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Globalization and Infectious Diseases

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- Global health challenges

In a report on global security developed by a high-level panel appointed by the Secretary General of the United Nations (UN), infectious diseases were included in a compact list of threats that the world must be concerned with now and in the decades to come.¹ According to the report, such threats recognize no national boundaries and need to be addressed at the global, regional, and national levels because no state, no matter how powerful, can, on its own, make itself invulnerable to them.

The purpose of this article is twofold: (1) to discuss the nature of the health challenges created by globalization and (2) to propose new forms of international cooperation to confront them. The discussion of global health challenges includes both the transfer of health risks, with an emphasis on infectious diseases, and the international dissemination of health opportunities, including the transfer of knowledge and technology. Consistent with the UN report on global security, we argue that the health-related challenges and opportunities of an increasingly interdependent world demand new forms of international cooperation. The authors suggest the promotion of 3 elements that, in their essence, contain the idea of collaboration: exchange, evidence, and empathy.

GLOBALIZATION AND HEALTH

Globalization is evolving at such speed and with such complexity that it challenges our ability to grasp its full extent. This dynamism is a good reason to constantly renew the discussion around the forces of globalization and their impact on everyday life.

Several processes illustrate the increasing degree of proximity in our world. The number of international travelers has reached 3 million people every day, telephone

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traffic amounts to 406 billion minutes a year, and there are more than 2 billion Internet users worldwide.² The antiglobalization movement itself went global in 2001 when activists gathered in Porto Alegre, Brazil in the first meeting of the World Social Forum.

These changes have profound implications for health. In all countries, the domestic health agenda has now been complicated by the international transfer of risks and opportunities.³

The transmission of communicable diseases is the best example of the increasing porosity of borders. To fully understand this phenomenon, we must first deal with 2 misconceptions that very often cloud the discussion on the role of infectious diseases in the global agenda.

The first misconception is that infections represent a sort of lower stage in the progression of disease patterns that has been characterized as the epidemiologic transition. Its original formulation by Omran⁴ in the early 1970s viewed the epidemiologic transition as a linear movement from communicable to noncommunicable diseases.⁴ Therefore, it was just a matter of time until societies got rid of the scourge of infection.

We know better now. We understand that the health transition is not a simple, linear, and unidirectional state, but rather a complex, contradictory, and dynamic process where several stages may overlap and where populations often experience veritable counter transitions with the reemergence of previously controlled infections.⁵ This negative outcome reflects complex interactions among disease agents, hosts, and environments that often lead to the appearance of drug resistance. In addition, the world has witnessed the emergence of new communicable diseases, the most prominent of which is, of course, AIDS.

Furthermore, the separation between communicable and noncommunicable diseases is not as clear-cut as it was once thought. To begin with, diseases originally classified as noncommunicable have been found to have an infectious cause. According to the World Health Organization (WHO), one-fifth of all cancers worldwide are caused by chronic infections produced by agents, such as human immunodeficiency virus (HIV), human papillomavirus, and hepatitis B virus. On top of that, many of these diseases, or their treatments, weaken the immune system, giving rise to associated infections that are often the precipitating cause of death.

In sum, infectious diseases are not the exclusive domain of a primitive stage in the health transition, but rather a shifting component of every epidemiologic pattern. This conclusion also serves to counter the second misconception that infectious diseases are mostly a problem of underdeveloped countries. As we have seen, even in societies where noncommunicable diseases dominate the epidemiologic pictures, infection is a common companion of such diseases. Furthermore, the extent of integration in our world means that no country can be isolated from risks that emerge elsewhere.⁶

In fact, this is not a new phenomenon. The first documented case of a transnational epidemic was the Athenian plague of 430 BC.⁷ Having probably originated in Ethiopia, it spread to Libya and Egypt and finally reached the heart of ancient Greece in grain boats.⁸ According to Thucydides, this calamity was responsible for the defeat of Athens in the war against Sparta and the Peloponnesian League, which marked the decline of its golden age.⁹

The Black Death of 1347, which killed at least one-third of the European population, originated in Central Asia and spread through military conflicts and international trade. It was during this epidemic that Venetians invented quarantine, isolating arriving ships for 40 days.¹⁰

The conquest of the Aztec and Inca empires in the sixteenth century was an early example of involuntary microbiological warfare through the introduction of smallpox

and measles into previously unexposed populations. The colonization of the Caribbean and Brazil almost led to the extermination of the indigenous populations, a situation that forced the importation of slaves from West Africa. This trade, in turn, brought malaria and yellow fever to the New World, creating additional disasters.¹¹ In this microbial exchange, Columbus probably took one dire disease from the Americas to Europe: great pox (syphilis).¹²

Another example in the uninterrupted history of the transnational transfer of infection is the 1829 cholera pandemic, which started in Asia, broke into Egypt and North Africa, entered Russia, and crossed Europe. Three years later it reached the eastern coast of the United States.¹³

In the twentieth century, the influenza pandemic of 1918, erroneously known as Spanish flu, accounted for an estimated 50 million deaths worldwide, 5 times more casualties than those produced in combat during World War I.¹⁴

As we can see, infectious diseases have an old record of cosmopolitan presence. What is new, however, is the scale of what has been called microbial traffic. The number of potentially infectious contacts has exploded as trade and travel bring persons and products closer than ever before. Today the longest intercontinental flight is briefer than the incubation period of any known human infectious disease, posing unprecedented challenges to disease surveillance and making classical quarantine measures obsolete. Even the existing therapeutic arsenal has lost a substantial part of its effectiveness in this context of growing health interdependence.¹⁵

Tuberculosis (TB) provides a dramatic example. In 2003, close to 9 million persons worldwide became infected with TB and more than 2 million died of it. Several reasons explain this unexpected comeback; one is the fragility of the immune suppressed. As we know, TB is often the first sign that a person harbors HIV. Other reasons include overcrowding, poor nutrition, and inadequate health care, which are common among the socially marginalized. Migrants are a particularly vulnerable population. Not surprisingly, morbidity and mortality rates for HIV and TB are several times higher among migrants and in the northern border states of Mexico than in this country as a whole. Likewise, more than 50% of TB cases in the United States are reported in the 4 states bordering Mexico.

The latest additions to the list of global epidemics are severe acute respiratory syndromes (SARS) and avian and swine flu. The 2003 SARS epidemic was the first serious warning of the potential health, social, economic, and security consequences of major disease outbreaks, and it confirmed the need for coordinated international action, timely reporting, and full transparency in handling epidemiologic information.¹⁶ H1N5 avian influenza has remained a regional threat, but H1N1 swine influenza produced a second warning in 2009, when the outbreaks in Mexico and the United States eventually spread to the whole world in a matter of weeks. The fast and transparent response of the Mexican health authorities, and the immediate implementation of the national and global preparedness plans developed in the previous years were crucial in the contention of the health and economic consequences of this pandemic.

EXPORTING LIFE STYLES AND HEALTH PRODUCTS

The rise in the global spread of infectious disease is related to radical changes in our environment and lifestyles, which have led Arno Karlen to speak, in his book *Man and Microbes*, of a new bio-cultural era.⁹ Such changes are also accounting for the global spread of noncommunicable diseases. Smoking and obesity are the exemplars of emerging health risks linked to globalization that are now placing a double burden on the health systems of developing countries, further compounding health inequities.

Indeed, *problems only of the poor*, like malaria, are no longer the *only problems of the poor*. Tobacco-related deaths are increasingly concentrated in developing countries that lack the legal and regulatory muscle to counter the power of multinational corporations.

Beyond diseases and risk factors, globalization is also affecting health products and services. This issue is particularly relevant for the Mexico-United States border. A recent study estimated that there are more than 17 million health-related crossings at this border every year.¹⁷ Seventy-five percent of these crossings are from the United States into Mexico, most often to purchase pharmaceuticals without prescription, including antibiotics.

Thus, improper prescription practices are no longer a strictly national problem, but have acquired an added global dimension. Such practices are at least partly responsible for the emergence of new forms of microbial adaptation and mutation, which have, in turn, produced resistance to many antibiotics. This resistance has become one of the major hurdles in the fight against TB and malaria. Two thousand years after the first recorded treatment against malaria, we are still facing the challenge of devising an effective cure. Ironically, that ancient treatment came from the Chinese *qing hao* plant, the source of artemisinin, which today offers new hope in the fight against drug-resistant malaria.¹⁸

The mutagenicity of known infectious agents is of particular concern given their easy global transmission. It, therefore, places an added burden on surveillance systems and represents a major challenge to the scientific quest for new drugs.

Another recent development with potential implications for irrational prescription practices and the ensuing spread of antibiotic resistance is the growing commerce of services and drugs through the Internet. That this is no longer a marginal phenomenon is reflected in recent efforts by the WHO to curb it.¹⁹

All of these are contextual factors that constrain the final impact of efforts to develop new drugs and vaccines because, in the end, all technological innovations will have to be delivered through real-life health care systems. As we have seen in the acrimonious debates surrounding access to antiretrovirals, the development of life-saving drugs without generating the mechanisms to reach those in need can create very difficult ethical and political dilemmas.

Fortunately, this is an area where interdependence has opened up novel avenues for international collective action,²⁰ as expressed in compromises, such as the Doha declaration on public health and trade; new financial instruments, such as the Global Fund to Fight AIDS, Tuberculosis and Malaria; and successful negotiations to reduce the price of AIDS drugs.

KNOWLEDGE AND HEALTH IMPROVEMENT

The growing complexity of health systems has made international comparisons more valuable than ever. Given the enormous economic and social impact of policy decisions, countries can benefit from a process of shared learning. This was the significance of the effort by the WHO to assess the performance of all 191 health systems of the world.²¹ Comparative analysis is likely to promote the international dissemination of good practice. Perfectible as it is, this exercise has nourished an intense and fruitful debate that, among other things, has improved the methodologies developed for the original assessment.

This type of knowledge-related global public goods²² will be key for the design and implementation of solutions to global threats. In fact, we now know that most of the health gains achieved during the twentieth century can be attributed to the

advancement of knowledge²³ through 3 main mechanisms. First, knowledge gets translated into new and better technologies, such as vaccines and drugs. This method is the best-understood mechanism through which it improves health. But knowledge is also internalized by individuals who use it to structure their everyday behavior in key domains, such as personal hygiene, feeding habits, sexuality, and child-rearing practices. Finally, knowledge becomes translated into evidence that provides a scientific foundation both for health care and for the formulation of public policies.²⁴

Recent developments in our country illustrate this last point. Thanks to the cooperation among several academic and international organizations, the analytical armamentarium for health policy has been greatly enriched during the past few years to include such robust tools as the measurement of burden of disease, cost-effectiveness analysis, national health accounts, and standardized surveys. The rigorous application of these knowledge-related global public goods, coupled with excellent country-specific data, generated the evidence base to catalyze a major legislative reform in 2003 that will allow Mexico to offer publicly funded health insurance to the entire population.²⁵

This development is a clear example of how globalization can turn knowledge into an international public good that can then be brought to the domestic policy agenda to address a local problem. Such application, in turn, feeds back into the global pool of experience, thus, generating a process of shared learning among countries. Everyone stands to benefit if we have the wisdom to move beyond the false dilemmas between research and action and between the global and the national levels.

More generally, false dilemmas have clouded the debate on the risks and opportunities of globalization. Progress requires that we avoid either of 2 extremes: on the one hand, a sort of unipolar globalization based on exclusionary trade, military might, or cultural uniformity, which would undermine global security by fostering marginalization and resentment; on the other hand, a sort of multipolar isolationism based on protectionist trade barriers, internal oppression of dissent or xenophobic nationalism, which would also undermine global security by fostering poverty and human rights violations.

NEW GLOBAL HEALTH

The only way of avoiding either of these extremes is to develop a new model of globalization. In fact, the current debates on globalization are reminiscent of those that surrounded structural adjustment policies in the late 1980s. Then, like now, positions were highly polarized. A virtuous middle course was at that time proposed by Cornia, Jolly, and Stewart from the United Nations Children's Fund as "adjustment with a human face."²⁶ What we now need is globalization with a human face.

Indeed, globalization is (and has been for a long time) an inescapable reality. But we can devise and implement a process of global integration that both minimizes ill effects and protects those who are vulnerable to them and, at the same time, maximizes benefits and produces a fair distribution of these benefits. "Global construction," writes the Nobel laureate Amartya Sen, "is the needed response to global doubts."²⁷

Health may contribute to this pursuit because it has always been a key component of development. Thanks to economic research, we know that health is a contributing factor, at both the individual and population levels, for enhancing learning, increasing productivity, reducing inequity, promoting economic well-being and growth, preventing impoverishment, and reducing poverty, all of which strengthen national and global security.^{28,29}

Equitable access to high-quality services has also become central to the global movement for human rights. In this way, health can contribute to humanizing globalization because it involves those domains that unite all persons. Health-related processes, such as birth, disease, suffering, recovery, and death, define the basis for our common humanity.

THE 3 E'S OF GLOBAL HEALTH

In the search for new ways of acting in global health the authors suggest the promotion of 3 key elements, the 3 e's, that, in their essence, contain the idea of collaboration: exchange, evidence, and empathy.

Health systems around the world are facing unprecedented challenges; many of them, as the authors have just discussed, are related to globalization. The communications revolution provides the opportunity to *exchange* experiences about the ways to deal with such challenges.

To be informative, such exchange should be based on sound *evidence* about alternatives, so that we may build a solid knowledge of what really works and what does not. This point is why global public goods, such as methodological tools, comparative analysis, and systematic evidence, are so important.

But there is another value, *empathy*, which is that human characteristic that allows us to emotionally participate in a foreign reality, understand it, relate to it, and, in the end, value the core elements that make us all members of the human race.

As we engage in this process of renewal, we would do well to remember the words of Dr Martin Luther King Jr, who, 4 decades ago, wrote the following:

*"It really boils down to this: that all life is interrelated. We are all caught in an inescapable network of mutuality, tied into a single garment of destiny. Whatever affects one directly, affects all indirectly."*³⁰

In this rendition of interdependence lies the key to understanding and acting upon the complex realities that must be transformed if we are to realize the destiny of a more secure and prosperous world through better health for all.

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