Sustainable health: A new dimension of sustainability science

The traditional view of health in the context of economic development was that if a country gets its macroeconomics right, health improvement will follow. Empirical evidence that some countries with low per capita gross domestic product have life expectancies comparable with those in the richest countries and others with significant gross domestic product per capita but poor health outcomes has changed the paradigm to recognition that health is a significant contributing determinant of economic and social development (1–3). Some health challenges for developing countries are how to share in the benefits of continually evolving and advancing medical technologies, how to control costs yet increase access to basic services, how to define and provide basic health prevention and care services, and how to create sustainable programs that improve the health of their people. Other issues include how to balance resource allocations for prevention relative to treatment, whether for HIV/AIDS or the epidemic of obesity, as well as how to deal with the workforce issues that drain poor countries of their limited health care professionals. For the international community in general, the new challenge goes beyond how to contribute to pilot programs in health that provide drugs, vaccines, and preventive or health care services that work in a given place. It is about how to do so in a way that is ultimately able to engage the local and national populations and enable the programs to expand to a nationwide scale. Another critical concern is how successful programs can be sustainable over time.

In recent years, increasing interest in the scientific community has been emerging in how to use science to explore questions relating to sustainable development, contributing to and learning from efforts at problem-solving in the world. Presidents of the National Academy of Sciences have long committed the Academies to providing leadership in harnessing science and technology to solve global problems and foster sustainable development. There have been many efforts to encourage scientific study of sustainable energy resources, urbanization, protecting the ecosystem, slowing global warming, and protecting the biodiversity of the planet. Because of the diversity of approaches and the multidisciplinary nature of what is increasingly becoming known as sustainability science, the editors of PNAS recommended that a new section be created to give them a "home of their own" (4). With the recognition of the importance of health in economic development, in social and human development, and in equity between populations and countries, the leaders of the Academies asked PNAS to include appropriate articles on health within its Sustainability Science section.

This issue presents the initial public health papers accepted for inclusion in the Sustainability Science section of PNAS. They have been subjected to the same rigorous level of scientific peer review as all papers published in the journal. Two papers analyze multisectoral strategies to control major parasitic diseases of developing countries. The first of these papers, by Gürtler *et al.* (5), describes a successful program in rural villages of Argentina to create a sustainable program to control the triatomid bugs that transmit *Trypanosoma cruzi*, the parasite causing Chagas disease, following a previous program that ultimately was unable to be sustained because it did not adequately mobilize the community. The second paper, by Singer and de Castro (6), argues that sustainable control of schistosomiasis and other water-borne diseases will require organizational changes and institutional bridges to ensure sustainable surveillance, monitoring the health impact of development projects and bridging the gaps between control of veterinary and human health as well as between engineering and health institutions responsible for clean water and sanitation. A third article, by Reddy *et al.* (7), provides an analysis of critical factors predisposing to cardiovascular disease among industrial workers in India that reveals the critical importance of education in reducing tobacco use and hypertension and lowering the risks for cardiovascular disease. In the fourth of these articles, Bloom and Canning (8) examine the distribution in gains in health across countries and note that despite an accelerated trend in increasing life expectancy in most countries, there remains considerable across-country heterogeneity. They argue that this trend is not a simple process of convergence; instead, it requires the rapid transition of some high-mortality countries to low mortality, whereas other countries appear to be stalled below a threshold for that transition in a "mortality trap."

All four papers emphasize the importance of multisectoral approaches to providing sustainable solutions to complex health problems in developing countries—public health, medicine, engineering, education, and community engagement. It is precisely this requirement for multisectoral scientific analysis and engagement that justifies the inclusion of these papers in the new PNAS section on sustainability science.

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1. World Bank (1993) *World Development Report 1993: Investing in Health* (Oxford Univ Press, Oxford).
2. World Health Organization (2001) *Report on Macroeconomics and Health: Investing in Health for Economic Development* (WHO, Geneva).
3. Bloom DE, Canning D, Jamison DT (2004) *Finance and Development* 41:10–15.
4. Clark WC (2007) *Proc Natl Acad Sci USA* 104:1737–1738.
5. Gürtler RE, Kitron U, Cecere MC, Segura EL, Cohen JE (2007) *Proc Natl Acad Sci USA* 104:16194–16199.
6. Singer BH, de Castro MC (2007) *Proc Natl Acad Sci USA* 104:16038–16043.
7. Reddy KS, Prabhakaran D, Jeemon P, Thankappan KR, Joshi P, Chaturvedi V, Ramakrishnan L, Ahmed F (2007) *Proc Natl Acad Sci USA* 104:16263–16268.
8. Bloom DE, Canning D (2007) *Proc Natl Acad Sci USA* 104:16044–16049.