result of vested interests. For example, in 2004, the WHO released its Global Strategy on Diet, Physical Activity, and Health, which focused on the population-wide promotion of healthy diet and regular physical activity in an effort to reduce the growing global problem of obesity. Passing this strategy at the World Health Assembly proved difficult because of strong opposition from the food industry and from a number of WHO member states, including the United States. Although globalization has had many positive effects, one negative effect has been the growth in both developed and developing countries of well-financed lobbies that have aggressively promoted unhealthy dietary changes and increased consumption of alcohol and tobacco. Foreign direct investment in tobacco, beverage, and food products in developing countries reached $90.3 billion in 2010—a figure nearly 490 times greater than the $185 million spent during that year to address NCDs by bilateral funding agencies, the WHO, the World Bank, and all other sources of development assistance for health combined. Investment in curbing NCDs remains disproportionately low despite the WHO's 2008–2013 Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases.

The WHO estimates that 80% of all cases of cardiovascular disease and type 2 diabetes as well as 40% of all cancers can be prevented through healthier diets, increased physical activity, and avoidance of tobacco. These estimates mask large local variations. Although some evidence indicates that population-based measures can have some impact on these behaviors, it is sobering to note that increasing obesity levels have not been reversed in any population. Tobacco avoidance may be the most important and most difficult behavioral modification of all. In the twentieth century, 100 million people worldwide died of tobacco-related diseases; it is projected that more than 1 billion people will die of these diseases in the twenty-first century, with the vast majority of those deaths in developing countries. The WHO's 2003 Framework Convention on Tobacco Control represented a major advance, committing all of its signatories to a set of policy measures shown to reduce tobacco consumption. Today, ~80% of the world's 1 billion smokers live in low- and middle-income countries. If trends continue, tobacco-related deaths will increase to 8 million per year by 2030, with 80% of those deaths in low- and middle-income countries.

### MENTAL HEALTH

The WHO reports that some 450 million people worldwide are affected by mental, neurologic, or behavioral problems at any given time and that ~877,000 people die by suicide every year. Major depression is the leading cause of years lost to disability in the world today. One in four patients visiting a health service has at least one mental, neurologic, or behavioral disorder, but most of these disorders are neither diagnosed nor treated. Most low- and middle-income countries devote <1% of their health expenditures to mental health.

Increasingly effective therapies exist for many of the major causes of mental disorders. Effective treatments for many neurologic diseases, including seizure disorders, have long been available. One of the greatest barriers to delivery of such therapies is the paucity of skilled personnel. Most sub-Saharan African countries have only a handful of psychiatrists, for example; most of them practice in cities and are unavailable within the public sector or to patients living in poverty.

Among the few patients who are fortunate enough to see a psychiatrist or neurologist, fewer still are able to adhere to treatment regimens: several surveys of already diagnosed patients ostensibly receiving daily therapy have revealed that, among the poor, multiple barriers prevent patients from taking their medications as prescribed. In one study from Kenya, no patients being seen in an epilepsy clinic had therapeutic blood levels of anti-seizure medications, even though all had had these drugs prescribed. Moreover, many patients had no detectable blood levels of these agents. The same barriers that prevent the poor from having reliable access to insulin or ART prevent them from benefiting from antidepressant, antipsychotic, and antiepileptic agents. To alleviate this problem, some authorities are proposing the training of health workers to provide community-based adherence support, counseling services, and referrals for patients in need of mental health services. One such program instituted in Goa, India, used "lay" counselors and resulted in a significant reduction in symptoms of common mental disorders among the target population.

*World Mental Health: Problems and Priorities in Low-Income Countries* still offers a comprehensive analysis of the burden of mental, behavioral, and social problems in low-income countries and relates the mental health consequences of social forces such as violence, dislocation, poverty, and disenfranchisement of women to current economic, political, and environmental concerns. In the years since this report was published, however, a number of pilot projects designed to deliver community-based care to patients with chronic mental illness have been launched in settings as diverse as Goa, India; Banda Aceh, Indonesia; rural China; post-earthquake Haiti; and Fiji. Some of these programs have been school-based and have sought to link prevention to care.

## CONCLUSION: TOWARD A SCIENCE OF IMPLEMENTATION

Public health strategies draw largely on quantitative methods—epidemiology, biostatistics, and economics. Clinical practice, including the practice of internal medicine, draws on a rapidly expanding knowledge base but remains focused on individual patient care; clinical interventions are rarely population-based. But global health equity depends on avoiding the false debates of the past: neither public health nor clinical approaches alone are adequate to address the problems of global health. There is a long way to go before evidence-based internal medicine is applied effectively among the world's poor. Complex infectious diseases such as HIV/AIDS and TB have proved difficult but not impossible to manage; drug resistance and lack of effective health systems have complicated such work. Beyond what is usually termed "communicable diseases"—i.e., in the arena of chronic diseases such as cardiovascular disease and mental illness—global health is a nascent endeavor. Efforts to address any one of these problems in settings of great scarcity need to be integrated into broader efforts to strengthen failing health systems and alleviate the growing personnel crisis within these systems.

Such efforts must include the building of "platforms" for care delivery that are robust enough to incorporate new preventive, diagnostic, and therapeutic technologies rapidly in response to changes both in the burden of disease and in the needs not met by dominant paradigms and systems of health delivery. Academic medical centers have tried to address this "know–do" gap as new technologies are introduced and assessed through clinical trials, but the reach of these institutions into settings of poverty is limited in rich and poor countries alike. When such centers link their capacities effectively to the public institutions charged with the delivery of health care to the poor, great progress can be made.

For these reasons, scholarly work and practice in the field once known as "international health" and now often designated "global health equity" are changing rapidly. That work is still informed by the tension between clinical practice and population-based interventions, between analysis and action, and between prevention and care. Once metrics are refined, how might they inform efforts to lessen premature morbidity and mortality rates among the world's poor? As in the nineteenth century, human rights perspectives have proved helpful in turning attention to the problems of the destitute sick; such perspectives may also inform strategies for delivering care equitably.

A number of university hospitals are developing training programs for physicians with an interest in global health. In medical schools across the United States and in other wealthy countries, interest in global health has exploded. One study has shown that more than 25% of medical students take part in at least one global health experience prior to graduation. Half a century or even a decade ago, such high levels of interest would have been unimaginable.

An estimated 12 million people die each year simply because they live in poverty. An absolute majority of these premature deaths occur in Africa, with the poorer regions of Asia not far behind. Most of these deaths occur because the world's poorest do not have access to the fruits of science. They include deaths from vaccine-preventable illness, deaths during childbirth, deaths from infectious diseases that might be