

GLOBAL HEALTH THREATS of the 21st Century

The world is a healthier place today but major issues continue to confront humanity

THE world's health greatly improved in the past century. Major killers such as smallpox and polio have been eliminated or contained. A large part of the world's population has access to clean water and better sanitation. Medicine can cure or improve many conditions that crippled or killed people only decades ago.

Nonetheless, human health continues to confront serious threats, as demonstrated by the recent outbreak of the Ebola virus.

Pandemic Risk

Olga Jonas

AMONG policymakers who worry about it at all, optimists think a severe pandemic is a once-in-a-century event.

But before the onset of the 2014 Ebola epidemic, most people, including policymakers, seldom thought about pandemics (worldwide epidemics)—which explains why the risk of contagion is undermanaged and the Ebola crisis is here at all.

The global community continues to confront serious threats from infectious diseases, as demonstrated by the ongoing Ebola crisis. Ebola is still largely confined to three small west African countries, where the human, social, and economic damage is already high. If the crisis is not contained, damaging health and economic impacts would be replicated in other developing countries and even on a global scale in the case of a pandemic.

Contagion surprises and then worsens because the authorities and the public are unaware of the risk and implications of exponential spread. Even without a global spread, disease outbreaks can be very costly. They occur with unnerving frequency. Recent years saw Severe Acute Respiratory Syndrome (SARS) and H5N1 and H7N9 avian flu—and now we face the Ebola crisis. With current policies, one of these, or another pathogen, will cause a pandemic.

According to economist Lawrence Summers, awareness of pandemic risks is much too low, and “every child should learn about the 1918 flu pandemic,” when 100 million died, out of a world population of less than 2 billion people. Although a



recent World Bank report identified pandemics as one of the three major global risks—together with climate change and financial crises—most official discussions, reports, and communications take no notice of pandemic risk.

As a result, governments do little to reduce the risk, even though the measures are known and the costs are low—involving mostly strengthening veterinary and public health systems to detect and control outbreaks. After all, contagion does

not start in a vacuum. A staggering 2.3 billion animal-borne infections afflict people in developing countries every year.

Even without a global spread, disease outbreaks can be very costly.

Uncontrolled livestock diseases and exposure to pathogens from wildlife can periodically spawn widespread contagion because weak veterinary and human public health systems fail to stop outbreaks and allow them to spread.

Policies thus shape the onset of contagion. Chronic neglect of veterinary and human public health is both a disastrous policy choice and the prevailing practice in most countries and donor programs.

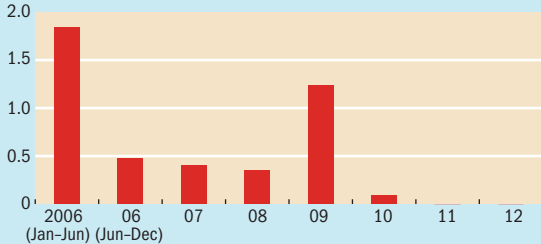
The economic imperative is compelling. Fear—which can spread faster than disease—changes consumer, business, and



Up and down

Funding to prevent pandemics rose during public concern about flu outbreaks in 2006 and 2009 and declined when public awareness fell.

(assistance to disease control in developing countries, billion dollars)



Sources: United Nations and World Bank (2010); and World Bank (2012).

Note: In a high-risk environment it would cost \$3.4 billion a year to bring public health and veterinary systems in 139 developing countries to disease control standards set by the World Health Organization and the World Organization for Animal Health.

government behavior. Though it was quickly contained in 2003, SARS cost \$54 billion, a toll driven by shocks to business and consumer confidence. The Ebola outbreak has severely disrupted trade, production, and health care in the most affected countries. In a pandemic, similar effects would cascade globally, with outcomes that the U.S. Department of Defense has characterized as the equivalent of a “global war.”

A 4.8 percent drop in global GDP is a realistic outcome in a severe flu pandemic, equivalent to \$3.6 trillion (based on global GDP in 2013). Even if the optimists are right that the probability of a pandemic is just 1 percent a year, the risk to the global economy is \$36 billion annually over a century. The world is spending about \$500 million now to prevent pandemics, so it’s a safe bet that \$36 billion a year would more than eliminate the risk. Spending up to that amount is warranted.

Fortunately, defenses against pathogens cost a fraction of this amount. A World Bank study (2012) found that spending \$3.4 billion annually would bring veterinary and human public health systems in all developing economies to performance standards set by the World Health Organization and the World Organization for Animal Health. The standards cover capacity for early detection, correct diagnosis, and prompt and effective control of contagion. (None of the countries that experienced the 2014 Ebola outbreak met these standards.) Robust public health systems would control pathogens that can cause pandemics as well as other, locally threatening, diseases.

The fragility of our defenses is illustrated by the responses to H5N1 and H1N1 influenza. Financing surged from 2006 to 2009, driven by awareness of risks, but then plummeted when policymakers stopped paying attention (see chart). Fluctuation in funding is not related to the level of the risk; risk rises when public health capacity degrades as funding dries up once the outbreak is over.

An effective infrastructure of defense requires steady support. Without robust public health systems in all countries, the dire prospect is that the still-expanding Ebola epidemic will not be the last, or the worst, crisis caused by late detection and ineffective control of a disease outbreak. ■

Olga Jonas is Economic Adviser at the World Bank.

References:

United Nations and World Bank, 2010, “Animal and Pandemic Influenza, a Framework for Sustaining Momentum” (New York and Washington).

World Bank, 2012, “People, Pathogens and Our Planet: The Economics of One Health” (Washington).

Environmental Hazards

Ian Parry

ALTHOUGH many environmental hazards threaten human health—including water contamination and toxic releases from factories and landfills—the two biggest concerns are air pollution and global warming, both caused in large part by fossil fuel combustion.

According to the World Health Organization (WHO, 2014), indoor and outdoor air pollution is responsible for 7 million premature deaths a year—one-eighth of global mortality. *Outdoor air pollution*, by itself, accounts for 2.7 million deaths and *indoor air pollution* 3.3 million, while 1 million deaths are caused by a combination of outdoor and indoor pollution. Pollution kills because people inhale particulates small enough to penetrate their lungs and bloodstream, increasing the prevalence, for example, of cardiovascular and respiratory conditions.



Nearly 90 percent of the outdoor pollution deaths occur in densely populated, low- and middle-income countries, particularly in the western Pacific and southeast Asia. The costs of health damage caused by outdoor air pollution vary considerably, depending on the country and type of fossil fuel being burned.

For example, according to IMF estimates (Parry and others, 2014), in 2010, health costs from coal use in China, which has high population exposure to air pollution and limited emission control, were \$11.70 per gigajoule (GJ) of energy—more than twice the world price of energy from coal. By contrast, in Australia, where population density is lower and fewer people are exposed to coal emissions, damages were 80 cents per GJ. Coal generally causes the most air pollution per unit of energy, followed by diesel, while natural gas and gasoline cause the least pollution.

Greater use of control technologies (such as those that filter sulfur dioxide in coal-fired plants) is likely to reduce future emission rates from energy production, lowering health risks. Offsetting this benefit, however, is increasing demand for energy in the developing world and urban population growth, which increase exposure to pollution.

Nearly all indoor air pollution deaths (from cooking and heating fuels) are in lower- and middle-income countries. These deaths might be reduced by promoting cleaner fuels (charcoal rather than coal, say), improved technology (such as better-ventilated stoves), and providing more households with electricity.

Properly reflecting environmental costs in energy prices is especially critical.

Fossil fuel combustion is also the main cause of rising atmospheric concentrations of heat-trapping gases, such as carbon dioxide. While the most important reason for mitigating greenhouse gas emissions is the extreme planetary risks—such as runaway warming, dramatic sea level rises from melting ice sheets, and reversal of the Gulf Stream (Nordhaus, 2013), *climate change* could affect human health at the local level in many ways.

According to the World Bank (2014), for example, weather-related events such as floods, droughts, and extreme temperatures have been rising, especially in Asia and the Caribbean, and are key sources of death (for example, through famines) as well as economic losses.

Health risks also include heat stress, spread of infectious diseases, declining food and water security, and aggravated air pollution. Of particular concern are health threats from a higher prevalence of diarrhea (affecting those with poor

sanitation), malaria (from mosquito migration in tropical regions), and malnutrition (from reduced living standards). Future risks might be mitigated, however, through improvements in income, sanitation, and health care; technology developments (such as malaria eradication); and adaptations (such as increased use of bed nets).

Taking action

Policies to reduce fossil fuel use can have large domestic health benefits and need not await global coordination. Improving environmental-health outcomes should be part of a broader strategy involving carbon pricing, clean technology investments and transfers to developing economies, and reduced subsidies for nongreen energy sources. Properly reflecting environmental costs in energy prices is especially critical and would, at a global level, reduce outdoor air pollution deaths from fossil fuels by an estimated 63 percent and energy-related carbon emissions by 23 percent. At the same time, actions to make energy prices reflect environmental costs would raise new revenue equal to 2.6 percent of GDP (Parry and others, 2014). ■

Ian Parry is Principal Environmental Fiscal Policy Expert in the IMF's Fiscal Affairs Department.

References:

Nordhaus, William, 2013, *The Climate Casino: Risk, Uncertainty, and Economics for a Warming World* (New Haven, Connecticut: Yale University Press).

Parry, Ian, Dirk Heine, Eliza Lis, and Shanjun Li, 2014, *Getting Energy Prices Right: From Principle to Practice* (Washington: International Monetary Fund).

World Bank, 2014, *World Development Report 2014: Risk and Opportunity* (Washington).

World Health Organization (WHO), 2014, *Public Health, Environmental and Social Determinants of Health* (Geneva).

Noncommunicable Diseases and Mental Disorders

Dan Chisholm and Nick Banatvala

MENTAL disorders and other noncommunicable diseases—mainly cardiovascular disease, diabetes, cancer, and chronic respiratory illness—claim many lives prematurely, cause massive ill health, and compromise human and economic development. In 2011, about 15 million people died prematurely (before age 70) from such diseases, 85 percent of them in low- and middle-income countries. Moreover, 80 percent of the years people live with disability are the result of noncommunicable diseases, especially mental and behavioral disorders. Yet the associated health problems can be prevented or mitigated.

The mounting burden imposed by noncommunicable diseases and mental health problems has many causes, including aging populations, rapid and unplanned urbanization, and lifestyle choices such as consumption of unhealthy food (partly because of irresponsible marketing and low risk awareness). Many people suffer from such diseases because of tobacco use and consumption of foods high in salt, fat, and sugar. And in urban areas changes in diet and physical activity, exposure to air pollution, and the widespread availability and consumption of alcohol are contributing factors. Overwhelmed by such forces, few governments, let alone individuals, are keeping



pace with the need for protective measures, such as smoke-free laws; regulations to discourage consumption of bad fats, salt, and sugar; policies to reduce harmful alcohol use; and better urban planning to promote physical activity. Simply put, the odds are often stacked against good lifestyle choices.

Noncommunicable diseases and mental disorders lead to increases in individual and household poverty and hinder social and economic development. About 100 million people in the world fall into poverty every year as a result of paying for health services they need. In low-resource countries, treatment can quickly drain household resources.

Businesses are hurt as well, through diminished labor supply and productivity. An analysis by the World Economic Forum (2008) estimated that Brazil, China, India, South Africa, and Russia—the biggest emerging market economies—lost more than 20 million productive life years to cardiovascular disease alone in 2000, a figure expected to rise by more than 50 percent by 2030. If prevention efforts remain unchanged, the cumulative global economic losses over the next two decades from noncommunicable diseases and mental disorders could amount to \$47 trillion. This exponential rise would hit emerging market economies increasingly hard as they grow (Bloom and others, 2011). A separate study estimated that the global cost of dementia—which is also expected to rise exponentially—was \$604 billion in 2010 (ADI, 2010).

Prevention and care for people with these diseases come with a price tag, but a relatively small one compared with the projected costs of inaction. For example, the average yearly cost of implementing the most cost-effective interventions for the prevention and control of cardiovascular disease in all developing economies is estimated at \$8 billion a year. However, the expected return on such an investment—a 10 percent reduction in the mortality rate from coronary artery disease and stroke—would reduce economic losses in low- and middle-income countries by about \$25 billion a year (WEF, 2011).

Current investments are particularly meager for mental health; many low- and middle-income countries allocate less

than 2 percent of their health budget to the treatment and prevention of mental disorders. As a result, an enormous number of people are not treated for mental disorders—severe or common.

Cost-effective, affordable, and feasible interventions include development of strategies to reduce tobacco and alcohol consumption, promotion of good lifestyle choices, measures to reduce dietary salt intake, treatment of common mental disorders in primary care, and management of people at risk for heart attack and stroke. Together, these efforts could reduce premature

The odds are often stacked against good lifestyle choices.

death rates from noncommunicable diseases by at least 25 percent at an annual cost of just a few dollars a person. Such efforts call for political commitment, strong multisectoral partnerships, and reorientation of health care systems toward chronic (as opposed to acute) disease prevention and control. ■

Dan Chisholm is Health Systems Adviser and Nick Banatvala is Senior Adviser in the Noncommunicable Disease and Mental Health Cluster of the World Health Organization. The authors' views do not necessarily represent the decisions, policy, or views of the World Health Organization.

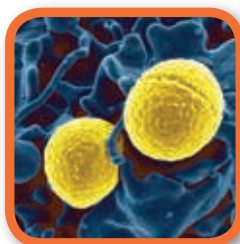
References:

- Alzheimer's Disease International (ADI), 2010, World Alzheimer Report 2010: The Global Economic Impact of Dementia (London).
- Bloom, David E., and others, 2011, "The Global Economic Burden of Noncommunicable Diseases" (Geneva: World Economic Forum).
- World Economic Forum (WEF), 2008, Working towards Wellness: The Business Rationale (Geneva).
- World Economic Forum (WEF), 2011, "From Burden to 'Best Buys': Reducing the Economic Impact of Non-Communicable Diseases in Low- and Middle-Income Countries (Geneva).

Antibiotic Resistance

Ramanan Laxminarayan

ANTIBIOTICS have transformed the practice of medicine. However, a massive scale-up in their use has resulted in an increase in drug-resistant strains of disease-causing bacteria and a global decline in antibiotic effectiveness. Rising incomes in low- and middle-income countries have generated huge demand for antibiotics, but high infection levels and uncontrolled antibiotic use in these countries are leading to treatment failures for people unable to afford expensive second-line drugs when antibiotics don't work. In high- and upper-middle-income countries, antibiotic use re-



mains high, particularly in hospitals, and resistance is driving up treatment costs.

Lack of access to antibiotics still kills more people than resistant bacteria, but antibiotics are not a substitute for good public health policy, vaccinations, clean water, and proper sanitation. The infectious disease mortality rates in low- and lower-middle-income countries today vastly exceed those in high-income countries before antibiotics were introduced in 1941.

Globally, most antibiotics are used in agriculture—added in low doses to animal feed for growth promotion and dis-