease occur in developing nations, with Sub-Saharan Africa and Southeast Asia showing the highest rates worldwide. It comes as no surprise to find out that in these same regions hepatitis B virus infection is endemic.

The third major group of NCDs is formed by chronic respiratory diseases, including asthma and chronic obstructive pulmonary disease, which produce 4.2 million deaths annually.[6]

Diabetes is the fourth major non-communicable challenge. The number of adults with this disease has doubled in the past three decades, from 153 million in 1980 to 347 million in 2008.[11] This disease produces 1.3 million deaths annually, more than 80% of them in developing regions.[6] To this we should add its morbidity impacts, since diabetes is the leading cause of renal failure, limb amputation, and visual impairment and blindness. This imposes huge economic burdens on individuals, households, health care systems, and national economies. According to a report of the International Diabetes Federation, total expenditure on diabetes reached 376 billion dollars in 2010 and is projected to exceed 490 billion dollars by 2030.[12]

Obesity is closely related to the increasing prevalence of cardiovascular diseases, several forms of cancer, and diabetes. According to a paper recently published in *The Lancet*, there are 1.46 billion overweight adults globally; 495 million of them obese.[13] Among other factors, this is the result of recent changes in the global food system which is producing increasing amounts of affordable processed food.[14] Obesity levels range from 3% in Japan to around 80% in some of the islands of the South Pacific. Children are being increasingly affected. A report of the US Institute of Medicine indicates that 20% of American children between the ages of 2 years and 5 years are overweight or obese.[15] Figures of the latest National Health and Nutrition Survey in Mexico indicate that the prevalence of obesity among children 5 to 12 years old increased from 6% to 10% between 1999 and 2006.[16] In the developing world this epidemic first affected the affluent middle-aged adults in urban settings, but it is now spreading to rural areas and indigenous populations, affecting younger age groups, and rapidly turning obesity into a disease of the poor.

If the present trends continue, by 2050 more than 50% of the world population could be clinically obese and national health systems would be overburdened by the demands associated to this health risk.[17] Withrow and colleagues estimated that obese individuals have medical costs 30% higher than those with normal weight.[13]

The shift of the burden of disease in developing countries towards chronic conditions is demanding the design and implementation of new local health strategies, but it is also calling for changes in the contents and orientation of the global health agenda. In the following section we will discuss four myths that have delayed the incorporation of NCDs to the global agenda and a set of proposals to successfully address these emerging challenges.

3. Overcoming the barriers to incorporate NCDs to the global agenda

During the 20th century international health was mostly involved in the control of communicable diseases, which were supposed to be characteristic of developing countries and mostly controlled in the developed world. NCDs, in contrast, had a low profile in the global health agenda, under the belief that they would be limited for quite a long time to high-income countries. In those days there was also a general consensus around the idea that infections and NCDs were biologically un-related.

Reality proved to be more complex. Infections never disappeared from the developed world. AIDS and antibiotic resistance have been strong remainders of the danger of lowering the guard against communicable diseases. As shown in the previous section, NCDs are increasingly dominating the health profile of the developing world. Finally, many ailments originally classified as non-communicable have now been found to have an

infectious cause. According to WHO, one fifth of all cancers worldwide are caused by chronic infections produced by agents such as HIV, HPV, and hepatitis B virus.[18] Bacterial, viral, and parasitic infections also underlie other NCDs, such as rheumatic heart disease, Chagas cardiomyopathy, and peptic ulcer.

To make matters more complex, many NCDs can literally be transmitted through genetic, epigenetic, and social networking mechanisms. The former Director General of WHO, Gro Harlem Brundtland, used to talk about "communicated diseases," which may be non-communicable in the epidemiologic sense of the word, but are transmitted through advertising and sponsorship of unhealthy products such as tobacco, junk food, and soft drinks.[19]

If we are to successfully meet the NCD challenge, we must overcome the four following myths, which have been identified in the work of the Global Task Force on Expanding Access to Cancer Care.

Myth #1: NCDs are not a major problem in developing countries. As shown above, a solid body of evidence has documented the rising importance of NCDs. According to the WHO *Global Status Report on NCDs*, nearly 80% of NCD deaths occur in low- and middle-income countries, and even in African countries they will exceed communicable, maternal, perinatal, and nutritional diseases as the most common causes of death by 2030.[6]

Myth #2: *Even if the NCDs are important, there is very little that developing nations can do to address them.* Actually, we have at our disposal cost-effective interventions for the majority of NCDs common in developing regions, and we should deploy them alongside preventive strategies in what has been called the full cycle of care.[20]

Myth #3: Even if there are effective interventions, developing countries cannot afford them. Several experiences show that it is feasible to mobilize both global and national resources in a fiscally responsible way to greatly expand access to comprehensive services for NCDs.

Myth #4: Responding to the challenge of NCDs would distract attention from other more urgent priorities, mainly the health-related Millennium Development Goals (MDGs). This myth is especially pernicious because it tends to polarize the global health community in a zero-sum, competitive mentality. Instead, we should look for synergies among disease-specific programs and strengthen health systems so that they can address the multiple, diverse, and complex needs of real people. A solid health system will be able to meet the needs related both to the unfinished agenda of common infections and to the emerging burden of NCDs.

These four myths sound very familiar because they were applied to AIDS over a decade ago. Back then, these same four misconceptions were put forward as justifications for inaction. Fortunately they were successfully eradicated and expanded access to prevention and care for HIV/AIDS is now considered one of the greatest achievements in the history of global health. The same success can now apply to NCDs if we develop the right evidence-based policies and if we continue to involve all relevant actors.

NCDs are the driving force behind a health picture that can be characterized by two words: change and complexity. Our common challenge is that most health systems simply have not kept up with the pressures derived from the epidemiologic transition. In particular, ministers of health throughout the world are facing unprecedented demands as they seek to become effective stewards to develop health systems that respond to the needs and expectations of the population with equity, quality, and financial protection for all.

This complexity can only be addressed through a comprehensive response to NCDs built on three major pillars:

- First, the design and application of a new generation of health promotion and disease prevention strategies;
- Second, the achievement of universal social protection guaranteeing access to high-quality care without fear of financial catastrophe;
- Third, the adoption of innovations in the delivery of health services that make use of the technological and managerial revolutions of our times.

Many countries have made progress along these pillars. Mexico is a relevant example. In the following paragraphs, some of the most important lessons in the use of each of the pillars in a reform recently implemented in this country are discussed.

The first pillar was predicated on the notion that health systems will not be able to handle the growing burden of NCDs without a renewed emphasis on public health. Aware of this reality, a crucial component of the Mexican reform was the establishment of a new public health agency charged with protection of the population against health risks through food safety, definition of environmental and occupational standards, regulation of the pharmaceutical industry, and control of hazardous substances like alcohol and tobacco.

Along with other developments, this new agency has greatly strengthened the stewardship role of the Ministry of Health, which has become empowered to mobilize all instruments of public policy in the pursuit of health as a social objective.

In addition, the financial re-engineering of the health system included a protected fund for community health services targeting health promotion and disease prevention interventions, including, of course, those targeted at NCDs.

Important as promotion and prevention are, control efforts must also include access to health care. Indeed, even if we invest increasing amounts of resources in the prevention of NCDs, we will still need to deal with the consequences of exposures to risks that have already occurred. Those consequences include episodes of disease that require treatment, which all too often exposes families to the associated risk of financial catastrophe. For this reason, a comprehensive strategy must also include the second pillar: universal social protection.

Based on sound evidence about the extent of pernicious out-of-pocket payments, in 2003 the Mexican Congress approved a major legislative reform establishing a system of social protection in health. This system has substantially increased public funding for health in order to provide universal health insurance, including the half of the population, 50 million persons, most of them poor, who had lacked protection until then.

The vast majority of these persons are now enrolled in a new public insurance scheme called *Seguro Popular*, which guarantees access to a comprehensive package of cost-effective services covering the prevention, early detection, diagnosis, treatment, and palliation of the major causes of ill health, including, of course, NCDs. The law stipulates that the package must be progressively expanded and updated annually on the basis of changes in the epidemiologic profile, technological developments and resource availability.

The key to expand such resources has been to start with an explicit set of guaranteed benefits. This ties the reform to concrete deliverables, which is a main ingredient to gain public support. This approach tackles health system strengthening starting with the desired

outcomes, rather than with the existing inputs, as is the usual practice. Once the package of guaranteed interventions has been defined, it is possible to work our way backwards to estimate the requirements for inputs, including financial resources, workforce development, facilities, drugs, and other technologies.

Thanks to this approach, there was ample support for increasing public investments in health, despite general economic difficulties. The recipe for success was very simple: the Ministry of Health didn't *ask* for money; rather it *offered* explicit benefits for all, including the health benefits but also the large economic benefits of reducing the burden of chronic diseases.

An explicit package of interventions is the key to develop a "diagonal" strategy, whereby specific disease priorities are used to strengthen the overall structure and function of the health system.[21]

The true test of a reform, however, comes when benefits and resources make their way to the communities and facilities where actual delivery of services takes place. And this leads to the third and final pillar of health system strengthening: the deployment of innovations to assure that high-quality services reach all who need them. A particularly promising avenue is offered by the mobile phone revolution, with its enormous potential to expand access. Equally important are managerial innovations to improve efficiency, such as the delivery of NCD care in settings that require less intensity in the use of human resources and medical technology but still achieve good levels of quality.

4. Conclusions

In order to address the challenge of NCDs in the developing world we need to put in place a comprehensive strategy whose components have to be implemented both at the global and the local levels.

First of all, we need to overcome the lack of attention to this development challenge and integrate NCDs with communicable diseases in the global health agenda. The main objective in this regard should be to expand the MDGs to include health targets related to NCDs common in low- and middle-income countries, such as hypertension, diabetes, and cancer. WHO, in fact, has already proposed a 25% reduction of deaths attributed to NCDs by 2025 based on 2010 rates.

Second, it is necessary to mobilize local and global resources to finance the sustainable implementation of comprehensive strategies to address NCDs. Additional global resources will be crucial to implement these strategies in low-income countries.

Third, new health initiatives should consider the integration of prevention and treatment to control NCDs in a mutually reinforcing way. There are lessons to be learned in this respect from AIDS, where treatment has enormous impacts in preventing dissemination. Early detection and treatment of diabetes is also crucial to avoid the complications of this ailment, which require complex and costly interventions that impose pressures both on households and health systems. In reality there is no choice but to strengthen health systems so that they can offer comprehensive responses to the double burden of disease confronted by low- and middle-income countries.

The attention to the full cycle of care also implies the integration of all sectors whose activities are related to health in order to design and implement not only health policies but

also *healthy* policies. This integration is particular relevant to the control of NCDs since many of the risk factors related to them fall beyond the limits of the health sector.

Finally, the health community should strive to create networks that guarantee the continuity of care, which is a crucial component of the treatment of most chronic diseases. A related transformation involves moving beyond health *centers*, which by definition concentrate human and technological resources, into health *spaces*, which extend the reach of comprehensive care into schools, workplaces, recreational areas, and the homes of those who live with a chronic condition.

We should recognize that the driving force to face the NCD challenge will be located in countries. However, no individual nation can respond on its own to the global challenges that underlie the risk factors for NCDs. To address them we require international collective action in the pursuit of shared goals. A major vehicle in this respect is the development of global policy instruments, like the Framework Convention on Tobacco Control. Another crucial element comes in the form of global public goods, like the evidence base that must be built by rigorously evaluating national innovations. In this way, it will be possible to fuel a process of shared learning among countries about what works and in which context.

International action also requires the mobilization of global solidarity, as the fight against HIV/AIDS has so successfully exemplified. NCDs once again offer the world the chance to demonstrate that we are all committed to the universal value of health. Everyone has a role in this common endeavor: national governments, bilateral agencies, international organizations, global partnerships, private business, and the rich diversity of civil society, from professional associations and advocacy groups to academic institutions and research centers.

Giving NCDs their rightful place in the global health agenda will not be an easy task. Yet, if we act together to develop a prompt and comprehensive response, major improvements will be made in the health and wellbeing of the world population.

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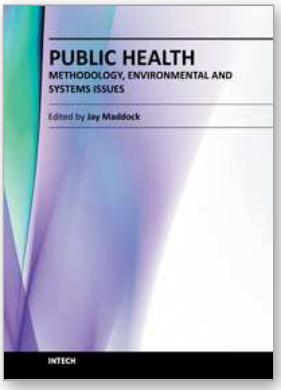

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Public health can be thought of as a series of complex systems. Many things that individual living in high income countries take for granted like the control of infectious disease, clean, potable water, low infant mortality rates require a high functioning systems comprised of numerous actors, locations and interactions to work. Many people only notice public health when that system fails. This book explores several systems in public health including aspects of the food system, health care system and emerging issues including waste minimization in nanosilver. Several chapters address global health concerns including non-communicable disease prevention, poverty and health-longevity medicine. The book also presents several novel methodologies for better modeling and assessment of essential public health issues.

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