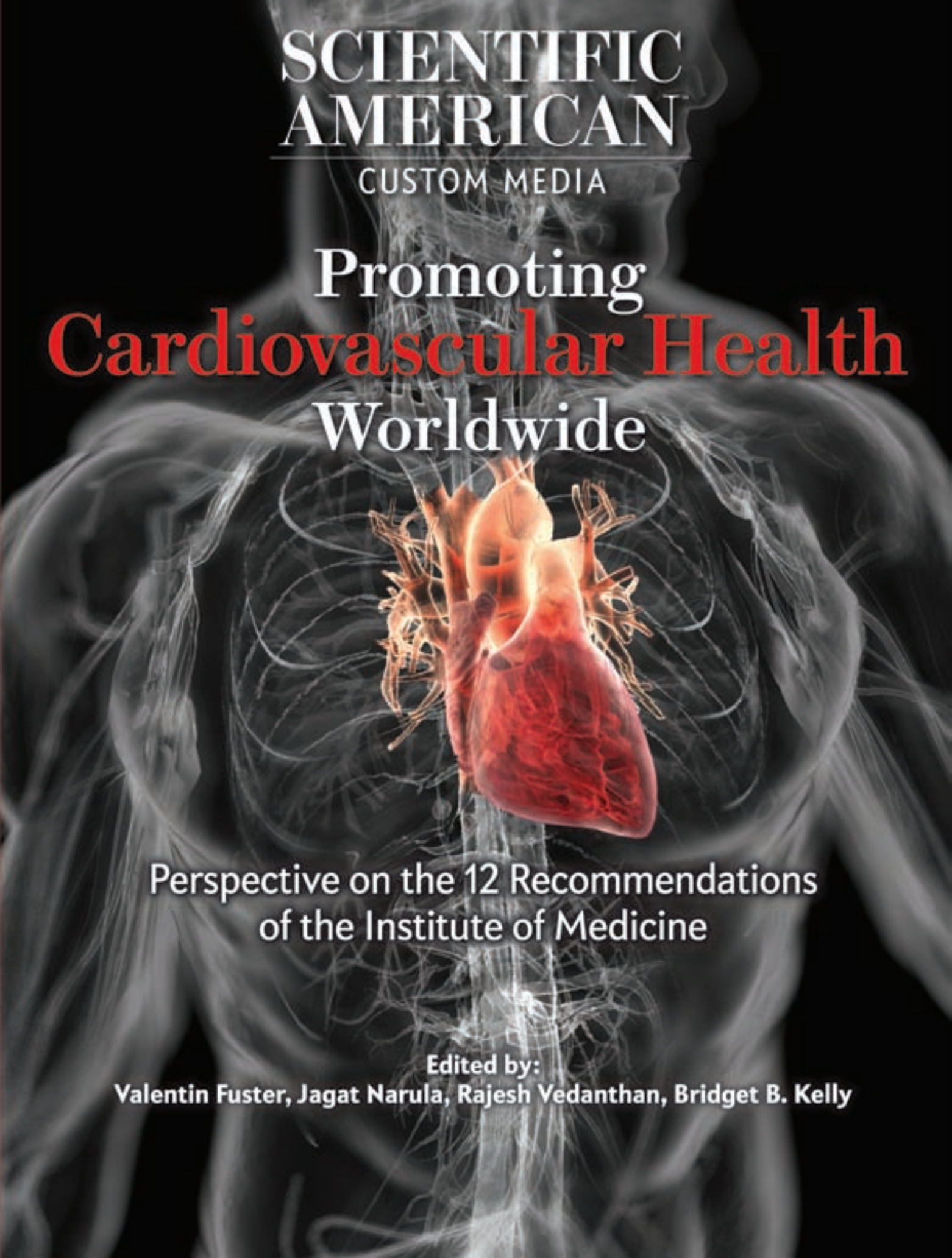




**SCIENTIFIC
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**Promoting
Cardiovascular Health
Worldwide**

**Perspective on the 12 Recommendations
of the Institute of Medicine**

Edited by:

Valentin Fuster, Jagat Narula, Rajesh Vedanthan, Bridget B. Kelly

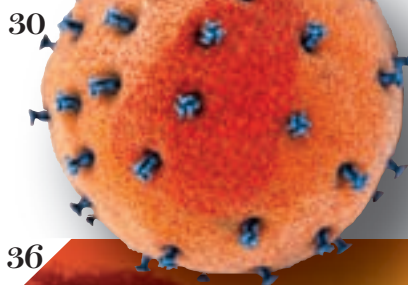


The Joseph and Vicky Safra Foundation
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for the advancement of cardiovascular
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Promoting Cardiovascular Health Worldwide

Edited by Valentin Fuster, Jagat Narula, Rajesh Vedanthan, Bridget B. Kelly

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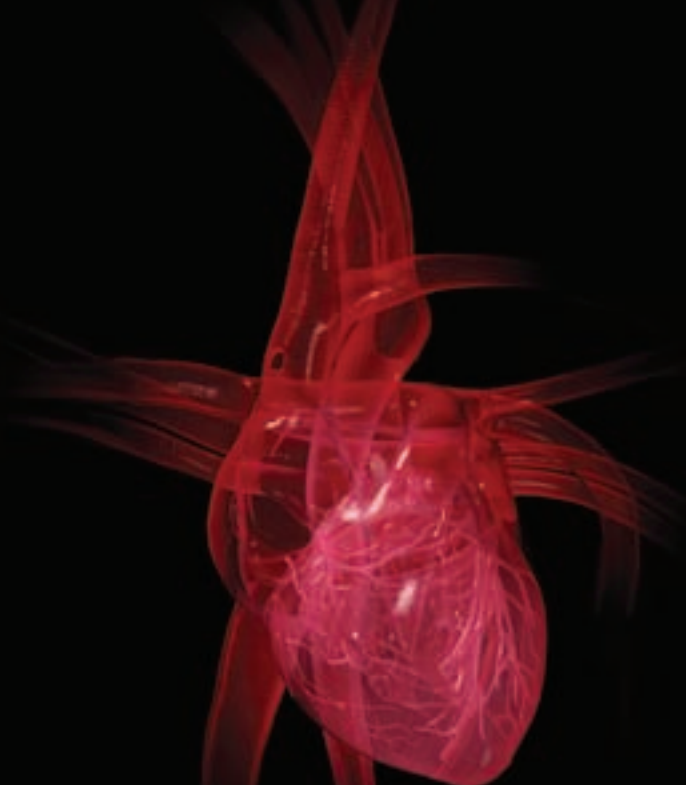
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PROMOTING GLOBAL CARDIOVASCULAR HEALTH: THE INSTITUTE OF MEDICINE RECOMMENDATIONS



Valentin Fuster, Rajesh Vedanthan, Bridget B. Kelly and Jagat Narula

Cardiovascular disease and related noncommunicable diseases were once considered a problem that only wealthy, industrialized nations faced. Together, they now rank as the leading cause of death across the globe. The vast majority of those deaths—more than 80 percent—occur in low- and middle-income countries. These diseases affect people from rural villages in India and Africa to small towns in Chile and major cities in the U.S., China, Europe—and everywhere in between. Beyond the human toll, there is also heavy economic impact: Heart attack, stroke, diabetes and other cardiovascular-related illness are extremely costly, straining both personal and national finances. This special issue, *Promoting Cardiovascular Health Worldwide*, explores the problem—and outlines the solutions.

The U.S. Institute of Medicine formed a committee to create a set of tangible recommendations that would catalyze and focus action around this important global health problem. The resulting report, *Promoting Cardiovascular Health in the Developing World*, was released in 2010. Funded by the U.S. National Heart, Lung and Blood Institute, it detailed the reasons behind the exponential growth in cardiovascular-related illnesses and the behaviors that contribute to them and outlined ways to reduce the global burden of these diseases. The recommendations highlighted a need for new tools, national policies and results-oriented programs. They also emphasized collaborations among governments, global health and development agencies and the international business community.

BARRIERS

ESSENTIAL FUNCTIONS

RECOMMENDATIONS

Lack of awareness



A

Building Priorities,
Advocacy
and Funding



1 Recognize Chronic Diseases as a Development Assistance Priority

Competing priorities for government/donors



2 Advocate for Chronic Diseases as a Funding Priority

Weak health systems



B

Policy and
Program
Implementation



3 Improve National Coordination for Chronic Diseases

4 Implement Policies to Promote Cardiovascular Health

Conflicting obligations in private sector



5 Include Chronic Diseases in Health Systems Strengthening

6 Improve Access to CVD Diagnostics, Medicines and Technologies

7 Collaborate to Improve Diet

Insufficient data on effectiveness



C

Data
Management
and Research



8 Improve Local Data

9 Define Resource Needs

10 Research to Assess What Works in Different Settings

Inadequate coordination among stakeholders



D

Global
Coordination
and Reporting



11 Disseminate Knowledge and Innovation among Similar Countries

12 Report on Global Progress

The following year, in September 2011, the United Nations General Assembly convened a high level meeting on noncommunicable diseases, placing the issue squarely on the world's agenda and demanding immediate action.

In this issue, some of the world's foremost authorities on cardiovascular disease elaborate on the Institute of Medicine's 12 recommendations to address this massive, worldwide problem. We provide concrete examples of programs that are working effectively on the ground, reflect on global progress made since 2010—and define a way forward.

THE GLOBAL CARDIOVASCULAR EPIDEMIC

There are myriad factors feeding the current cardiovascular disease (CVD) epidemic, including heredity, lifestyle choices and the impact of other illnesses. Genetic predisposition, high blood pressure, high cholesterol and diabetes are all contributors, along with a high-fat, heavily salted diet and limited physical activity as well as smoking and other tobacco use.

Although preventing and treating these diseases appears straightforward, the reality is much more complex. Each risk factor may be exacerbated by any of a number of other issues: poverty, war, social inequity, lack of education, culturally based or traditional medicine and limited access to health care, among others. And even in the best of circumstances, behavioral changes are difficult to make.

There is a surprising lack of awareness regarding the scope of the problem among large, potential international donors. This limits the financial and human resources available for prevention and control efforts. Meanwhile, a host of other priorities compete for both government and donor attention, with some people expressing concern that other important health initiatives might suffer if greater attention were paid to noncommunicable diseases. Action is further complicated by uncertainty about the ability to implement efficient programs in developing countries—where limited health systems are currently unable to effectively treat, manage or prevent these illnesses.

Over the last decades, a steady stream of international declarations, campaigns and conferences have spread the word that CVD is reaching epic proportions in developing countries. However, chronic diseases remain the least-funded area in global health. Together, they received less than 3 percent of all health aid from 2001 through 2007, although there have been nascent attempts by philanthropic organizations and private foundations to help bridge part of the funding gap.

Ultimately, success or failure in controlling this suite of cardiovascular-related diseases will depend on coordinated public and political resolve across the globe. That will, first and foremost, require leadership. Strong advocates must establish clear priorities, encouraging proactive government policies and eliciting adequate funding for programs that are appropriate to each region. That can only be assured by conducting locally relevant research. In many cases, health departments will have to upgrade their health record systems to track patient health—and gather nationwide disease data.

Here, we build on the Institute of Medicine's recommendations, highlighting programs from around the world that are successfully addressing aspects of this global epidemic.

BUILDING PRIORITIES, ADVOCACY AND FUNDING

RECOMMENDATION 1

Recognize Chronic Diseases as a Development Assistance Priority Epidemics without Borders

Although cardiovascular and related chronic diseases are starting to be recognized as part of the global health agenda, there is still relatively little investment from international development assistance agencies and the global health donor community; in many nations, these diseases are still largely ignored. Many developing countries lack well-staffed, well-equipped primary care facilities and need technical assistance to implement treatment and prevention programs, evaluate their effectiveness and find the funds to pay for them. Mobilizing support across the global health arena is critical. Gregory Paton and his colleagues describe the challenges involved in making these diseases a priority, and provide a vision for the future based on successful models that have germinated since the U.N. Summit on Noncommunicable Diseases.

RECOMMENDATION 2

Advocate for Chronic Diseases as a Funding Priority

Funding the Fight against Chronic Diseases

Without powerful advocates, these diseases will not get the attention or the funding they need. This article notes that garnering adequate support will require a strong coalition of international and local NGOs and advocacy groups along with patients and their families. Together they must raise the alarm about the ever-growing prevalence of cardiovascular diseases, the human toll and economic impact as well as the effectiveness of prevention and treatment programs. Their targets: private foundations, charities, governmental agencies and individual donors.

In this article, Valentin Fuster provides examples where governments, development assistance agencies and other donors have been convinced to invest in prevention and control despite cash-strapped health budgets and many competing priorities.

POLICY AND PROGRAM IMPLEMENTATION

RECOMMENDATION 3

Improve National Coordination for Chronic Diseases Kenyans Come Together against Chronic Diseases

Chronic diseases need representation at the highest level of government. Many countries have a strong precedent, having created HIV/AIDS commissions that report directly to a high-level cabinet member. This structure allows for coordination with key agencies—health, agriculture, education and transportation—as well as direct communication with legislators to ensure inclusion in public policy.

But an entire gamut of coordinated, sustained initiatives will be needed to promote global cardiovascular health, according to Gerald Yonga, not least of which are screening, early treatment and community-level education that empowers healthy individual behavior. The author explores Kenya's integrated approach in this article.

RECOMMENDATION 4
Implement Policies to Promote Cardiovascular Health
How Policy Makers Can Advance
Cardiovascular Health

To promote cardiovascular health and to reduce risk, both national and local governments should implement proven policies that are carefully tailored to individual communities' needs. Policy makers may consider a range of regulations, incentives and voluntary measures, such as raising tobacco taxes, placing restrictions on the marketing of certain foods to children, strengthening school physical education requirements, imposing subsidies or import duties on certain foods and enacting clinical guidelines. Input from both citizens and industry can help determine a working balance of the most effective measures. In this article, Sonia Angell and her colleagues summarize a range of approaches.

RECOMMENDATION 5
Include Chronic Diseases
in Health Systems Strengthening
Echoing the Lessons of HIV

The rising burden of cardiovascular disease requires stronger health care systems, and as countries ramp up, they should plan for improved prevention, diagnosis and management. That includes recruiting public health leaders who understand chronic disease management—and training a medical workforce capable of treating these conditions. It also means integrating CVD within primary health care services as well as within existing infectious disease and maternal-child health programs.

This article by Miriam Rabkin and co-authors describes the successes of the global HIV response and the ways those lessons can be applied to the fight against chronic diseases.

RECOMMENDATION 6
Improve Access to CVD Diagnostics,
Medicines and Technologies
Delivering Care Where It's Needed

It will be impossible to effectively fight this war against chronic disease without proper weapons: affordable medicines, diagnostic equipment, new technologies and more. These can be made widely available with leadership from government officials and consultation with experts on health care systems and financing. It will also require partnerships between development agencies, insurance companies and cardiovascular disease associations as well as firms that manufacture pharmaceuticals, medical devices and software. This article by K. Srinath Reddy and his co-authors includes case studies of successful programs and collaborations.

RECOMMENDATION 7
Collaborate to Improve Diet
Get Down to Business

We need international strategies to encourage healthier eating habits in both adults and children that lower consumption of salt, sugar and high-fat foods. In addition to public education programs to change personal behavior, healthier food choices must be available within the food supply chain. Jose Saavedra notes that this will require collaboration across wide

arenas, from the public health community and international agencies to the entire food industry, including such players as the International Food and Beverage Alliance, multinational and local food manufacturers, restaurants and retailers.

DATA MANAGEMENT AND RESEARCH

RECOMMENDATION 8
Improve Local Data
Collecting Reliable Data

Current data is essential to controlling chronic diseases. However, many countries lack the information gathering capabilities needed to inform local priorities and to measure the impact of policies and programs. Globally, governments should create and maintain robust health monitoring systems to quantify cardiovascular disease risk and the prevalence of disease as well as the number of deaths it causes in local populations, say C. James Hospedales and his co-authors—systems created with financial and technical assistance from WHO, the U.S. Centers for Disease Control and Prevention, USAID and other experts. Recommendation 8 details efforts to improve monitoring in different parts of the world.

RECOMMENDATION 9
Define Resource Needs
What Will It Take to Do More?

Planning and taking effective action requires knowing, at the country level, the areas of greatest need, the existing capacity, the available resources and what it would cost to do more to address cardiovascular disease and other chronic diseases. Rachel A. Nugent and Celina Gorre discuss what information is needed to better understand these elements, and how case studies in a few diverse countries could pave the way to do these kinds of analyses more broadly.

RECOMMENDATION 10
Research to Assess What Works in Different Settings
One Size Does Not Fit All

Programs that successfully control heart disease, stroke and other CVD-related illnesses in wealthy countries do not always translate to low- or middle-income countries. On-the-ground research is critical to ensure that interventions are appropriate to the local setting and culture. Cristina Rabadán-Diehl and colleagues describe several efforts to spearhead this kind of research through collaborations between funders and public health agencies in partnership with local governments, NGOs, universities and communities. The successful models they describe are also aimed at improving the research capacity for cardiovascular diseases in developing countries.

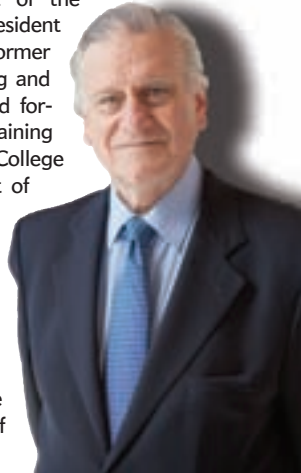
GLOBAL COORDINATION AND REPORTING

RECOMMENDATION 11
Disseminate Knowledge and Innovation
among Similar Countries
Share What Works

With good communication networks, countries are able to share knowledge, innovations and technical capacity with other nations on how to make intervention approaches work in different local environments. Regional reporting is also needed to inform appropriate action to address cardiovascular

Valentin Fuster serves The Mount Sinai Hospital as director of Mount Sinai Heart, the Zena and Michael A. Wiener Cardiovascular Institute and the Marie-Josée and Henry R. Kravis Center for Cardiovascular Health. He is the Richard Gorlin, MD/Heart Research Foundation Professor at the Icahn School of Medicine at Mount Sinai. He is now the general director of the Centro Nacional de Investigaciones Cardiovasculares Carlos III in Madrid, Spain.

Valentin Fuster is also the editor in chief of the *Journal of the American College of Cardiology*. His many distinctions include past president of the American Heart Association, past president of the World Heart Federation, former member of the National Heart, Lung and Blood Institute Advisory Council and former chairman of the Fellowship Training Directors Program of the American College of Cardiology. He was the recipient of the 2013 International Impact Award of the American Heart Association. Thirty distinguished universities throughout the world have granted him honorary doctorate degrees. A member of the Institute of Medicine of the National Academy of Sciences, he serves as chair of the Committee on Preventing the Global Epidemic of Cardiovascular Diseases.



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and other chronic diseases. That information also helps build international support for both regional and national solutions. Efforts to maximize growing efforts to disseminate CVD information and innovation are described by authors Shanthi Mendis, C. James Hospedales and Jagat Narula.

RECOMMENDATION 12 Report on Global Progress The WHO Monitoring Model

Charting progress in a consistent, standardized way is key to moving ahead. It will help the global community define goals, coordinate efforts, communicate shared messages, take decisive action and know whether these efforts are effectively reducing the burden of chronic disease. On a local level, it will help governments identify shortfalls in resources and recognize needed policy changes. Shanthi Mendis and Oleg Chestnov describe the global monitoring framework embedded within WHO's noncommunicable disease programs—and lay out the benchmarks that have been set to prevent and control noncommunicable diseases.

Given the massive, growing burden of heart disease, stroke, diabetes and other related illness, promoting cardiovascular health is now critical—and eminently possible. But it will require long-standing commitment, strong leadership and collaboration based on well-defined goals, with targeted investment of financial, technical and human resources. Given that many noncommunicable diseases share the same suite of risk factors (tobacco use, physical inactivity and poor diet) and are impacted by similar social factors (poverty, access to medicines and urbanization), an integrated approach will yield the greatest benefits.

Specific recommendations and guidance have been described in the Institute of Medicine report; this special issue provides concrete examples of successful programs in communities around the world. We hope that it offers a road map for improved global cardiovascular health.

Any opinions herein are those of the authors alone and should not be construed as representing the views of the Institute of Medicine of the U.S. National Academies.

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Epidemics without Borders

Cardiovascular and Other Chronic Diseases: The Next Development Assistance Priority

— AUTHORS —

Gregory Paton, K. Srinath Reddy and Kiti Kajana

It's not every day that presidents and heads of state fly to New York City to discuss a virus. It was September 2001, and governments, charities, corporations and activists took over several city blocks to galvanize action against further spread of the HIV/AIDS virus. Addressing a United Nations Special Session, Nigerian President Olusegun Obasanjo captured the sense of urgency, warning fellow leaders that, "the prospect of extinction of the entire population of a continent looms larger and larger." At the time, 36 million people were living with HIV/AIDS—25 million in sub-Saharan Africa alone.

News of the meeting was broadcast around the world, showing images of advocates holding quilts in honor of deceased loved ones, celebrities wearing red ribbons and philanthropists pledging billions in aid to assist AIDS-ravaged countries. Images of the devastating impact of the virus went viral—along with growing feelings of injustice that people who lived in poor countries lacked access to lifesaving medicines available in the Western world.

Fortunately, politicians listened. A decade later, nearly 10 million people are alive and healthy, thanks to antiretroviral drugs largely funded by the United States and other Western governments. These medicines transformed AIDS from a death sentence into a chronic, treatable condition, and millions avoided contracting the virus through widespread prevention and education programs. The global solidarity shown in the fight against AIDS sparked dramatic progress and became a

landmark achievement in international public health.

A NEW THREAT

The fight against AIDS, as well as tuberculosis and other infectious disease, is far from over—in 2012, three quarters of AIDS cases in low-income countries went untreated and tuberculosis caused 1.3 million deaths. But research by the World Health Organization (WHO) and leading epidemiologists has identified another global epidemic. This one is not contagious, caused instead by a combination of lifestyle and environmental factors. This groundswell of "noncommunicable disease" (NCD) cases—heart disease, stroke, diabetes, cancers and respiratory diseases—all share common risk factors, including a fatty, salty, sugary diet; a sedentary lifestyle; smoking and chewing tobacco; and drinking too much alcohol.

Ten years after the HIV/AIDS meeting in New York, governments recognized that this new crisis warranted a second United Nations health summit. Thirty-five heads of state attended, plus 120 ministers of health and representatives from a host of nonprofit organizations—but all returned home with empty pockets. Some countries questioned the point of the meeting, asking behind closed doors whether weeks of diplomatic negotiations and the voluntary "political declaration" they passed would yield tangible results. Countries were unable to agree on targets for reducing these diseases, and



“The failure to act globally would create a catastrophe,

one that we know is coming

and have the power to prevent.”

without significant funding from governments or philanthropists, it would be impossible to turn words into action. The media was skeptical. In their reporting, *The Economist* wrote, “So far, the world’s response has been to have meetings.”

But up until then, these diseases had essentially been neglected by governments, international health organizations and aid organizations. Despite any shortcomings, the summit placed the issue squarely on the table. And people did take notice: A rally organized by the NCD Action Network (a coalition of young health workers, students and concerned citizens) greeted heads of state with megaphones and banners demanding increased access to medicines, action against tobacco companies, and other local and global measures. Their overall message: NCDs are a matter of social justice.

As politicians and ministers flew out of New York, one point was undisputed. They were not doing enough to address these health conditions at home, and almost nothing to encourage cooperation beyond their own borders.

FROM MYTHS TO ACTION

Although no one expected one meeting to change the world overnight, the lack of international and domestic commitment is something governments can no longer ignore. Together, heart disease and other noncommunicable diseases kill nearly 36 million people each year. Four fifths of those deaths occur in low-income countries. Contrary to common belief, these diseases do not affect only the elderly; about nine million sufferers don’t live to see their 60th birthday.

For some, vulnerability begins in the womb. Infants who are malnourished in utero and born at low birthweight come into the world with heightened odds of developing heart disease and diabetes later in life, according to a 2010 study published in *BioMed Central Public Health*.

These diseases were once highly common only in wealthy

countries. But over the last decades, rural dwellers have streamed off the land into rapidly industrializing cities, with new, low-income urban communities across the globe adopting unhealthy lifestyles. It’s one of the driving forces behind this global epidemic. New evidence is emerging that the poorest members of society are most at risk.

Another myth is that Western countries haven’t made progress against these conditions. The combination of prevention and treatment over the last 20 years is paying off in places like Finland, where deaths from heart disease have dropped by 80 percent, largely because of healthy lifestyle changes.

IT IS ABOUT THE ECONOMY

The rapid rise of the health burden of chronic diseases is compelling on its own, but economic development is another reason for donor governments, along with philanthropic and international organizations to shift some of their efforts to global noncommunicable diseases. A recent study led by David Bloom, a professor at Harvard School of Public Health, found that the cumulative price tag for heart disease and other noncommunicable diseases in developing countries could surpass \$7 trillion by 2025.

That study was commissioned by the World Economic Forum (WEF), a nonprofit organization that engages the world’s leading business and political leaders on key issues. Another WEF study unearthed equally shocking statistics: Brazil, China, India and the Russian Federation currently lose more than 20 million productive life years annually to these diseases. In an increasingly interconnected global economy, productivity losses of this magnitude reverberate far beyond individual borders. In a forum survey, Fortune 500 companies identified NCDs among the top global threats to economic growth.

With effective solutions, the fight against HIV/AIDS and other infectious diseases made dramatic gains. Similarly, there are known effective solutions to reduce the burden of chronic diseases, but commitment is needed to implement them. The inventor of the first oral polio vaccine, Albert Sabin, said that a vaccine that sits on the shelf is useless. Not all interventions are as simple as vaccinating children. But if fully implemented, cardiovascular disease interventions could avert some three million premature deaths a year in low- and middle-income countries—and save billions of dollars in treatment costs and lost productivity.

AID THAT SUPPORTS HEALTH FOR ALL

There is intense competition over the \$28 billion that high-income governments and philanthropists donate each year to combat disease in developing nations. One pressure on how that money is spent is the need to find quick-win initiatives like vaccine programs where governments and organizations can easily demonstrate short-term results to taxpayers and sponsors.

While demonstrating success is crucial, effective aid also needs to finance change that benefits every patient who seeks health services. That means building a strong health system



U.N. Secretary General Ban Ki-moon and WHO Director General Margaret Chan at the September 2011 U.N. Summit on Noncommunicable Diseases.

with well-trained health care workers, readily available primary care and a monitoring system that reveals what's happening on the ground, quantifying the burden of disease. All are crucial components of a coordinated response. But revamping a nation's health care system is a costly, long-term investment that many donors aren't willing to sign on for.

Primary care centers in rural settings suffer the most, lacking basic equipment like blood pressure cuffs, heart and blood pressure medicines and needed staff. Such centers are a community's first line of defense, not only offering screening, diagnosis and health counseling, but early treatment that will prevent future complications—or death—so creating and supporting these facilities is key.

In these difficult economic times, it is understandable that Western governments may have difficulty prioritizing noncommunicable diseases within their international health agendas. But if some part of the \$28 billion they spend each year fighting disease in developing countries builds sustainable health systems, huge gains will be made in the coming years.

ASSISTANCE BEYOND THE HEALTH SECTOR

Several years ago, health and development organizations (including WHO) began focusing efforts beyond the health sector, recognizing that there were wider issues driving the exponential rise in chronic diseases. Among them were food systems, migration patterns, growing urban slums and increased tobacco use. The health system is left to pick up the pieces and absorb high treatment costs, becoming a victim to policies outside its control. In 2013, at the 66th World Health Assembly in Geneva, health ministers agreed on actions that would, if properly implemented and monitored, cut early deaths from noncommunicable diseases by 25 percent. But trying to lower epidemic levels of heart disease, stroke, obesity and diabetes without proper policies in place to prevent them is akin to patching a hole in a pipe with infinite leaks. No amount of financial aid will stop the endless flow of patients created by weak policies on tobacco, unhealthy food and exercise—and their huge effect on health systems and the economy.

This raises an important question: How much impact will U.N. goals forged in Geneva bring, when



...it “sometimes takes pressure from advocates and concerned citizens for governments to take action.”

at home some countries have not established even basic health policy measures? At the 2011 Summit on Noncommunicable Diseases, all 194 U.N. members promised to develop national NCD action plans by January 2013, but the date passed with little attention to who had met this commitment.

The focus of external health assistance needs to continue to expand beyond health services. It also must provide technical cooperation and policy support that, working with strong national leadership, will result in countries enacting policies that nurture healthier populations, with fewer sick people for hospitals to treat. Enacting and implementing policy measures that impact cardiovascular diseases can cost less money than individual interventions or changes to the health system. Tax hikes on tobacco, alcohol and unhealthy foods are a great example: They drive down consumption while raising cash for health services. Modifying existing initiatives is also relatively easy and less costly—for example, adding a quit-smoking component to a tuberculosis program.

A huge roadblock to progress is the fact that health ministers hold limited influence compared with their counterparts in trade, agriculture, transportation and finance—and vested interests wield immense power. Trying to enact health policies that negatively impact local incomes or corporate profits—even when those measures will save countless lives—are difficult, if not impossible to push through.

Tobacco is a case in point. By 2014, 177 nations had ratified the WHO Framework Convention on Tobacco Control, the world's first

JUST THE FACTS

Some 275 million people across India use tobacco, with over 1 million tobacco-related deaths each year.



The World Health Organization has identified a set of “best-buy” interventions that, based on the available evidence, are likely to be cost-effective and feasible to implement within the constraints of local health systems in low- and middle-income countries.

RISK FACTOR/DISEASE	INTERVENTIONS
Tobacco use	• Tax increases • Smoke-free indoor workplaces and public places • Health information and warnings • Bans on tobacco advertising, promotion and sponsorship
Harmful alcohol use	• Tax increases • Restricted access to retail alcohol • Bans on alcohol advertising
Unhealthy diet and physical inactivity	• Reduced salt intake in food • Replacement of trans fat with polyunsaturated fat • Public awareness through mass media on diet and physical activity
Cardiovascular disease and diabetes	• Counselling and multidrug therapy for people with a high risk of developing heart attacks and strokes (including those with established CVD) • Treatment of heart attacks with aspirin

global public health and corporate accountability treaty. They committed to reducing tobacco use by raising taxes on tobacco products and banning advertising, creating smoke-free public spaces and workplaces, publicizing health warnings and preventing industry interference in health policies.

Guidelines require signatories to treat the industry differently from others because tobacco is perhaps the only legally available consumer product that kills people when used as intended: It kills someone every six seconds. But global tobacco lobbies exert powerful influence. In India, industry pressure successfully delayed implementation of pictorial warnings on tobacco products for two years. The government ultimately weakened and reduced the size of those warnings. Some 275 million Indians use tobacco, with over one million tobacco-related deaths each year.

In Uganda, a proposed tax increase on cigarettes ignited a huge industry outcry, although levies in neighboring countries are far higher. At the end of 2013, no final decision had been made.

A 2008 WHO report calculated that the world’s governments collect 500 times more money from tobacco taxes each year than they spend trying to curb use. Meanwhile, governments often accept money from the industry under the corporate “social responsibility” umbrella. “These policy makers need to realize how the industry manipulates the system to interfere with public health policy—and ‘charitable donations,’ which only serve to open doors for the industry to expand their businesses, provide legitimacy to their actions and block effective tobacco control policies,” said Ehsan Latif, director of tobacco control at the International Union Against Tuberculosis and Lung Disease. An example: In 2004, tobacco manufacturers spent seven million Kenyan shillings (about \$90,000) on a luxurious “workshop” in Mombasa for members of parliament in an attempt to weaken their Tobacco Control Act.

International business interests also come into play. For 13 years, Samoa was denied entrance into the World Trade Orga-

nization (WTO), in part because they held a firm import ban on “turkey tails.” Turkey tails are poor quality, high-fat offcuts meat sold mainly to Third World markets. Only when Samoa lifted the ban in 2011 were they admitted to WTO. Nick Wilson, an expert on the health of Pacific nations, called the move “highly problematic” in the Samoan press. “From a public health perspective the decision to allow turkey tails...will fuel the epidemics of obesity, diabetes and cardiovascular disease that are hitting Pacific Island nations,” he said.

ASSISTANCE IN BUILDING LOCAL KNOWLEDGE

Another way that donor assistance can help is by supporting collaborative research. To date, there have been few long-term studies of these diseases and interventions to address them in developing nations. To counter that, institutions from high-income countries are partnering with public health agencies and university health departments, collaborating on first-class research.

One such study is helping diagnose children with rheumatic heart disease in Uganda. Without antibiotics, strep throat can progress to rheumatic fever, damaging heart valves. Cardiologists from Children’s National Medical Center, in partnership with the World Heart Federation, ran echocardiograms on some 5,000 children. “What we found is that there were many children who had clinically silent RHD [rheumatic heart disease], which would have gone undetected without an echocardiogram,” said Andrea Beaton, the study’s lead author. This type of screening proved to be three times more effective than a normal examination with a stethoscope. Rheumatic fever affects more than 15 million people, mostly in poor countries.

When establishing these partnerships, Western researchers need to consider whether their protocol or technology will work in small, remote villages in Asia or Africa or Latin America—places that may be fairly inaccessible, may lack electricity and refrigeration or may have strict religious or cultural traditions. They also must make sure to translate their findings in



an understandable, accessible way for health ministers and other policy makers.

And funding must be targeted. Large international nonprofits and philanthropists must ensure that the billions they spend on health projects each year include screening and treatment for coronary heart disease and other NCDs.

GLOBAL SUPPORT—AND LOCAL COMMITMENT

Change must begin at home. A commitment will be more likely from donors and international organizations—and the resources will go further—if that commitment is paired with national commitment in low- and middle-income countries. Despite limited resources, governments must prioritize the health of their citizens. Achieving that goal sometimes takes pressure from advocates and concerned citizens that prods governments to take action. The average citizen suffering from heart disease may be unaware of commitments and targets created in New York and Geneva, but they do know what is happening in their own countries. The role of national patient groups and activists is critical in forcing politicians to translate rhetoric and resolutions into services.

Those efforts sometimes come at a price. The public protests that characterized the AIDS movement sparked action—

but persecution of people living with HIV/AIDS became widespread and remains a major challenge in some countries today. Likewise, the stigma associated with cardiovascular disease and diabetes has prevented many from going public and making their case to politicians.

Without advocacy and partnerships, voluntary international commitments may be little more than paper tigers, never becoming high priority domestic issues. For example, pressure from advocates and patients prompted Uganda's elected officials to create the Parliamentary Forum on Noncommunicable Diseases. In 2012, the forum wrote, "Uganda faces a real threat of an epidemic of NCDs within the next few years if immediate practical steps are not taken to reverse this dangerous trend." The forum characterized these stigmatized diseases as "silent killers," hidden because they are considered by many to be "some kind of witchery." They noted that the only way to avoid overstressing already strained health systems is prevention—and education.

Toward that end, the Uganda NCD Alliance, a national coalition of groups, offers integrated services to patients. One initiative sends volunteers, many of whom live with these conditions, into villages. They train health workers to educate community members and counter the common myths that prevent people from seeking treatment. There is also a global NCD Alliance that unites more than 2,000 organizations in the fight against noncommunicable diseases.

In his work at the Uganda Cancer Institute, Uganda NCD Alliance Chair Jackson Orem has demonstrated that millions of lives could be saved if doctors, governments and medical companies work together to facilitate affordable access to the latest technologies and medicines.

Across the globe, advocacy groups are pushing politicians to draft new laws and increase government health budgets. But for now, the political leadership shown by Uganda's elected officials remains the exception rather than the rule.

TOWARD A HEALTHY FUTURE

These health problems are far from solved in the U.S., Europe and other Western countries. But the failure to act globally would create a catastrophe, one that we know is coming and have the power to prevent. Let's start by creating a sense of urgency and pushing our governments to protect people from the tragedy of shortened lives and disability. Noncommunicable diseases have gone global, and looking beyond our own borders is the right course of action.

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Funding the Fight against Chronic Diseases

*Philanthropic organizations, private foundations
and individuals are making a difference*

AUTHOR

Valentin Fuster

I n 2011, some of those who attended the United Nations Summit on the growing global specter of chronic noncommunicable diseases (NCDs) left feeling skeptical: Some countries questioned, behind closed doors, if the voluntary declaration issued by governments at the close of the meeting would yield tangible results. The declaration had affirmed these diseases as a major challenge to development in the 21st century, and called for an urgent response from member states and the U.N. system with increased attention and resources. But there was real reason for that skepticism: In reality, without significant funding to turn words into action, it would be impossible to fight this global epidemic.

For a decade prior to the summit, efforts to get chronic diseases on the world agenda fell flat, and despite skyrocketing incidence, these diseases remained largely neglected by governments, international health organizations and aid organizations. Could we expect that, in just 10 years, a sudden awareness of the huge threat they posed would open the floodgates and bring in significant funding? The obvious answer is no. But the summit brought awareness and has triggered both action and greater advocacy.

There is another big opportunity looming. With the current U.N. Millennium Development Goals expiring in 2015, there is powerful jockeying to determine which

priorities will receive aid. The current goals galvanized unprecedented efforts to meet the needs of the world's poorest people, with three out of eight of those goals focused on health. A barrage of competing interests is now trying to influence the post-2015 framework, which has an explicit focus on helping low-income countries. One of those advocates, the nonprofit NCD Alliance, notes that in order to safeguard progress made by the current Millennium Development Goals—and to continue to drive sustainable and equitable development—health must be at the heart of the new framework. They are among many who insist that addressing chronic diseases (along with the risk factors and the social, economic and environmental conditions that drive them) is central to creating a healthier world.

Advocates have led an impressive lobbying effort, asking governments to include targets for cardiovascular and other chronic diseases in the new goals. Creating specific targets would place greater responsibility on developing countries (where 80 percent of deaths from chronic diseases occur) to take action—and would generate more international aid for NCDs from Western countries.

Global health funding for these diseases has increased in recent years. Expanded support has allowed for a proliferation of global health organizations and

“There is another big opportunity looming.

With the current U.N. Millennium Development Goals
expiring in 2015, there is powerful jockeying to determine

which priorities will receive aid.”



initiatives focused on cardiovascular and related diseases worldwide. Though these successes exist within a fragmented, complicated and inadequately tracked state of global health finance, they provide a basic roadmap for ways to pay for prevention, diagnosis and treatment of chronic disease.

The responsibility for health-related financial resources over the long term will ultimately fall to governments, supported by taxes from businesses and by the general public, with additional support from NGOs and nonprofit private foundations. Policy makers and researchers have long recognized that investing in strong health system infrastructure is key. That means establishing a strong primary care network and training and employing health workers as well as building a comprehensive national health database to track disease and causes of death. Each of these steps is crucial in the fight against chronic disease.

Unfortunately, both funders and politicians have largely neglected the glaring lack of health infrastructure in developing countries. Politicians, policy makers and philanthropies are most likely to act on problems they think they can readily solve. Building a health system requires long-term investments that don't create tangible changes overnight. Aid programs have traditionally invested in quick-fix initiatives such as providing vaccines for contagious diseases—initiatives that are easy to track and show prompt short-term results. More recently this has shifted with the global response to HIV/AIDS, which has

The Uganda NCD Alliance supports patients and furthers research, runs public awareness campaigns and advocates for action on chronic diseases.

In 2006, the New York City Board of Health approved then-Mayor Michael Bloomberg's plan that outlawed the use of artery-clogging trans fats in approximately 24,000 New York City restaurants.



increasingly focused on systems strengthening as well as longer-term planning for sustained intervention.

GOVERNMENT AGENCIES, TAXATION AND MANDATES

One of the main reasons for the success in the multifaceted international fight against HIV/AIDS was a great sense of urgency, fanned by a small army of protesters, celebrities and philanthropists. It sparked action that was possible only because there were a number of available, effective solutions.

The global solidarity shown by government agencies is one of history's great achievements in international health, on par with the eradication of the smallpox virus in the 1970s. The question is whether the long-term, devastating threat of cardiovascular disease and other chronic illnesses can generate a similar vigorous response. The answer is yes, with three initiatives offering examples of global, national and local programs: the Global Alliance for Chronic Diseases, the Uganda Parliamentary Forum on Noncommunicable Diseases and former Mayor Michael Bloomberg's New York City model.

THE GLOBAL ALLIANCE FOR CHRONIC DISEASES

There has been startlingly little research in developing nations on the prevalence of cardiovascular diseases or on treatment protocols and prevention programs. In 2009, the Global Alliance for Chronic Diseases became the first international governmental coalition to specifically address chronic noncommunicable diseases (heart disease, type 2 diabetes and hypertension, among others). It's a powerful alliance forged



This Health Foundation women's group meeting in Malawi is part of a regional program that helps to improve the quality and reliability of health care.

among national health research institutions in Australia, Canada, China, the United Kingdom, the United States, India, South Africa and Europe. Together, these institutions contribute 80 percent of public health research funding worldwide. The goal of the alliance is to coordinate and provide financial aid for research that addresses prevention and treatment of NCDs. Part of their stated mission is to identify the most effective interventions and to develop and share the knowledge needed to guide public policy; they are now taking a leadership role in promoting global investments in cardiovascular research and building well-staffed health systems in developing nations. The outstanding motivation of the alliance is based on the principle that unification with shared responsibility produces greater results.

Uganda's Countrywide NCD Fight

In 2010, Uganda formed a national nonprofit coalition, the Uganda NCD Alliance, to advance action on cardiovascular diseases and cancer. The nation has seen a sharp rise in cases over the last decade, and although there are no hard data on prevalence, there are more people sick and dying of noncommunicable diseases than those who seek care at health facilities—many of whom live far from clinics or hospitals and are still treated by traditional healers.

The organization has its roots in the Uganda Women's Cancer Support Organization, a group that had been founded by breast cancer survivors six years before. They later teamed up with others working on NCDs to form the alliance, which supports research, offers support for thousands of patients, runs large-scale public awareness campaigns and targets advocacy to unite action. They have also begun deploying village health teams to educate rural people on how to prevent NCDs, and refer those who are ill to a new patient resource center in Kampala that offers free screening, counseling and patient support.

Public outcry from the alliance and numerous patient groups convinced Uganda's elected officials to take action. Uganda's Parliamentary Forum on NCDs was launched in 2012 with the intent of better equipping the country to fight the spread of cardiovascular and other chronic diseases, to implement the U.N. Summit resolutions—and to lobby for resources to pay for it all. Part of their mission is also to monitor progress and ensure that all levels of government are investing manpower and money in the interests of health.

A Healthier New York City

The *New York Times* once characterized former New York City Mayor Michael Bloomberg as “the Impossible Mayor of the Possible.” Part of that reputation comes from bold initia-



tives that reshaped New York City into a culture of healthy lifestyle, changes that were funded by both taxpayer dollars and Bloomberg's own significant personal contributions. Among his achievements are a network of bike lanes that now cover more than 600 miles, a fleet of public bikes for tourists and commuters and 800 acres of new outdoor space, much of it along the city's shorelines.

To lower exposure to secondhand smoke, Bloomberg signed a law in 2002 banning smoking in public indoor spaces. In 2011, he went further, eliminating smoking in parks, on beaches and at shopping plazas, with a \$50 fine for offenders. These anti-smoking measures prompted one of the fastest declines in the country: The city's smoking rate dropped from 22 percent to about 14 percent by 2013, according to Susan Kansagra, a deputy commissioner at the New York City Department of Health and Mental Hygiene.

Unhealthy food has been another target. In 2006, the New York City Board of Health approved Bloomberg's plan that outlawed the use of artery-clogging trans fats in approximately 24,000 of the city's restaurant kitchens. Three years later, new regulations required restaurant chains to include calorie counts on menu boards and printed menus. And a “Salads in Schools” initiative created low-height salad bars in grade schools across the city's five boroughs. Obesity rates among New York elementary and middle school students dropped by 5.5 percent from 2006 to 2011. Together, this suite of initiatives has helped create a healthier New York.

NONPROFIT PRIVATE FOUNDATIONS AND PHILANTHROPY

Private Funding for Public Health

According to the World Bank, nonprofit organizations donated nearly \$5 billion for international projects or development in 2005; nearly one third of those initiatives were health-related, with the lion's share (\$1.2 billion) coming from the Bill & Melinda Gates Foundation. Their entry into the global health landscape in 1998, along with a \$30-billion donation by investor Warren Buffett, took private philanthropic funding to

new and unprecedented heights. The Gates Foundation's global health grants are nearly equal to the annual budget of the entire World Health Organization. They fund tobacco control, including new support for antismoking programs in Africa and also provide extensive support for agricultural development that is improving the accessibility of healthy foods in developing countries. But chronic diseases per se are not among their "priority areas," despite the large and growing global burden.

Other substantial nonprofit contributors include The Rockefeller Foundation, the Wellcome Trust, the Ford Foundation, the United Nations Foundation and the Aga Khan Foundation—but their total contribution to noncommunicable diseases is relatively limited.

The SHE Foundation

Local nonprofit foundations can make a huge impact, so in 2009, I created the Science, Health and Education (SHE) Foundation to promote cardiovascular health in Spain. After a lifetime devoted to medicine and research, I was firmly convinced that a change in people's lifestyles was the only way to stem the spread of epidemic cardiovascular diseases. Our overall 21st-century challenge is figuring out how to build preventive health care.

Although SHE focuses on research, it also helps to teach healthy habits from childhood onward. With the onset of cardiovascular disease drifting toward younger populations, it's key to instill healthy behaviors as early in life as possible. Toward that end, the SI! Program instructs about 20,000 chil-

GLOBAL HEALTH FINANCING LANDSCAPE		
Providing		
Governments Public	Nonprofit Private Foundations	For-Profit Private Corporations
Managing		
Providers	Provider Partnerships	NGOs
Spending		
Providers or Managers	Multilateral/ U.N. Agencies	
SOURCE: Modified from D. McCoy, et al. <i>Health Policy and Planning</i> , 2009; 24: 407		

dren from preschool to high school in Spain on diet, human physiology (including heart function) and the need for exercise and emotional management (to prevent tobacco, alcohol and drug abuse). It incorporates learning materials produced by *Sesame Street* (including a new Muppet, Dr. Valentin Ruster), video segments, storybooks, a board game, flash cards and more. An initial trial in 2010

with 1,000 preschoolers, their parents and their teachers demonstrated that even a year afterward, children's attitudes about and knowledge of health—and healthier behaviors—remained significantly higher than those who hadn't been part of the program.

Another initiative in seven towns in Spain, the Fifty-Fifty Programme, organizes small groups of adults from 25 to 50 years old that support one another's efforts to eat better, improve physical fitness, quit smoking and monitor blood pressure. With nonprofit private funding, we are creating a frame of reference for health that involves people of all ages and at all stages of life.

GOVERNMENT PARTNERSHIPS WITH NONPROFIT ORGANIZATIONS

With the need to fund ongoing health research and the need for state-of-the art facilities equipped with costly equipment to adequately treat patients, governments and public research institutions must enlist the aid of both private donors and corporations.

Although partnerships with corporations are still essential in their infancy, there are some programs that are creating

Participants in the children's SI! Program gather at an annual meeting in Cardona, Spain, in July 2011.



new ways to address important global health problems. In the late 1970s, amidst rising concern about the inability of international agencies to cope with the world's enormous health and social problems, new public-private partnerships began to emerge. In the United States, that was made possible by legal and tax restrictions that had been lifted two decades

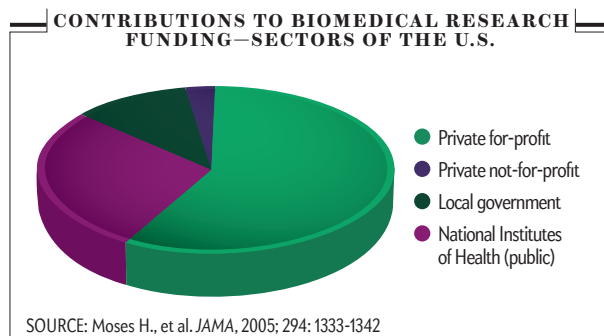
before, a move that encouraged corporations to establish charitable foundations. More recently, some members of the business community have recognized broader obligations to society. Private funding has become increasingly important, to the point where it is irreplaceable. Such injections of private money have traditionally come from philanthropic donations by wealthy benefactors or charitable foundations, but is increasingly coming from corporations. Public-private partnerships also combine different skills from the worlds of government and business to address persistent global health problems.

Some of these partnerships come in the form of straight, no-strings-attached financial support, with positive publicity, tax breaks and in some cases, social commitment as the main incentives. These "social-commitment partnerships" are usually sparked by the recognition that science and technology drive the future economy or by wide concerns regarding the social and economic costs of epidemic levels of chronic diseases.

Generous social-commitment donations have helped build several leading research institutes devoted to biomedical research in Europe, the U.S. and other Western countries. One of these is the National Center for Cardiovascular Investigation (CNIC) in Madrid. This national center was designed to expand national capabilities for cardiovascular research and to bring those research results into clinical practice, both in Spain and internationally.

To fund this ambitious plan, the government sought long-term financial commitments from the largest businesses in the country. The resulting agreement, signed in 2005 between the Ministry of Health and a group of prominent Spanish companies, became the ProCNIC Foundation; its 14 members include representatives from the energy, banking and media industries, among others. In this innovative arrangement, the Spanish government committed \$620 million over the first decade, with the foundation donating \$248 million more. That money was invested in areas that public funding often can't afford, such as training for young investigators, very focused research and costly equipment needed for those studies that would be otherwise unaffordable, along with programs that offer incentives to keep valuable investigators at the center.

Corporate members sit on the board, contributing a wealth of managerial and



business expertise and taking an active role in management, planning and decision-making. The result: Some of Spain's most powerful corporations have committed to a direct involvement in biomedical research and the fight against cardiovascular diseases.

But contributions from the pharmaceutical or biotech sectors are quite different. Quite

often, these are entrepreneurial investments meant to generate profits from a new product, technology or procedure. Product-development partnerships may launch start-up companies at university science parks or fund specific collaborations with a government research group.

One of these enterprises is a three-way collaboration between the Spanish government's research foundation, the CNIC, a nonprofit, the World Heart Federation and a Spanish pharmaceutical company, Ferrer. Together, they are developing a "polypill" that combines three medications into one pill, targeting patients with a history of heart attack. It's an affordable approach that costs far less than three separate prescriptions. With one medication to take instead of three, the hope is that patient adherence to treatment will grow, preventing additional heart attack—or death. As of February 2014, this combination drug had been approved in seven countries.

Health funding for cardiovascular and other noncommunicable disease has increased in recent years—a beginning response to the fragmented, complicated and inadequately tracked state of global health finance. That funding has sparked a proliferation of global health organizations and initiatives. Programs across the globe have been made possible through successful, ongoing financial support from government agencies, nonprofit private or philanthropic foundations, for-profit private corporations—and partnerships among them. Those cited here illumine the basic principles for future funding that will allow us to address the world's epidemic of noncommunicable diseases.

ABOUT THE AUTHOR

Valentin Fuster is the physician in chief of The Mount Sinai Hospital in New York City. He has served as president of the American Heart Association as well as the World Heart Federation. He is editor in chief of the *Journal of the American College of Cardiology* and the popular Hurst's *The Heart* textbook of cardiology. He has been named a Living Legend in Cardiovascular Medicine by the American College of Cardiology.

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Kenyans Come Together

against Chronic Diseases

— AUTHOR —
Gerald Yonga

Upon arrival in one of Kenya's mud-and-thatch villages, a settlement that may lack running water and electricity, you'd never guess that at least a quarter of the subsistence farmers and herders who live here die from chronic diseases that are usually associated with a far more opulent Western lifestyle.

However, no one really knows what the true numbers are because 80 percent of the population lives in rural areas and no whole-country epidemiological data exist.

The illnesses that are killing so many in this East African country—cardiovascular disease, diabetes and hypertension, among others—are rising exponentially, and they stand among the top 10 leading causes of death nationwide. Stroke is number seven on that list, coronary heart disease ranks eighth and Kenya is facing an impending epidemic of chronic diseases.

It's a hard life for many here. Nearly half of all Kenyans live in poverty; half of those people subsist on under \$1 a day and the average yearly per capita income hovers around \$780. Health spending is about \$27 per person, which is mostly out of pocket. In contrast, the United States spent \$8,233 per person in 2012. But with Kenya's vast economic disparities, the reality is that most people receive little or no health care, and if a villager has a heart attack or stroke, he or she may just die. Current life expectancy is 60.

Traditionally, HIV/AIDS, pneumonia, infectious dysentery and malaria have been among the greatest health con-

cerns, but chronic, noninfectious diseases are now straining the system. The reasons are many: About a quarter of all men over 18 smoke. The country is among the hardest hit by rheumatic heart disease, with 200,000 new cases each year caused by untreated strep infections. Most women prepare meals over smoky indoor cook fires, exposing themselves and their small children to particulate matter and other pollutants that can damage both heart and lungs.

With increasing urbanization and wider availability of processed foods, a nutritional transition is in full swing. Tastes for and attitudes about food are changing rapidly. Traditional staples such as maize, vegetables and the occasional meat or fish that were previously steamed or boiled are now fried in saturated fat. Meals once seasoned with herbs are now heavily salted. People eat more meat, potato chips have arrived in rural shops and kids are clamoring for soda.

The result: High blood pressure is now rampant, found in nearly 50 percent of the population. In 2012, the country tallied about 720,000 diabetes cases; perhaps another 600,000 go undiagnosed, and these numbers are expected to double by 2030. And although malnutrition is still prevalent, obesity

is spreading, and along with it, heart disease. The 2008–2009 Kenya Demographic and Health Survey found that 25 percent of women were overweight or obese compared with 12 percent that were underweight.

The economic toll of cardiovascular diseases is devastating to individual families who lose income. Patients often cannot afford treatment—even the cheapest blood pressure medication that costs only 50 cents per day—let alone equipment such as walkers or wheelchairs. And chronic diseases also siphon millions of dollars from the national economy in both health care costs and reduced productivity as workers in the prime of life disappear from the workforce.

But if these problems are caught early by screening programs and treated with relatively simple measures, dire outcomes are largely preventable.

THE CHALLENGES

The Kenyan health system is currently struggling to cope with increasing demand, much of it from noncommunicable

diseases (NCDs), that exists alongside the same challenges that face other developing countries: spiraling costs, a lack of facilities and equipment—and a shortage of skilled health care professionals. With about 1,500 doctors available in public service, the ratio is one physician for more than 26,000 people. There is a severe shortage of specialists, almost all of whom practice in Nairobi, the capital, which is home to about 12 percent of the population. There are currently no cardiology training programs in East Africa. All five cardiac catheterization laboratories and open-heart surgery options are also in Nairobi; only one of these is a public facility and it opens only intermittently because of inadequate supplies.

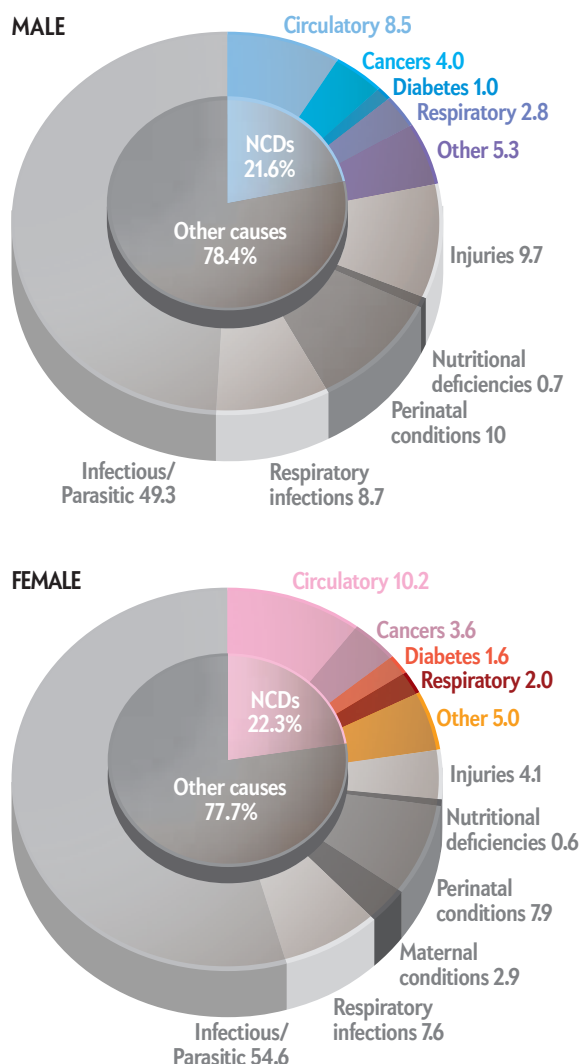
Private facilities are too costly for most people, and though some care is available through nonprofit and faith-based organizations, most Kenyans rely on public health services provided by the government. Although these facilities may be able to offer a free diagnosis, they may not have blood pressure machines or other standard medical devices, and probably won't have basic medicines—not even aspirin. Despite a pledge made



ESTIMATED PROPORTIONAL MORTALITY (%), KENYA, 2004

Infectious and parasitic diseases have traditionally been the largest killers in Kenya, responsible for more than twice as many deaths as noncommunicable diseases. In 2004, cardiovascular disease and diabetes accounted for 9.5 percent of deaths in men and 11.8 percent in women.

Estimated Proportional Cause of Death in Kenya, 2004 (%)



SOURCE: WHO Global Infobase, Global Burden of Disease: data sources, methods and results

alongside other African Union countries in 2001 to increase government health spending to at least 15 percent of their national budget by 2015, expenditures have ranged between 5 and 8 percent over the last five years. That money has been almost entirely invested in the treatment of infectious disease, with a heavy emphasis on acute care. The ability to administer continued, long-term care for chronic illness is largely lacking.

Ultimately, the dearth of tools, facilities and health workers (who may not have sufficient training in NCDs) is increasing the risk that chronic diseases may remain undetected or be misdiagnosed.

STATE OF PLAY

Until now, much of the medical care available for noncommunicable diseases has come through the efforts of nonprofits, including patient advocacy groups. One of the most influential advocates is the NCD Alliance that was formed five years ago, an umbrella for seven organizations including the Kenya Cardiac Society, Kenya Diabetes Association and the Kenyan-Heart National Foundation. They function as part of a larger international alliance that networks over 2,000 organizations in some 170 countries. Their stated mission: To combat the NCD epidemic by putting health at the center of all policies.

One project that has helped diabetes sufferers is the Base of the Pyramid Project. Since 2012, it has provided insulin access to more than 2,600 patients and as a result, the cost of a month's supply dropped by more than two thirds, down to about \$6. Every month, one hundred-plus facilities now host days devoted specifically to diabetes and local patient support groups. This project partners the Ministry of Health and the Royal Danish Embassy with the Kenya Defeat Diabetes Association as well as a number of faith-based health organizations and Novo Nordisk, the world's largest manufacturer of insulin.

Though such initiatives have made some types of care available and have brought awareness of the growing problem, it's occurred in a limited, piecemeal way. Over the past five years the NCD Alliance has lobbied the Ministry of Health to address the growing incidence of NCDs. Their efforts have helped to spark new policy and action. Now, the entire health system is about to be revamped, with chronic disease being actively incorporated into a new action plan.

A BRAND NEW FRAMEWORK

Kenya's adoption of a new constitution in 2010 altered jurisdictions and decentralized many areas of government, changing the framework for the country's health care system. The national government still runs the large, urban hospitals but county governments are now responsible for the bulk of primary care, including prevention and diagnosis. Community health workers provide much of this "Tier 1" care, along with a few primary and acute care facilities in each of Kenya's 47 counties.

The new Kenya Health Policy 2012–2030, which is currently under review, provides an overarching strategy for bringing proven interventions to villages, clinics and hospitals. The so-called Kenya Essential Package for Health defines minimum health care requirements. It also outlines ways to prevent disease through education on common risk factors such as poor diet, tobacco, indoor smoke and lack of exercise, and by targeting at-risk populations. Few Kenyans know much, if anything, about these diseases.

A 2008 tobacco control law bans smoking in public places and workplaces and prohibits virtually all advertising, promotion and sponsorship of tobacco products. But implementation has been weak and an enormous economic war is being waged by multinational companies that sell tobacco and unhealthy foods, and their efforts are not being adequately countered by the political will to protect health. There are no laws in Kenya regulating food, including salt content.

The new health plan also recommends that community health workers screen for signs of heart disease, diabetes, obesity and high blood pressure in the small towns and villages they

“A hospital bed is more expensive in Nairobi than a bed in a five-star hotel...”

– Former Prime Minister of Kenya Raila Odinga

visit, and that those screenings become standard protocol at district clinics and hospitals as well. These diagnostics are often not available even at high-level provincial hospitals.

But Kenya also needs to quantify the scope of the problem. In 2011, the government launched an eHealth strategy that will help supplement the dearth of health data. But it will also help to address other gaps in the health care system. Digital health records will help extend the reach of health services into remote areas and mitigate some of the disparities between access to care in urban and rural areas. Computerized patient “charts” will facilitate medical referrals and follow-up care.

Digitally available information will go a long way toward educating citizens and allowing medical personnel to investigate new treatment protocols. The eHealth database will also inform policy, investment and research decisions. Electronic data may help communities stock needed drugs and equipment—so that shortages become a thing of the past.

Even if medicines and access to care become widely available, cost remains a huge barrier. In April 2012, then-Prime Minister Raila Odinga expressed his concern in an interview with Capitol Broadcasting Network, a local media outlet. “As we change policy, we must also think about how to make medical care both accessible and affordable to all Kenyans who are living just one disease away from bankruptcy or death.” The reason, he said, is that “a hospital bed is more expensive in Nairobi than a bed in a five-star hotel...” He expressed the need to “develop a universal medical insurance to cushion the least fortunate members of the society.”

There is great competition over scarce resources. Though HIV/AIDS is still the biggest killer in Kenya, and 64 percent of all deaths are attributed to contagious conditions compared with the 26 percent of deaths caused by cardiovascular and other noncommunicable chronic diseases, that will not be the case going forward. As the Ministry of Medical Services and the Ministry of Public Health and Sanitation noted in Kenya Health Policy 2012–2030, “Emerging trends point to the fact that noncommunicable conditions...will increasingly, in the foreseeable future, be the leading contributors to high burden of disease in the country...” If current policies and interventions continue, infectious disease will drop to 39 percent of all



deaths by 2030 and chronic disease will jump by 55 percent, becoming the cause of 47 percent of all deaths in Kenya.

Separate national policies for individual diseases are not tenable in a low-income country like Kenya that struggles under a critical shortage of human and financial resources. One all-encompassing national policy on chronic disease is essential to clarify goals and to integrate diagnosis and treatment within existing health and social policies.

The government needs to put a final stamp on a national strategy to prevent new cases of stroke, diabetes, heart attack and the disability they may cause, and to save lives across Kenya. With this overarching framework, the government can integrate this suite of illnesses within a larger, synergistic public health strategy that targets all citizens.

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How Policy Makers Can Advance Cardiovascular Health

—| AUTHORS |—

Sonia Angell, Jessica Levings, Andrea Neiman, Samira Asma and Robert Merritt

Consider Turkey before 2008.

Nearly half of all men smoked, as did nearly one out of every six women—among the highest rates in the world. Cigarettes were lit at business meetings, on buses and in Parliament. Restaurants and hotels were perpetually shrouded in a dingy, choking haze.

Cigarettes were considered a polite hospitality gift when visiting friends and family. And, perhaps most shocking of all, nearly a third of Turkish smokers started before the age of 10, according to a 2003 survey. Smoking flavored tobacco in a water pipe is a tradition that dates back to the 17th century under the Ottoman Empire.

Then came a health revolution. In December 2007, Turkish Prime Minister Recep Tayyip Erdogan declared the fight against tobacco to be “as important as our counterterrorism struggle.” He told a meeting of the National Tobacco Control Program in Ankara that tobacco products were “literally murdering our future generations.” Less than a month later, he signed a law banning smoking in all enclosed public spaces. It was part of a comprehensive effort involving government, advocacy groups, universities and nonprofit organizations to reduce tobacco-related diseases, which had accounted for more than 20 percent of admissions and half of deaths at Turkish hospitals at the turn of the millennium. Other policy measures included a stiff 81 percent tax on tobacco products, a total ban on cigarette advertising and promotion, warning labels on packages and government-funded quit-smoking programs. On Turkish television, a filter blurred out cigarettes held by actors on-screen.

Results came fast. “In just one year, between 2009 and 2010, admissions to hospital emergency rooms for smoking-related disease decreased by 24 percent,” says Toker Erguder, a physician and National Tobacco Control Program officer for the World Health Organization (WHO) in Turkey. “It demonstrates that policies to control tobacco work, and if they work in Turkey, with our strong smoking culture, they can work anywhere in the world.”

We tend to think of cardiovascular ailments as diseases of lifestyle because their development and progression are influenced by what appears to be individual personal choices: Whether we smoke, what we choose to eat, how much we exercise and other factors. But those personal choices are heavily swayed by our environment and by our options. And—as Turkey’s experience shows—public policy

Turkish Prime Minister Recep Tayyip Erdogan told a meeting
of the National Tobacco Control Program in Ankara that
tobacco products were

“literally murdering our future generations.”



is a powerful tool for shaping that environment. It's no wonder, then, that in its report, "Promoting Cardiovascular Health in the Developing World," the U.S. Institute of Medicine urged that policy be used to promote cardiovascular health around the globe.

A wide range of government policies have been used to protect people from cardiovascular diseases. Taxes, for example, are a powerful force for discouraging high-risk behaviors. Raising taxes on cigarettes is often a foundational part of any national antitobacco campaign. That strategy is now being applied in the fight against obesity. In Mexico, which recently surpassed the U.S. with the world's highest prevalence of obesity, legislators approved a national levy of one peso per liter on sugar-sweetened beverages (about 10 percent) as well as an 8 percent tax on junk food (foods that contain 275 calories or more per 100 grams).

Subsidizing what's good may be as important as taxing what's bad, such as government support for quit smoking or healthy diet programs. In Mexico, that includes federal spending to install water fountains in public schools to ensure a cost-free, healthful alternative to soda.

Including efforts such as these within a well thought-out, larger strategy is an effective way for policy makers to help make the healthier choice the easier choice across an entire population, reducing the risk for heart disease and stroke and leading to improved health and lives saved. This approach has proven successful in high-income countries and is now being rolled out in middle- and low-income nations to combat the world's two biggest causes of cardiovascular mortality: tobacco use and high blood pressure.

AN "MPOWERED" APPROACH TO TOBACCO POLICY

Tobacco is responsible for 9 percent of all deaths worldwide, killing six million people a year, mostly from cardiovascular diseases, cancer and chronic lung diseases. High-income countries currently bear a greater burden than middle- and low-income countries, with 18 percent, 11 percent and 4 per-

cent of all deaths, respectively. That's because tobacco use peaked in wealthier countries several decades ago, and it typically takes 30 to 40 years for smoking to do fatal harm. But that ratio will shift in coming years, with rising tobacco use and population growth in less wealthy countries and decreasing use in more affluent nations. By 2030, tobacco-related diseases will kill eight million people a year, more than half of them in developing nations. These diseases are expected to claim a billion lives this century—with about 70 percent in the developing world.

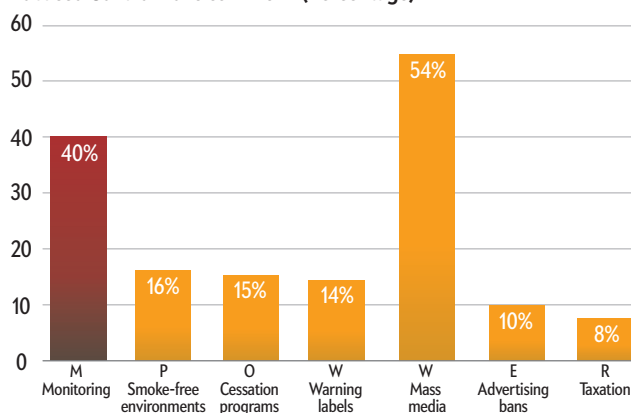
In May 2003, WHO took unprecedented action, passing the Framework Convention on Tobacco Control on behalf of its member states, the world's first public health treaty. Reflecting decades of careful evaluation of interventions conducted in various locales, the WHO framework provides a foundation to successfully reduce tobacco use. As of June 13, 2013, 178 countries had signed on. To support their commitment, WHO introduced MPOWER, a package of six tobacco-control measures. The acronym defines the strategy: **M**onitor tobacco use and prevention policies (with rigorous oversight and metrics); **P**rotect people from tobacco smoke (generally with policies that limit or ban smoking in public spaces and indoors); **O**ffer help to quit tobacco use (through cessation programs, hotlines and medications); **W**arn people about the dangers of tobacco (with labels on cigarette packages and health promotion campaigns); **E**nforce bans on tobacco advertising, promotion and sponsorship; and lastly, **R**aise taxes on tobacco. Together, these measures create an environment where not smoking or quitting is an easier choice to make.

Turkey has implemented these policies more thoroughly than any other nation, according to a 2013 WHO analysis, and New York has done the best job of any major city. After all six MPOWER strategies were adopted there, adult smoking declined from 22 percent in 2002 to 14 percent in 2010, with far fewer young people lighting up, down from nearly 18 percent to 8 percent—a record drop.

MPOWER is gaining momentum: More than one third of

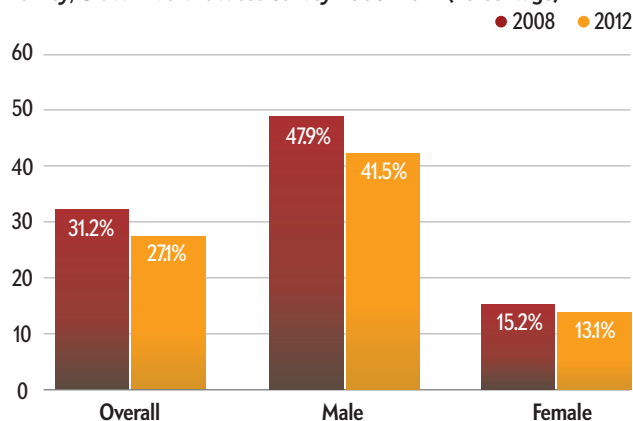
THE TOBACCO PROBLEM

Share of the World Population Covered by Selected Tobacco Control Policies in 2012 (Percentage)



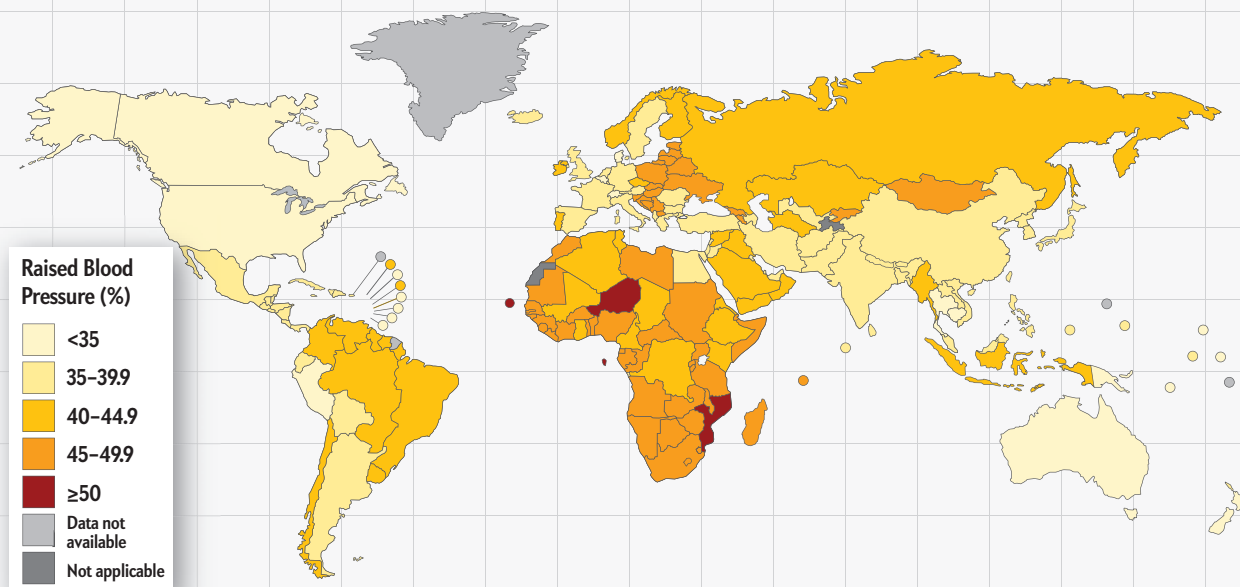
SOURCE: WHO Report on the Global Tobacco Epidemic, 2013

Turkey, Global Adult Tobacco Survey 2008–2012 (Percentage)



SOURCE: Global Adult Tobacco Survey (GATS) Turkey, 2008–2012

Prevalence of Raised Blood Pressures,* Ages 25+, Age Standardized, Both Sexes, 2008



SOURCE: World Health Organization, 2011

* Systolic Blood Pressure ≥ 140 and/or Diastolic Blood Pressure ≥ 90 or using medication to lower blood pressure

the world's population—2.3 billion people in 92 countries—are now covered by at least one of its six measures. Nearly 7.5 million smoking-related deaths will be averted because of MPOWER policies adopted in 41 countries between 2007 and 2010.

Major funding for tobacco-control efforts in developing countries comes from Bloomberg Philanthropies, which has committed more than \$600 million since 2007. Meanwhile, the U.S. Centers for Disease Control and Prevention (CDC) provides technical support in 180 nations, collecting country-level information on tobacco use, interventions and evaluates the public's awareness of the risks. The world's most populous

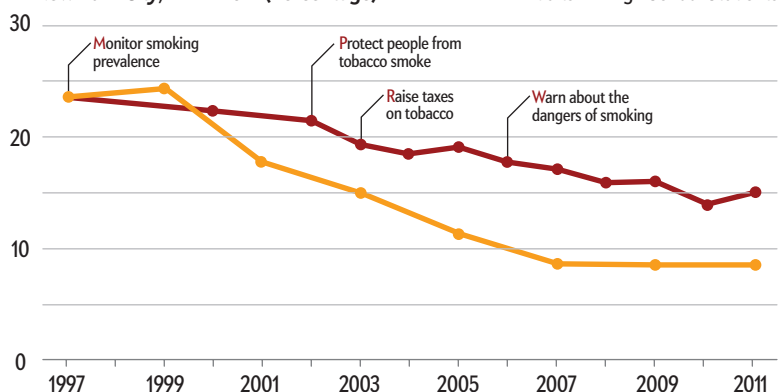
countries—China and India—have made major commitments to MPOWER policies, along with Russia, where 40 percent of adults smoke and where one of the world's toughest tobacco-control laws went into effect in June 2013.

LOWERING BLOOD PRESSURE WITH POLICY

High blood pressure is responsible for massive disability and huge numbers of cardiovascular-related deaths globally. It's astonishingly common. Approximately one third of adults age 25 and older have high blood pressure, defined by doctors as having a systolic pressure (the pressure in the arteries when the heart beats) at or above 140 millimeters of mercury and/or a diastolic pressure (when the heart is resting between beats and refilling with blood) at or above 90 mm. In parts of Africa, Asia and eastern Europe, prevalence exceeds 45 percent.

High blood pressure, also called hypertension, puts a steady strain on blood vessels, resulting in damage that may cause them to narrow and harden with plaque. It raises the risk that vessels will break or that clots will form, break loose and cut off circulation to the brain, resulting in a stroke—or block blood flow to the heart, causing a heart attack. About one half of all heart attack and stroke deaths worldwide are linked to hypertension—causing over nine million largely preventable deaths each year. The financial toll is staggering: about \$370 billion in 2001, the most recent comprehensive estimate. That's more than 10 percent of the world's health care spending.

Number of Current Smokers among Adults and High School Students in New York City, 1997–2011 (Percentage)



SOURCE: CDC. Decline in Smoking Prevalence—New York City, 2002–2006. New York City Department of Health and Mental Hygiene. *MMWR Weekly*, Jun. 22, 2007; 56(24): 604–8

Governments can play an important role in helping to reduce hypertension risks among their citizens. Due to the effect of sodium intake on blood pressure, policies are increasingly focused on reining in excessive consumption of salt (sodium chloride). Most people, regardless of race or nationality, consume too much, exceeding WHO recommended levels: 2,000 milligrams of sodium daily or five grams of salt (about four fifths of a teaspoon). In many Asian countries, average intake is more than twice that level. According to an analysis led by Perviz Asaria of Imperial College London, reducing sodium intake by just 15 percent in 23 low- and middle-income countries where hypertension is rampant could prevent 8.5 million deaths over a 10-year period.

Although there is no precise equivalent to MPOWER when it comes to battling hypertension, an array of effective policies can work to change the trajectory. These policies, however, are best customized, as sodium intake varies greatly according to regional diet and reliance on packaged food. In high-income countries where processed foods are a common part of the daily diet, three quarters of salt comes from packaged and restaurant foods, while in other countries, nearly that much salt is added during cooking or at the table. In more economically developed countries, improvement has come through reducing salt in processed foods by clearly labeling sodium content on packages, making more healthful options available in the marketplace and using public programs to educate consumers. Finland pioneered the approach in the late 1970s, a protocol that reduced salt consumption by one third. The result: The average systolic blood pressure dropped by 10 mm over the next 30 years and death from both coronary heart disease and stroke fell by 75 percent.

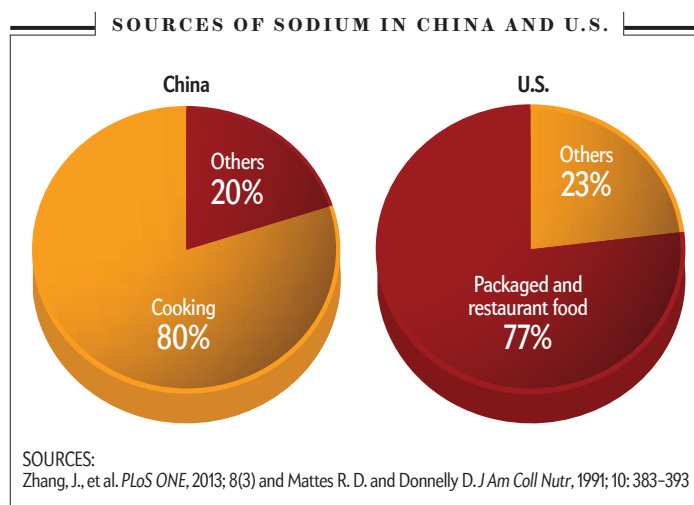
In the United Kingdom, the government is working closely with food manufacturers to voluntarily lower salt content in 85 categories of processed and packaged foods. “Reformulation of mass-market products was the foundation for the most successful nutrition policy in the U.K. since the Second World War: The salt reduction programme that has cut the average national intake by 16 percent in its first six years,” noted J. T. Winkler, a British nutrition policy expert, in the *British Medical Journal*.

The approach has been adopted in the United States through the National Salt Reduction Initiative, and by the governments of Canada, Australia, Brazil and Colombia, among others. While the U.K. has shown that reducing population-wide sodium intake will require changes in the food supply at large, a pilot study in Argentina suggests that even small changes can make a difference: Just cutting the salt content in French bread from 2 percent to 1.4 percent sparked

moderate reductions in average blood pressure.

In countries like China, where 80 percent of salt is added during cooking, other approaches may be appropriate. A 2011 survey found that about one quarter of adults in the northeastern province of Shandong had high blood pressure; average salt consumption was 12.5 grams per day. And yet, just one in four people was aware of the risks of a high-salt diet. In 2011, Shandong leaders and the national health ministry introduced a comprehensive salt reduction program, with technical support from the Chinese Center for Disease Control and Prevention in Beijing and the U.S. CDC. Their objective: reducing salt intake to 10 grams a day by 2015 and providing better treatment for those with high blood pressure. The program includes classes in public schools, messages that are broadcast

on television and on posters placed in restaurants and supermarkets. It also targets those who prepare food, with training for chefs and food service employees on preparing low-salt recipes and distribution of special spoons to individual households that measure out two or three grams of salt. Salt content in food now appears on food labels, there are new low-salt food aisles in grocery stores and the health department is working with doctors to improve



the detection and treatment of hypertension.

A preliminary assessment of the program’s impact is expected later this year, with more complete results due in 2015. “We are convinced that the salt reduction project will decrease the risk of hypertension among Shandong residents in a short time, and lower cardiovascular mortality in the long term,” says Wang Linhong, executive deputy director of China’s National Center for Chronic and Noncommunicable Disease Control and Prevention. “The experience in Shandong should be of value to the rest of China.”

To be comprehensive, programs also may include easy access to diagnosis, treatment and follow-up care for those with high blood pressure. This is a major challenge—even in economically developed countries. Effective treatment generally requires prescription drugs and long-term monitoring to ensure that patients reach and maintain a healthy blood pressure. In the U.S., only about half of those with hypertension have it under control, while in China—home to almost a fifth of the world’s population—only about 19 percent of people with hypertension have stabilized their blood pressure.

A new global initiative seeks to develop a standardized, affordable framework for treatment that can be adapted for use anywhere. That initiative, the Global Standardized Hypertension Treatment Project, is currently being launched by the U.S. CDC in collaboration with the Pan American Health Organization and other regional and international partners. It builds on approaches that proved previously successful in treating

infectious diseases, such as those used to treat tuberculosis and HIV/AIDS. Managing these diseases also requires regular monitoring and lifelong adherence to medication as well as standardizing the specific medications used to treat them and promoting reliable data collection and patient management systems. Much of this is achieved by increased involvement of nurses.

Proof of concept comes from a 2013 study published in *The Journal of the American Medical Association*: This approach enabled doctors in the Kaiser Permanente health system to nearly double the numbers of patients with controlled hypertension in northern California. Creating comprehensive registries to track patient data, simplifying and standardizing treatment protocols and rigorous monitoring of clinical practices were all key to success, said Marc Jaffe, who heads the Kaiser Northern California Cardiovascular Risk Reduction Program. “Conceptually, this is easy, but to get it done takes a lot of persistence and strategy,” said Jaffe, who is now advising the CDC on the new global hypertension project.

And it’s not just high-income countries that can use this approach. Malawi, for example, has partnered with nonprofit organizations to manage hypertension, diabetes and other chronic diseases at a clinic that originally focused on HIV. That facility, which serves 50,000 people on the outskirts of the capital, Lilongwe, now treats HIV patients two days a week and those with noncommunicable diseases three days a week. The intake room is equipped with a touch-screen computer that makes care management and data collection easy. “We are using the same computer system and the same infrastructure for chronic care as for HIV,” said Anthony D. Harries, a senior advisor to the International Union Against Tuberculosis and Lung Disease, who also advises the Malawi Ministry of Health on the project.



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The clinic will use a streamlined approach to treating hypertension that is similar to the Kaiser Permanente model. A low-cost diuretic is the first-line treatment with calcium channel blockers and low-cost ACE (angiotensin-converting enzyme) inhibitors added if needed. “It is very standardized,” Harries said. “We think this is the way forward, and my feeling is that if it can work in Malawi, which is one of the poorest countries in the world, it can work anywhere.” Both Harries and the national health ministry will be evaluating the program’s efficacy over the next few years, with a view toward replicating it throughout the country.

The rising tide of cardiovascular diseases in low- and middle-income countries threatens not only the health of their citizens, but also endangers their economic future. Over the last decade we have increased our knowledge of effective interventions that address cardiovascular health by lowering risk and has made healthy choices—such as avoiding tobacco and limiting sodium—much easier to make. In some cases, less developed countries may have an opportunity to avoid some

of the woes that plague high-income countries—for example, by ensuring that high-fat, high-salt processed foods don’t become a mainstay of local diets. Disseminating lessons learned from innovative policies, such as China’s salt reduction program to prevent and reduce hypertension, Malawi’s approach to treating hypertension and Turkey’s implementation of MPOWER may share lifesaving lessons across the globe that improve cardiovascular health and curtail its risk factors.

Disclaimer: The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the U.S. Centers for Disease Control and Prevention.

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Echoing the Lessons of HIV

How to Serve the Millions with Cardiovascular Disease

— AUTHORS —

Miriam Rabkin, Eric Goosby and Wafaa M. El-Sadr

Millions of people around the world die from complications of diabetes, a disease that has been treatable for a century. But poor countries with weak health systems are ill-equipped to deal with the growing problem. The questions are daunting: How can people learn about diabetes and when to seek care? How can countries provide access to low-cost diagnostic testing, affordable medications and effective counseling to help people manage high blood sugar? How can health workers reach and treat far-flung people with limited means? Because diabetes is a chronic disease, there is another critical challenge: How can health systems provide care over a lifetime? In 2010, when health professionals gathered in South Africa to discuss diabetes, their frustration was palpable.

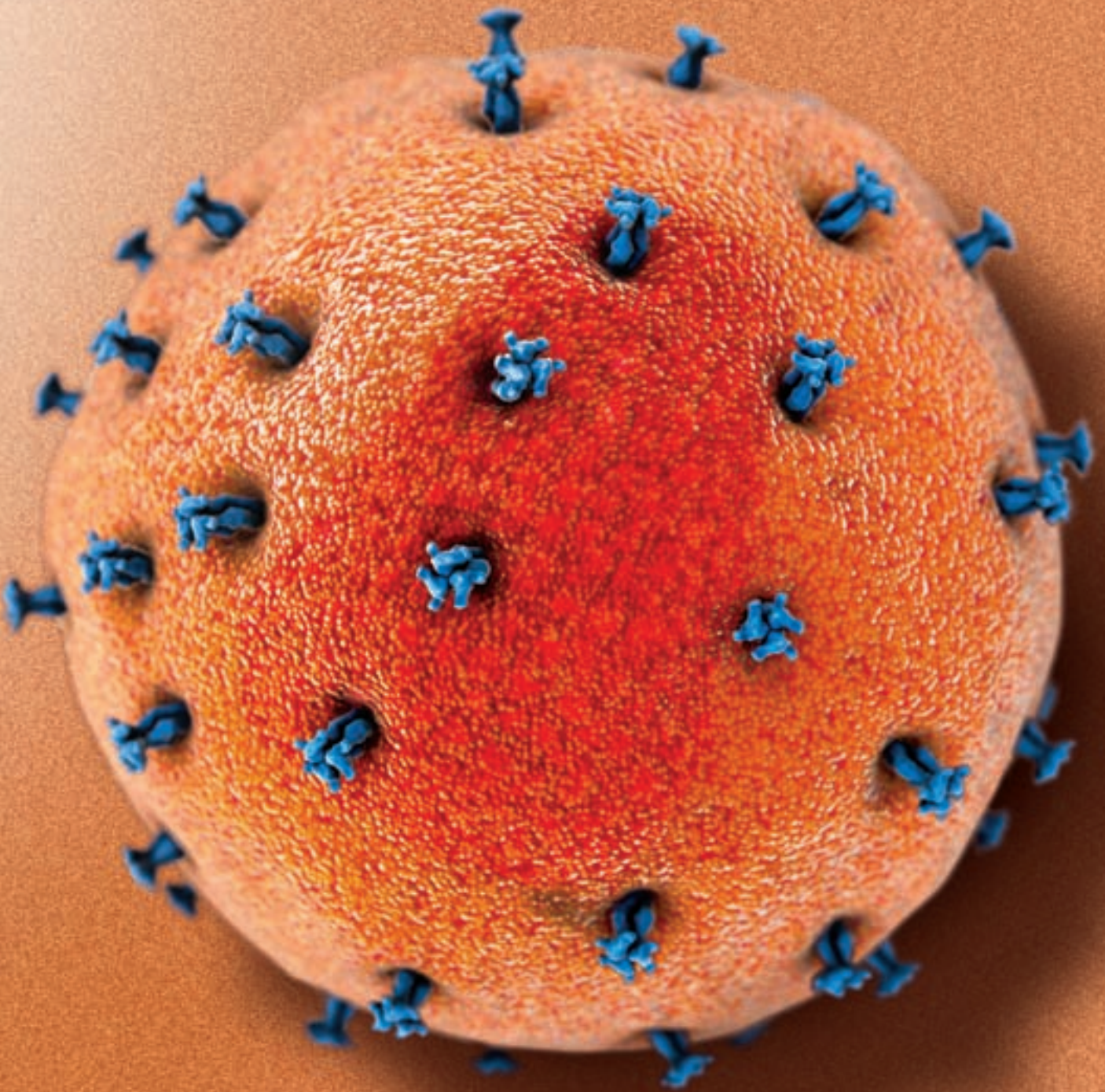
One aspect of the situation was eerily familiar to the HIV experts in the room. Their colleagues who were trying to tackle the diabetes problem were focusing their energies on underfunded and fragmented attempts to treat individual patients, while making little headway on the big picture—the systems and strategies needed to diagnose and treat millions with the disease. “History is repeating itself,” murmured these HIV specialists amongst themselves—and not just with diabetes. Across the world, the same pattern is also playing out for other chronic conditions, including, heart disease, lung diseases and others.

Heart disease is the world’s leading cause of death, killing 17 million people in 2008. The World Health Organization (WHO) notes that heart disease deaths are increasing “aston-

ishingly fast” in low- and middle-income countries, where the disease strikes young adults as well as the elderly. Forty-two percent of those who die from heart disease in poor countries do so before age 60, compared with only 4 percent in wealthy countries. These deaths ripple out across society, shattering families and communities, reducing productivity and slowing economic growth.

At first glance, this “slow-motion emergency” of chronic illness seems to have little in common with the explosive devastation of the HIV/AIDS epidemic. In fact, there are many similarities. In both cases, millions of people are in need of diagnosis and lifelong treatment in countries lacking health workers, medications, infrastructure and the systems and policies needed to address a complex and large-scale health crisis. And chronic care, over years and decades instead of hours or days, is dramatically different from shorter-term health interventions, such as immunizations, care for pregnant women or treatment of acute infections, such as pneumonia or diarrhea.

Whether facing an infectious chronic disease like HIV or noninfectious chronic diseases like diabetes and heart disease, health systems need to deliver the same essential services. Patients need information, easily accessible testing and long-term, high quality care from well-trained, available health workers. And health systems must be guided by effective, humane and equitable policies based on the best available evidence.



***“History is repeating itself,” murmured these HIV specialists amongst themselves
—and not just with diabetes.***

*Across the world, the same pattern is playing out for a range of chronic conditions,
including diabetes, heart disease, chronic lung diseases and others.*

THE PATIENT'S PERSPECTIVE

Individuals with chronic conditions need to:

Interact with the health system on a regular basis, often for life.

Follow up with medical appointments and laboratory testing

Sustain healthy behaviors, such as treatment adherence, healthy nutrition, and smoking cessation.

Access psychosocial support services to assist with the emotional, financial and social impact of chronic illness

THE SYSTEM'S PERSPECTIVE

Health systems providing chronic care services need to:

Diagnose patients and enroll them in care and treatment programs by: identifying risk factors; developing simplified and standardized diagnostic protocols; decentralizing diagnostic technologies; using swift diagnostic tests that do not require specialized laboratories; and educating communities about risk and treatment.

Enhance retention in care and adherence to treatment by: developing appointment systems; identifying people who miss appointments and reaching out to re-engage them in care; training patients to provide education and support to their peers; securing medication supply chains; and enhancing support for pharmacies and their staff.

Help patients to complete referrals to clinics, laboratories, pharmacies and other appointments by: providing reminders, transportation and/or someone to accompany them to appointments.

Improve medical records and program data by: developing medical charts and simple tools (such as flowsheets) to help providers manage patients over time; and identifying a few standardized and robust indicators to evaluate program performance.

Make care more acceptable, effective and efficient by: identifying opportunities for task shifting and task sharing; attending to the needs of families as well as individuals; and ensuring access to both clinical and psychosocial care.

SOURCE: Rabkin M., Goosby E., El-Sadr W.M., 2014

Given these similarities, public health experts have recognized that the lessons learned in crafting an effective response to the HIV epidemic can be applied to other chronic disease programs. Rather than “reinventing the wheel,” countries may be able to jump-start programs for heart disease by building on these lessons.

THE HISTORY OF THE HIV RESPONSE

Twenty-five million people have died from HIV/AIDS over the last 30 years, devastating families and communities across the globe. Effective treatment was available in wealthy countries by the late 1990s; a decade later its use was widespread, and the average survival for people with HIV rose from less than six months to more than 20 years. But the vast majority of people living with HIV in lower-income countries continued to go untreated: In 2003, only 400,000 had access to lifesaving treatment. The scale-up of HIV services presented a formidable challenge to the global community.

At the time, innovative programs showed that HIV treatment could be successfully provided in poorer countries. In 2001, Doctors Without Borders, an international medical humanitarian group, worked with the primary health centers of the Khayelitsha Township in Cape Town, South Africa, offering HIV care and antiretroviral treatment to people with advanced HIV infection. On the other side of the globe in Haiti, the Haitian Group for the Study of Kaposi's Sarcoma and Opportunistic Infections (GHESKIO) teamed up with Partners in Health, a nongovernmental organization based in Boston, to run a program that also provided comprehensive

care for HIV/AIDS and related illnesses.

Shortly thereafter, Columbia University's Mailman School of Public Health launched the MTCT-Plus Initiative, a program designed to demonstrate the feasibility of HIV care and treatment in low-income countries. This initiative offered HIV services to pregnant, HIV-infected women and their families in eight African and Asian countries, ensuring the health of individuals and families while preventing mother-to-child transmission of the virus. The Pangaea Global AIDS Foundation supported testing, prevention and treatment programs in Rwanda and Uganda. And slowly but surely, programs in impoverished communities around the world changed the way people thought about the disease. Together, these groundbreaking programs provided “proof of concept” that HIV/AIDS could be treated in some of the poorest places in the world.

The fact that millions of people were dying from a treatable condition inspired a historic movement for universal access to HIV treatment, and the response was profound. The Global Fund to Fight AIDS, Tuberculosis and Malaria was established in 2002 and the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) was launched in 2003, with \$15 billion targeted for lower-income countries. These two initiatives signaled a transformation in support from the global community.

But money alone could not have stemmed the tide of the HIV epidemic. Health ministries and public health practitioners had to develop and introduce innovative ways to bring treatment to millions of people in countries with severe shortages of health workers, drug supply systems, laboratories and clinics. They engaged more personnel and brought testing, diagnosis

and treatment to people's doorsteps. They navigated political imperatives and trade regulations to ensure access to low-cost and generic drugs. They put information systems in place to record and follow patients over time—and to track each program's performance. And importantly, these efforts were incorporated into national-level strategies rather than functioning as stand-alone programs.

The results were remarkable: By the end of 2013, 9.7 million people in low- and middle-income countries had access to antiretroviral drugs. Although there is still a long way to go toward universal availability, enough progress has been made that the Joint United Nations Programme on HIV/AIDS (UNAIDS) has embraced a new goal of “zero new infections, zero discrimination and zero AIDS-related deaths.” Amidst that success are lessons on how to expand access to treatment for heart disease, diabetes and other chronic illnesses in the developing world.

THE PUBLIC HEALTH APPROACH

Many of the nations hardest hit by HIV have fragile health systems. Yet over the past decade, many of these countries have created their first large-scale chronic disease programs to successfully extend HIV services to millions in need. While other health assistance programs had historically focused largely on procurement—buying contraceptives or vaccines—the global investment in HIV programming launched one of the first large-scale, multifaceted chronic disease initiatives in history.

The key was to use a “public health approach” to service delivery. Public health focuses on big-picture thinking, bringing a population-level perspective to health challenges. Public health programs are designed to reach entire communities and countries with prevention, care and treatment services, in contrast to a “medical approach” in which efforts are focused on people who come to a clinic or hospital for care.

Access to effective medical care is, of course, critical to any health program. But where the medical model often starts with the sick patient who has come to a health facility, the public health model views such a patient as the tip of the iceberg—representing thousands more who have risk factors for an illness but have not yet acquired it, those who have the illness but do not yet have symptoms and those who have symptoms but are unable to reach help.

A program using the medical model might concentrate on how to help a young man with HIV coming to a clinic with a fever and a cough or his mother visiting a hospital with high blood pressure. In contrast, a program using a public health model would provide treatment for these patients, but would also bring services to community members who have not come to a health facility, including: education about disease prevention (providing

counseling on safer sex to prevent HIV or heart-healthy eating at schools, churches and community centers to prevent heart disease); diagnostic testing (providing screening for HIV or high blood pressure using mobile vans or local community health workers); and linkages to health services (providing information about when to seek care or assistance with transportation costs).

With this public health perspective, the architects of HIV scale-up realized that business as usual was not an option. In order to reach millions, things would need to change. Providing HIV treatment could not be limited to doctors. Engagement of patients and communities was a priority. Fragmented approaches would have to be coordinated. And standardized and streamlined guidelines and protocols were necessary.

MOVING BEYOND PHYSICIANS: TASK SHIFTING AND COMMUNITY ENGAGEMENT

More than 50 countries—including many of those hardest hit by HIV and heart disease—have what WHO describes as a “critical health workforce shortage,” with fewer than 23 doctors, nurses and midwives for every 10,000 people. Malawi, for example, has just one doctor per 50,000 people, compared with the United States, which has one per 390 people. Compounding the problem, most Malawian physicians live and practice in cities, beyond the reach of rural populations. More than a billion people will never see a health worker in their lives.

Given these statistics, it is clear that services delivered only by doctors will never reach the millions in need. A critical step in addressing HIV/AIDS was the recognition that other clinicians—nurses, medical officers, community health workers and trained laypeople—could effectively deliver HIV services. Because these clinicians are more plentiful and less concentrated in urban areas, shifting tasks away from doctors to other types of health workers—particularly nurses—has enabled some countries to reach many more people with life-saving health services. And research shows that even complex

protocols, such as administering antiretroviral drugs, can be delivered by nurses, rather than doctors, without sacrificing quality or health outcomes. By changing regulations about who can provide HIV treatment, some countries have swiftly increased the number of patients who can be treated—an approach that could also be used for heart disease and other chronic illnesses.

In order to be effective, chronic disease services need to be delivered in homes and communities as well as clinics and hospitals. Community leaders, community-based organizations, faith-based organizations and advocacy groups for people living with chronic illnesses are essential partners. In many countries, people living with HIV now work as “expert patients,” providing coun-

JUST THE FACTS

Malawi has just one doctor per 50,000 people,

compared with the U.S., which has one per 390 people, according to a 2008 U.N. report.

More than a billion people worldwide will never see a health worker in their lives.



HIV programs have introduced systematic approaches to clinical and laboratory screening as well as careful documentation of patient information, enabling ongoing monitoring and counseling to ensure adherence to protocols. Chronic disease programs could build upon these systems to accelerate a scale-up of services. A clinician in Tanzania screens a patient for high blood pressure (right); A clinician adds information to a patient file (bottom left); Patients receive medication and counseling from a pharmacy in Mozambique (bottom right).



selling and assistance to newly diagnosed peers. Community health workers provide ongoing emotional and practical support to patients and families, encouraging them to continue taking their medications and attending their appointments at the local health facility. Local organizations provide outreach, education and information about HIV, encouraging people to be tested and combatting stigma. New technologies, such as mobile phones, can be used to provide services and support from a distance. For example, HIV programs in Kenya use SMS text messages to remind patients to take their medications; people who were sent the texts did better than those who did not receive them.

STREAMLINING AND STANDARDIZING SERVICE DELIVERY

As funding for HIV services became available, governments quickly realized the dangers of fragmentation. It was not unusual to find two clinics, mere miles apart, using different forms, treatment algorithms and monitoring systems to treat

the same disease. Although diversity can certainly breed innovation, it can also overwhelm fragile health systems by creating duplicated efforts, mixed messages, incompatible data and unsustainable programs. In 2003, UNAIDS proposed the "Three Ones" principles, which state that each country should have only one HIV/AIDS action framework, one national HIV/AIDS coordinating authority and one country-level monitoring and evaluation system.

If asked to describe the components of a health care program, most people would think of the health worker, the medications and the clinic or hospital where the services are provided. But behind the intersection of patient and clinician or doctor lies a health system. Medicines need to be ordered, paid for and transported to health facilities across the country. Laboratories need to be equipped, pharmacies need to be stocked, clinics need to be staffed and staff need to be trained, supervised and paid. Records need to be kept and new supplies ordered on time. And in order to do all of these things rapidly, effectively and at scale, systems need to be as simple

as possible—and standardized throughout the country.

Large, public health-scale programs need the support of national policies and step-by-step guidelines that establish evidence-based, cost-effective protocols at every level of the health system: prevention, screening, diagnosis, treatment and support. For example, a national system might identify the “essential minimum package” of HIV (or diabetes or heart disease) services that every program should provide to every patient. These guidelines can help program planners calculate staffing needs, purchase equipment, design monitoring and evaluation systems and provide standardized training to large numbers of clinicians, counselors, pharmacists and lab technicians.

LEVERAGING LESSONS FROM HIV

Health ministries and program planners in lower-income countries are facing a daunting challenge when it comes to heart disease. Patients who seek services are just the tip of the iceberg. Behind them, tens of thousands of people remain unaware of what may be a life-threatening problem, living with unexplained symptoms, possibly unable to seek help or afflicted by asymptomatic conditions that remain invisible to them—and to the health system. To identify and help these individuals, successful programs must maximize outreach by engaging patients and communities, launching large-scale health programs to diagnose people with heart disease and providing life-long care to large numbers of people.

Addressing the epidemic of heart disease requires urgent and widespread intervention, and may move faster and more effectively by leveraging lessons learned from HIV programs and the public health approach they spearheaded. Creating simple and standardized guidelines—step-by-step instructions—for heart disease prevention, care and treatment would enable countries to run large programs efficiently and well. National heart disease programs could streamline and coordinate efforts using the “three ones” approach and by adapting already-existing tools and systems developed for HIV programs. Program managers could adapt HIV appointment systems, medical records and charting tools as well as strategies for tracking and supporting patients. Making simple diagnostics available and empowering nurses and other clinicians to prescribe and manage medications for heart disease and its risk factors would greatly facilitate diagnosis and treatment, especially in rural areas. And the involvement of patients and communi-

ties could be as effective for heart disease as it was for HIV.

Another strategy is to expand HIV programs into “chronic care clinics” that provide services for multiple chronic diseases. One program in Cambodia treats patients with HIV, diabetes and hypertension in the same clinics, using the same tools and medical record systems for all three conditions. A clinic in Uganda uses the same staff and systems to provide services for HIV on some days and for diabetes and heart disease the rest of the week.

Clearly, there are some important differences between the HIV and heart disease epidemics. Stigma is more of a challenge with HIV than with heart disease. In some countries, heart disease is more widespread than HIV, requiring broader outreach and different approaches. And a critical element in the success of HIV programs in low-income countries is that services are usually free to patients. Out-of-pocket fees and co-payments, no matter how small, have been clearly shown to reduce the likelihood that people will continue long-term treatment. Providing services free of charge and/or expanding low-cost or subsidized health insurance will greatly facilitate the fight against heart disease.

One of the most notable differences between the two epidemics is that they receive dramatically different amounts of funding. While official development assistance for the HIV response runs into the billions of dollars, funding for heart disease and other noncommunicable diseases remains extremely limited. According to the Center for Global Development, less than 3 percent of overall global assistance for health in 2007 went to chronic diseases, just \$503 million out of \$22 billion. Without additional resources, it will not be possible to scale up services for heart disease and to translate the lessons learned from HIV programs into action.

Overall, heart disease programs can benefit from the huge investments in HIV prevention, care and treatment programs. The global investment in HIV programming expanded health care programs; catalyzed health system innovations, such as empowering nurses and other professionals; decentralized services to reach people who previously had limited access to quality health care; and provided the analysis and evidence needed to demonstrate successful approaches to chronic disease services in lower-income countries. In this way, the response to HIV offers a critical platform to propel a rapid, effective scale-up of preventive and curative services to reach the millions who need them.

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6

RECOMMENDATION

IMPROVE ACCESS TO CVD DIAGNOSTICS, MEDICINES AND

Delivering Care Where It's Needed

AUTHORS

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The rural village of Chepkemel in western Kenya sits near Lake Victoria and the border of Uganda.

The residents rise early, leaving their mud-and-grass homes to tend fields of maize, sweet potatoes, beans and other crops. But Silas, a 41-year-old community health worker, rises earlier. Carrying a blood pressure monitor, his phone, data collection forms and a stack of educational pamphlets, he makes house calls before breakfast.

Four years ago, he noticed signs of hypertension—high blood pressure—in his neighbor Gladys, a 57-year-old mother of eight. He referred her to a doctor and she began taking medication. Today, her pressure is under control, one of many such success stories. By improving access to diagnostics and treatment, Silas and many others are improving the health of communities in many low- and middle-income countries.

The need is all too real. Death and disability from cardiovascular and related diseases have risen sharply in developing countries in recent years, fueled by a complex array of causes, from dietary changes and increased tobacco use to indoor air pollution. Four fifths of the world's chronic illnesses now occur in countries classified as low- or middle-income by the World Bank. The World Health Organization (WHO) estimates that collectively, heart attack, stroke, diabetes and other related diseases will kill 28 million people in Africa over the next decade—far outpacing deaths from malnutrition, starvation, childbirth complications and infectious diseases. In 2005, cardiovascular disease was responsible for twice as many deaths as HIV, malaria and tuberculosis combined





Doctors and nurses conducting ward rounds in Kenya's new Cardiac Care Unit, which officially opened in June 2013 in Eldoret.

in low- and middle-income countries worldwide.

Limited access to therapies for common conditions like high blood pressure exacerbates the problem. Funding and infrastructure is often lacking. Governments and relief organizations have, understandably, invested more heavily in treating infectious diseases and acute illnesses. But a striking lack of rural doctors and poor health care coverage are just two examples of the hurdles facing countries that are struggling to cope with cardiovascular conditions.

This growing burden of disease, coupled with inadequate care in these regions, led the U.S. Institute of Medicine's Committee on Preventing the Global Epidemic of Cardiovascular Disease to list the need for improved access to cardiovascular diagnostics, medicines and technology among its recommendations back in 2010. Many efforts to provide cardiovascular services in developing countries are now underway, the most successful of which involve strong collaboration among not-for-profit organizations, governments and private companies.

IMPROVING PUBLIC HEALTH IN INDIA

Coronary heart disease is reaching epidemic levels in India. The younger population is particularly hard hit, due in part to undiagnosed high blood pressure, increased smoking and inefficiencies in the health care system that leave these and other risk factors unmanaged. News of a 30-year-old who has suffered a heart attack is no longer a shocking event. About 25 percent of 30- to 59-year-olds die of heart ailments; among those under 64, that number jumps to 40 percent.

The economic consequences are severe. Stents implanted after a heart attack cost about \$3,000 whereas coronary bypass surgery runs between \$1,500 and \$5,000. These costs are prohibitive even for a mid-level employee (who earns about \$10,000 to \$12,000 a year). One study found that about 70 percent of Indians who suffer severe cardiac events face catastrophic expenses. Half are forced to sell property, and almost that many lose income. Most health care expenses in India—nearly three quarters—are paid out of pocket. Some companies offer widows compassionate employment when one of their workers dies, but that salary is usually too low to sustain a family. However, the economic impacts radiate further: WHO estimates that India will lose \$237 billion between 2005 and 2015 due to heart disease and diabetes.

India's health care system has been slow to adapt and is

already severely strained. The National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke was established in 2010, and although a preexisting cancer component is now active, other programs are yet to roll out nationwide.

The system also faces a severe shortage of skilled health workers, especially in remote rural areas. India doesn't meet WHO's recommended minimum of 23 doctors, nurses and midwives per 10,000 people, averaging just 19. But there is also an extreme shortage of both general practitioners and specialists—just 6.5 doctors per 10,000 people versus the global average of 14.2, with only a quarter practicing in the rural areas that are home to three quarters of all Indians. Most doctors prefer to work in the larger clinics and hospitals that are concentrated in the cities.

Public health expertise is also in short supply, as India did not invest in schools of public health until very recently. As a result, health care policies were not adequately informed by research. The design, delivery and evaluation of health programs fell short, failing to meet the country's health needs. To bridge the gap, the Public Health Foundation of India (PHFI) was launched in 2006 with initial funding from the government of India, the Bill & Melinda Gates Foundation and private donors. While launching the foundation, Manmohan Singh, India's prime minister, noted the importance of public health in India's development. "Ours is a demographically young country," he said. "The largest growing demographic segment in India over the next two decades lies between 15 and 59 years. This provides a wide window of opportunity to enhance human growth, provided we can productively deploy this vast human resource."

In collaboration with premiere research universities in Europe and the United States and a range of public-private partnership, PHFI has forged a model for addressing national health crises, one that Singh said, "can help blend the commitment of government with the operational efficiency of not-for-profit private groups."

One focus point is education. Five Indian institutes of public health now offer epidemiology, health promotion, research methodology and other on-campus and distance learning programs. Since 2008, these institutes have graduated some 1,500 public health professionals; another 17,000 have received shorter-term training.

In another initiative, PHFI is researching the effectiveness of India's current cardiovascular disease care efforts in partnership with Emory University and the London School of Hygiene & Tropical Medicine. These investigations include the role of lesser-trained health care workers in diagnosing and treating chronic disease and the efficacy of innovative mobile phone technology to transmit health data.

Other research is examining the impact of policy changes such as new, higher taxes on cigarettes. With more than 120 million smokers and nearly a third of the country using tobacco

in some form, the institute has given its use special attention. Among the younger population, smoking poses the greatest heart attack risk. The Indian government recently raised cigarette taxes to 18 percent, but far more people smoke bidis, which are far cheaper. And with a social stigma against females smoking, women tend to chew tobacco instead. PHFI is pushing to raise taxes on these products, too, with those revenues targeted for universal health care coverage. The organization is also working with law enforcement to ensure that India's formidable antitobacco measures are enforced—laws banning sales to minors and smoking in public places, and another requiring public service announcement screenings in movie theaters that detail tobacco's health hazards.

PHFI is also bringing technology to the frontlines of cardiac care. Rural health care workers are now inputting patient data into electronic tablets—blood pressure readings, blood sugar levels, blood test results, electrocardiogram readings and more—and then uploading that data to a primary care physician or a cardiologist so that problems can be addressed quickly. While the tablets cost the government \$400 each, a diagnostic test costs an individual just \$2.

PROVIDING COMPREHENSIVE CARDIOVASCULAR CARE IN KENYA

Because heart disease is considered a wealthy country problem, its rise in low- and middle-income nations is often believed

to exclusively reflect the lifestyle changes of an expanding middle class. The rate of cardiovascular disease in rural western Kenya contradicts that notion. Most people work the land and make about \$800 a year, yet stroke and heart disease rank in the top 10 causes of death nationwide. One in 10 people have high blood pressure; this high incidence may be due to both traditional causes, such as high salt intake, as well as more endemic causes, including indoor air pollution from burning wood or animal dung for cook fires. By 2025, this burden is expected to skyrocket globally: 75 percent of all hypertension cases worldwide will be in low- and middle-income countries.

Accessibility to diagnostics and treatment has been a major challenge. In Chepkemel, Silas's village, a clinician visits once a month. Much of their time is spent treating patients with acute illnesses, so the likelihood of early detection of heart problems—before costly complications ensue—is slim. For example, if hypertension is diagnosed early, medication needed to control it costs under \$2 per month, while treatment for later-stage hypertension in more sophisticated medical facilities costs an unaffordable \$10 per month; local farmers earn \$1 to \$2 per day. Left untreated, a debilitating stroke could make it impossible to ever work again, hospitalization is extremely

As part of World Heart Day celebrations, cardiac nurses and research assistants conduct hypertension and diabetes screenings in Kenya's Cardiovascular and Pulmonary Disease Center of Excellence.



costly—and a stroke could prove deadly.

In 2001, an international consortium of universities formed an organization to address the health care needs faced by the 3.5 million people living in western Kenya. The Academic Model Providing Access to Healthcare (AMPATH) partnership teamed Kenya's Moi University and Moi Teaching and Referral Hospital with U.S. medical schools, including Indiana, Brown and Duke universities, among others, initially to implement a comprehensive care program for patients with HIV/AIDS. More recently, AMPATH expanded its clinical scope to include the most common cardiovascular and related diseases: stroke, hypertension, heart failure, diabetes and rheumatic heart disease. By twinning implementation and delivery of care with a robust research program, the organization was designated a Center of Excellence to Combat Chronic Diseases by the U.S. National Heart, Lung and Blood Institute in 2009.

AMPATH collaborates with Kenya's Ministry of Health to work with community health workers like Silas, who are schooled in data collection and trained to monitor blood sugar, measure blood pressure and conduct other diagnostic testing. They are then dispatched to make door-to-door visits in their own communities. Villagers are comfortable sharing personal information with them, people who are their neighbors, making it a very effective program. Now, the entire adult population in this area is being monitored for hypertension and other cardiovascular issues.

But screening does not guarantee treatment. Access to even the most common medications in some places is difficult, if not impossible. The nearest government-run pharmacy may be far away, and though medicines are affordable, they are often out of stock. AMPATH is now helping communities create small pharmacies inside local health clinics; if patients have transportation problems or government supplies run out, they can purchase medications nearby for just a little more than what they'd spend at the government-run outlets. A new service supervises patients taking blood-thinning medications: By using devices that provide instantaneous test results, dosing can be adjusted immediately and individualized pillboxes could help promote adherence to treatment.

Although no existing records quantify exactly how prevalent chronic disease is in western Kenya, the numbers of people streaming through AMPATH's cardiovascular outpatient unit hints at the magnitude of the problem. The center has enrolled 4,000 patients, including 800 children; its inpatient cardiac care unit has treated more than 300 critically ill patients since



Tom Carrigan and Kevin Weatherwax from the University of Michigan and Balasundaram Lavan from Pace4Life recently traveled to Ghana as part of a medical mission to train local physicians on pacemaker implantation procedures.

opening in February 2013.

The organization is also a leader in the use of health information technology to improve care of patients in a low-income country setting, from electronic health record systems and computerized data collection to portable automated blood pressure machines and glucose testing kits. The hope is to empower community health workers to provide more effective care. Researchers are now evaluating the role of mobile devices; smartphone technology could be harnessed to prescribe medication and monitor patients in rural areas.

THE PACEMAKER RECYCLING MOVEMENT

A stark example of the inequity in cardiovascular treatment across the world is in the area of lifesaving implantable cardiac devices: pacemakers and cardioverter-defibrillators (ICDs) that are used to treat dangerously slow or fast heart rhythms. The need for such devices is increasing in developing countries for multiple reasons. In Latin America, a bite from the triatoma

bug often infects the victim with the *Trypanosoma cruzi* parasite. The resulting condition, Chagas disease, scars heart tissue, which may cause “heart block” or heart failure. The need for implantable devices is also on the rise from increasing numbers of smokers and people who suffer from high blood pressure or diabetes.

But they cost a small fortune, making them prohibitively expensive for people living in low- and middle- countries. The price of a pacemaker runs between \$2,500 and \$3,000, while defibrillators cost an order of magnitude more, anywhere from \$20,000 to \$40,000. A 2009 survey quantifying the yearly global use of pacemakers reported 767 implantations annually per million people in the United States versus only five per million in Bangladesh. About a million people may be dying every year due to lack of access to pacemakers. Some foreign manufacturers have reduced the price to \$800 per unit, which is still far more than the average annual income in many parts of the world. Although some donate their product widely through organizations like Heartbeat International, it's not nearly enough for everyone in need.

Recycling these devices is an obvious, if bureaucratically thorny, solution. While brand-new pacemakers and ICDs are expensive, previously used pacemakers can be harvested from deceased patients—they're always removed prior to cremation, and they can be sterilized and reused at a fraction of the original cost. Given that pacemakers generally last 10 years or more and roughly 40 percent of patients die within four years of receiving them, a significant fraction have enough remaining

battery life to be potentially reusable. Three quarters of pacemakers removed for medical reasons will continue working for another five years. Some heart patients request removal of the device in a living will; studies have found that family members and funeral directors are more likely to donate the device if there is a system in place to do so.

One organization that is attempting to build such a system is My Heart Your Heart, which studies and facilitates pacemaker and ICD reuse. It was founded in 2010 by physicians from the University of Michigan Cardiovascular Center in collaboration with the Michigan Funeral Directors Association; World Medical Relief, a nonprofit that helps people with medical and pharmaceutical needs in developing nations; and a company that recycles the metallic by-products of the cremation process, Implant Recycling, LLC. The group has already stockpiled more than 12,000 previously implanted devices and is working with Pace4Life in the United Kingdom to collect pacemakers and ICDs in Europe.

The numbers are promising, but in order to build a successful large-scale recycling program, a few obstacles must be overcome. Chief among them are U.S. Food and Drug Administration regulations that categorize pacemakers and ICDs as “single-use,” which means that those intending to reprocess them for reuse would need to comply with the same handling and product standards as the original manufacturer. These standards may be difficult to achieve by charities involved in device reuse, even though current reprocessing protocols have been shown to be safe.

Safety is the primary concern with “adulterated” products. Manufacturers cannot be held accountable for any malfunction during their second incarnation. The potential risks extend beyond the devices themselves: A worry is that reimplantation could, in theory, transmit infection from the donor to the recipient.

Numerous small cohort studies carried out over the last several decades suggest that the infection risk is really quite small. Recent research in Nicaragua, Mexico and India has found a low incidence of complications, on par with those in brand-new devices. Although these small case studies are promising, My Heart Your Heart is poised to conduct a large prospective multicenter study to determine the clinical efficacy and safety of pacemaker reuse.

In the meantime, many obstacles remain before cardiac pacemaker and ICD reuse can become mainstream and recycling remains, for the moment, more of a concept than a reality. To safely reuse devices on a large scale, rigorous and transparent protocols will be needed to carefully collect, evaluate and reprocess pacemakers in the U.S.—with careful oversight. Collaborations between medical facilities, the funeral industry and nonprofit funders will also be necessary in low- and middle-income countries.

Cardiovascular disease can no longer be stereotyped as a “rich world” disease. With nearly 30 percent of deaths in low- and middle-income countries now attributed to coronary heart disease, stroke and other related ailments, these nations need the infrastructure to cope. Poverty, too few doctors and other systemic issues thwart early detection, which allows costly and debilitating complications to arise. However, rising necessity sparks novel strategies that will ensure access to diagnostics,

medications and technology.

Gradually, these innovations are creating a new landscape. It is visible when a sugarcane grower in Andhra Pradesh, in southeastern India, pays \$2 for a 33-point diagnostic test or when a funeral home director inquires about pacemaker donations. And it is transforming the hillsides of western Kenya, as Chepkemel's residents emerge from their homes asking when Silas will arrive.

The economic consequences are severe.

[In India] stents implanted after a heart attack cost about \$3,000 whereas coronary bypass surgery runs between \$1,500 and \$5,000.

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Get Down to Business

The Role of Private Industry

— AUTHOR —

Jose M. Saavedra

The global epidemic of coronary heart disease, stroke and related illness is fueled by just a very few risk factors. At the top of that list are smoking, inadequate exercise and unhealthy eating habits—specifically a high-calorie diet laden with fat, salt and sugar. Cardiovascular diseases and diabetes are on course to become a global epidemic, affecting countries across the economic spectrum. Together, they account for about 18.6 million premature deaths worldwide, predominantly in developing nations.

Although deceptively simple changes in behavior can decrease those risks, altering habits isn't easy, even under the best of circumstances. In many places, poverty, geography, war or other factors can make lifestyle changes even more difficult. A major collaborative effort by all who have a stake in the health and well-being of the population is needed to undertake the immense challenge of controlling this epidemic.

Over the last few decades, as the world realized that chronic diseases are rising dramatically in developing countries, governments and policy makers viewed food companies as one force behind unhealthy dietary habits. But today, leading food companies are slowly beginning to see themselves as contributors to the health of the communities that consume their products, and some have begun taking steps to help curb rising rates of cardiovascular diseases. Investors are closely watching this food industry transformation, and have begun ranking companies based on

their efforts to fight obesity. It's a move that would have been unheard of even a few years ago.

With this dawning realization of the need for collaboration to produce healthier products and promote healthier diets, the adversarial stance between policy makers and industry has begun to soften. Industry leaders have also stepped into major roles in World Health Organization-led discussions on ways to reduce the global burden of chronic diseases.

Bringing industry to the table is a necessary step, as outlined in the Institute of Medicine's 2010 report, "Promoting Cardiovascular Health in the Developing World." It specifically called on the food industry, including the International Food and Beverage Alliance (IFBA), to play its part in reducing dietary intake of salt, sugars, saturated fats and trans fats. The process, it noted, "should include stakeholders from the public health community and multinational food corporations as well as the food services industry and retailers."

Such collaborative efforts are just beginning to emerge. The IFBA, formed in 2008 by CEOs from some of the world's largest multinationals, pledged support to WHO's Global Strategy on Diet, Physical Activity & Health. The IFBA committed to developing new, healthier products; reformatting existing ones; providing complete, understandable nutritional information and ensuring responsible advertising campaigns for products marketed to children. A

“...leading food companies are slowly beginning
to see themselves as contributors
to the health of communities that consume their products.”



recent three-month analysis of newspapers, magazines, Web sites and TV stations in eight countries found almost total compliance with IFBA's commitments toward responsible advertising directed at children by the 11 members of the alliance.

Partnerships are yielding results. In the United States, for example, 16 food and beverage companies teamed up with Michelle Obama's Partnership for a Healthier America to eliminate 1.5 trillion calories from the nation's marketplace by 2015. The Healthy Weight Commitment Foundation announced that by January 2014, they had exceeded that goal by 400 percent—and had sold 6.4 trillion fewer calories in 2012 than they did in 2007. But we still have a long way to go.

TACKLING THE OBESITY EPIDEMIC

People across the globe are exercising less while eating greater amounts of fattier, saltier, higher calorie, more sugar-laden foods. This type of diet contributes directly to weight gain, high blood pressure, high cholesterol and increased risk of heart attack, stroke and diabetes. Although it appears that obesity rates in wealthy nations are beginning to plateau, the trend is worsening in developing countries.

The statistics are alarming. Global obesity has more than

doubled in the last three decades. Today, more than 1.4 billion adults—35 percent—are overweight, and 500 million are obese. Scarier yet, in 2011, one fifth of children aged five to 17 were overweight, a 60 percent rise since 1990. Most of those children live in developing countries. Studies show that obese children generally become obese adults, and extra weight contributes to nearly half of all diabetes cases and a quarter of coronary heart disease cases.

Currently, 65 percent of the world's population lives in countries where obesity kills more people than undernutrition and starvation. In poor countries, the obesity epidemic coexists with persistent malnutrition. Together, this double burden bears great health and economic consequences.

What's especially frustrating about the obesity epidemic is that it is avoidable. It's clear that preventing obesity will require societal and individual behavior changes—and there is a recent population-wide, public health precedent: tobacco. The WHO's Framework Convention on Tobacco Control, adopted in 2003 and implemented two years later, detailed the dangers of tobacco and set limits on sales, distribution and advertising around the world.

Many believe that a similar framework aimed at society in general, and the food industry in particular, could stem the rising tide of weight-related ills. But a tobacco-control program is dramatically different from a healthy diet program. Humans need food to survive, and meals are part of the social and cultural fabric of communities. And while cigarettes can be universally deemed unhealthy, it's hard to argue for a complete ban on soda, chips or family recipes. More importantly, the determinants of eating behaviors and obesity risk are present throughout the life cycle.

The ultimate goal is to influence food choices and dietary habits in people of all ages. The Institute of Medicine report notes: "Accumulation of cardiovascular risks begins early in life, and strong evidence supports the value of starting cardiovascular health promotion during pregnancy and early childhood and continuing prevention efforts throughout the life course." Infants born to obese mothers are themselves at higher risk of obesity and by two years of age, an infant's weight is already predictive of their obesity risk as an adult. Breast-feeding alone decreases obesity risk. Metabolic patterns, taste preferences and diet patterns are imprinted in the first 1,000 days of life (gestation to two years of age), and are shaped by how infants and toddlers are fed. Healthy—or unhealthy—diet and eating habits start at home, influenced by cooking, choices of both fresh and packaged foods and family meals and snack patterns. Helping parents instill healthy eating habits could prove to be the most effective obesity prevention strategy. Changing established poor habits is a greater challenge, requiring education (and reeducation) on healthy eating, and initiatives that promote these habits at home, at school and in the community.

The bigger picture is even more complex. Diet is inextricably linked to other global challenges. There is a pressing need to produce more nutritious foods while preventing obesity as countries develop and gain affluence. Food production must double by 2050 to feed some nine billion people, according to United Nations estimates. These problems grow thornier with a growing global water crisis that requires radically altered water use for agriculture, with food crops being diverted to bio-

"After decades of supersizing and encouraging consumer tastes for products high in fat, sugar and salt, companies now need to reverse the message."



fuel production to meet rising energy needs—and with nearly two billion rural subsistence farmers living in poverty. There is also the need to grow food amidst increasing drought and devastating floods as the effects of climate change grow more extreme. These issues need global solutions that safeguard farmers' livelihoods, maintain food safety and are implemented in an environmentally sustainable way.

CREATING HEALTHIER PRODUCTS AND PROMOTING HEALTHIER DIETS

Although it's tempting to think that companies could easily fix some obesity-related issues by drastically reformulating their products, it's not that simple. Take the example of Campbell's Soup, the world's largest soup maker. In February 2010, the company announced that it was slashing salt levels in one line of its condensed soups by 45 percent. A surprising second announcement came a year and a half later: The company was putting much of that salt back in to combat lukewarm sales. Creating healthier products does little good if consumers won't eat them.

Consumer taste preferences matter. In a seven-country survey conducted by Unilever and the International Union of Nutritional Scientists, 80 percent of those polled felt no need to reduce their salt intake and listed taste as their top priority in food choices. If manufacturers change the sodium content in their products—without testing for taste preference, without pricing it affordably and without education on why it matters—these efforts are likely to fail.

After decades of supersizing and encouraging consumer tastes for products high in fat, sugar and salt, companies now need to reverse the message. This means finding a balance between acquired tastes, habits and health concerns. Such efforts need support from public and private health programs that educate consumers on nutrition.

In the U.S., the poorest paradoxically have the highest rate of obesity. Processed products, particularly those with added sugars and high fat content, are far cheaper than nutrient-dense whole-grain breads, fresh fruits and vegetables, seafood and lean meats. Farm subsidies for corn, soy and other grains have boosted the production of increasingly affordable processed food, to which added fat and sugar (including the ubiquitous high fructose corn syrup) decreases their nutritional value. Too much added sugar of any kind contributes empty calories, causes weight gain and raises risk for type 2 diabetes, high triglyceride levels and heart disease. Policy makers can help align support for agri-



Products from Unilever, Nestlé and Danone

“Nonprofits and investors are tracking industry performance and rewarding companies that take decisive steps toward manufacturing healthier products.”

culture with growing nutritional concerns, making it easier and more cost-effective for companies to produce healthier packaged food—and there is a growing demand from consumers in both wealthy and lower-income countries for such products. One study found that these healthier options accounted for 39 percent of overall packaged food sales and 72 percent of sales growth in sales from 2007–2011.

Few people follow government-established dietary guidelines. A recent study from University of California, Davis, found that to be true for most Americans, and low-income consumers were even less likely to do so. They cited prohibitive prices and availability as primary reasons. Retail prices of fruits and vegetables rose by almost 120 percent from 1985 to 2000, about six times the rate of soft drinks and three times more than fats or sweets. Those living in poor neighborhoods are inundated with unhealthy offerings: “dollar” menus at fast-food restaurants and corner stores that sell snacks, instead of farmers’ markets in middle-class neighborhoods that sell fresh produce. That will have to change, and industry is beginning to take notice.

JUST THE FACTS

Worldwide, more than 1.4 billion adults are overweight, and 500 million are obese.



ADDRESSING CORPORATE CHALLENGES

The solutions will ultimately require participation of individuals, families, communities, government, nonprofit organizations, academia, the media—and industry. Historically, mistrust has inhibited and undermined collaboration with industry, in part because of a lack of corporate transparency and the lack of common nutritional and health standards for

***“People across the globe
are exercising less while eating...
fattier, saltier, higher-calorie,
more sugar-laden foods.”***



products. Industry needs to reassess and innovate its business models to meet these societal challenges. C. K. Prahalad, best known for documenting the correlation between sustainability and innovation, wrote, “Innovation in business models is key... No single firm can do it alone. Successful firms build an ecosystem of local entrepreneurs, small- and medium-size firms, NGOs and large firms acting together as one. The solutions must be co-created.”

The corporate bottom line is always in play. There is intense pressure to satisfy shareholders, boost sales and maintain profit margins today, which counters attempts to manufacture healthier products with lower demand. Often, even if a company’s CEO has embraced change, the ideas may not fully trickle down to the company’s marketing practices, says Derek Yach, an ex-WHO health policy expert who led nutrition-based efforts at PepsiCo until recently. Companies must devote as much effort to producing and selling their wholesome products and educating consumers as they do promoting less healthy choices like cookies and potato chips—and the public sector must reinforce the benefits of those healthier choices.

Companies that work with governments and NGOs to co-create better food choices will help everyone understand the value (benefit for the cost) of healthier diets, and will benefit from a more loyal and sustainable consumer base. Incorporating shared value as part of companies’ business models can greatly improve health while allowing industry and the economy to do well by doing good.

In the short term, leadership is needed and some companies are showing greater dedication to nutrition, health and wellness. For example, Nestlé has set targets for reducing public health-sensitive ingredients (salt, trans fats, total fat, calories

and artificial colors) in its products. By 2011, the company had eliminated 12,500 tons of salt from its recipes and was using 9,000 less tons of sugar in its breakfast cereals. Cereal Partners Worldwide, Nestlé’s joint venture with General Mills, is cutting sugar content in 20 breakfast cereal brands to nine grams or less per serving by 2015.

In 2004, the company developed its Nestlé Nutritional Profiling System (NNPS) for benchmarking its products against recommended values from WHO and other independent authorities. The system evaluates a product’s nutritional content, considering its role within a balanced diet, its ingredients (including sodium, fat, added sugars, calcium and whole grains) and the serving size consumed by adults or children. Over the eight years since the system was adopted, three quarters of Nestlé’s products—and 89 percent of its children’s products—had adequate nutritional criteria.

Unilever’s Nutrition Enhancement Program, launched in 2003, has also reduced salt, sugar and both saturated and trans fats in their products. By 2012, the company had removed trans fats from partially hydrogenated vegetable oil in all of their products. Reformulations are also generating spreads and ice creams with less saturated fat. More than half of the company’s foods meet WHO standards for maximum salt levels; their goal is to reach this standard for all products by 2020.

PepsiCo, too, has launched nutrition-based programs. Five years ago, a quarter of the company’s beverages sold in the U.S. had lower-calorie options; that number is now 50 percent. The company’s Frito-Lay division has reduced sodium levels in chips by 25 percent; other “lightly salted” corn and potato chips have half the sodium of the original products.

INDEPENDENT VIEWS

Nonprofits and investors have begun tracking industry performance and evaluating companies on the nutritional quality of their products and their marketing practices. One of these watchdogs, the Access to Nutrition Index (ATNI), is a new global enterprise that rates food and beverage manufacturers’ contribution to obesity and poor nutrition. The program, launched with funding from the Bill & Melinda Gates Foundation, the Wellcome Trust and the Global Alliance for Improved Nutrition, published its first assessment of the world’s 25 top food and beverage manufacturers in 2013. The ATNI Index rated companies according to the types of products they sell, their marketing strategies, the degree of truth and transparency in their food labels, and their degree of engagement with policy makers.

The organization’s findings showed much room for improvement. Just three companies—Unilever, Nestlé and Danone—ranked above 5 on a scale of 1 to 10 (with 10 rating highest). Most ranked under 3. Despite commitments from 16 companies to create heart-healthier products, just five have revealed concrete plans to do so. And only three companies—Grupo Bimbo, Nestlé and Unilever—have disclosed targets for reducing salt, sugar, fat and trans fats in their portfolios.

The ATNI report noted that, “While some companies have commitments to make their healthy products more affordable and available, few provided evidence of actually having done so.” And although most are taking at least some action, the ATNI wrote that, “across the board, the world’s largest food

and beverage manufacturers can do substantially more to improve consumers' access to nutrition."

The intent is not to name and shame companies, said Inge Kauer, the ATNI's executive director, "but instead to highlight strong practices and to provide a means for companies to benchmark their approach to nutrition against their peers and identify areas for improvement."

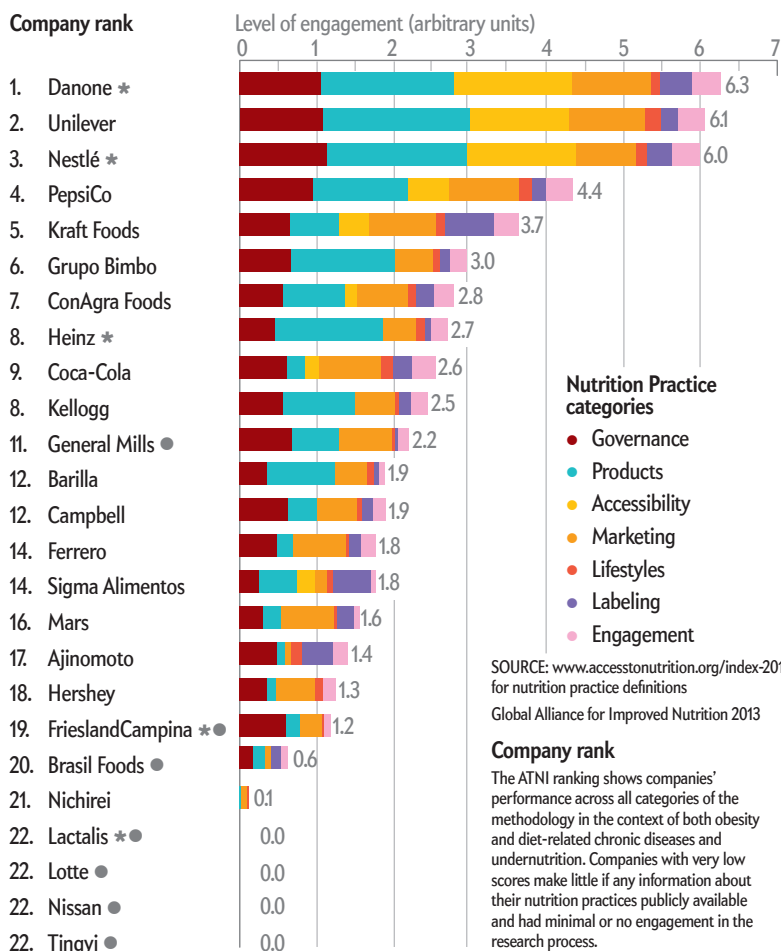
The index is already changing the landscape. Companies that previously failed to provide information are now promising to engage in the next round, with reporting due in 2015. Perhaps that is because the index is also recruiting the support of socially conscious investors. Forty investment firms from around the world have signed the ATNI's investor's statement, committing to the philosophy that health and nutrition are crucial drivers of future growth in the food and beverage sector.

It can be argued that food companies that manufacture infant formula require particular investor oversight because their marketing practices can derail mothers from exclusively breast-feeding babies for the first six months of life, with significant health consequences. *The Financial Times* and London Stock Exchange socially responsible investment index (FTSE-4Good) has developed an assessment of companies' commitments to compliance with WHO's International Code of Marketing of Breast-Milk Substitutes.

At least one major firm, UBS, has incorporated index rankings in its sustainable investing reports, endorsing the idea that a low ranking from an independent body such as the ATNI represents a long-term risk to the company. In August 2013, Bank of America's corporate and investment banking division released a report that rates stock values in the food, pharmaceutical, weight loss and sports industries on how effectively they target obesity. As big investors begin to cite performance and commitments to nutrition as reasons to invest, industry players should come onboard.

ACCESS TO NUTRITION INDEX 2013

Top 25 Companies Engaged in Positive Nutrition Practices



SOURCE: www.accesstonutrition.org/index-2013 for nutrition practice definitions
Global Alliance for Improved Nutrition 2013

* Breast-milk substitute manufacturer

● Company did not provide information to ATNI's research partner during the research phase

Poor diets are inextricably linked with the epidemic of non-communicable diseases, and improving them is everyone's responsibility. Collaboration between companies, government agencies, NGOs and the public can help create a virtuous cycle, where food supply and demand meet—on a healthier plane. To quote Charles Darwin, "In the long history of humankind... those who learned to collaborate and improvise most effectively have prevailed." As a species, we owe this to ourselves.

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MORE TO EXPLORE

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COLLECTING RELIABLE DATA

*Improving National and Subnational Surveillance Data:
The Models of Bangladesh, Iran and Chile, and the Role of PAHO*

AUTHORS

C. James Hospedales, Reza Malekzadeh, Daniela Godoy,
Andrew Mirelman and Paolo Boffetta

Matlab, Bangladesh, is home to one of the longest-running health and demographic surveys in the developing world. Traveling on foot or by rickshaw, local women regularly visit villages to collect data in this rural subdistrict, where people live in huts topped by corrugated tin roofs and work in the verdant green rice paddies nearby. Going household to household, the surveyors use a small tablet computer to enter basic information on the latest births, deaths, marriages and changes in socioeconomic status as well as health details such as the frequency of prenatal care in expectant mothers, incidence of pneumonia and the prevalence of dysentery among children.

The Matlab survey was started in 1966 to track the lethal, infectious scourge of cholera. Since then, it has amassed nearly a half century of data on more than 200,000 people in 142 villages. But as cholera came under control, the study documented an unsettling new threat.

When the survey's director, Peter Streatfield, graphed mortality data from 1986 through 2009, the trend became quite obvious. On his color-coded graph, small bars of green, yellow and pink represented maternal and infant deaths, fatal injuries and "miscellaneous" causes of death. Shortening blue columns depicted declining deaths from infectious disease—while a swelling wall of red reflected a rising tide of chronic diseases, such as heart disease, stroke and cancer. The chart "bleeds out red," said Tracey Koehlmoos, a health systems and policy scientist who worked in Bangladesh

from 2006 to 2012. "All of a sudden...more than half of the deaths in Matlab come from noncommunicable diseases," she said, in particular, cardiovascular problems.

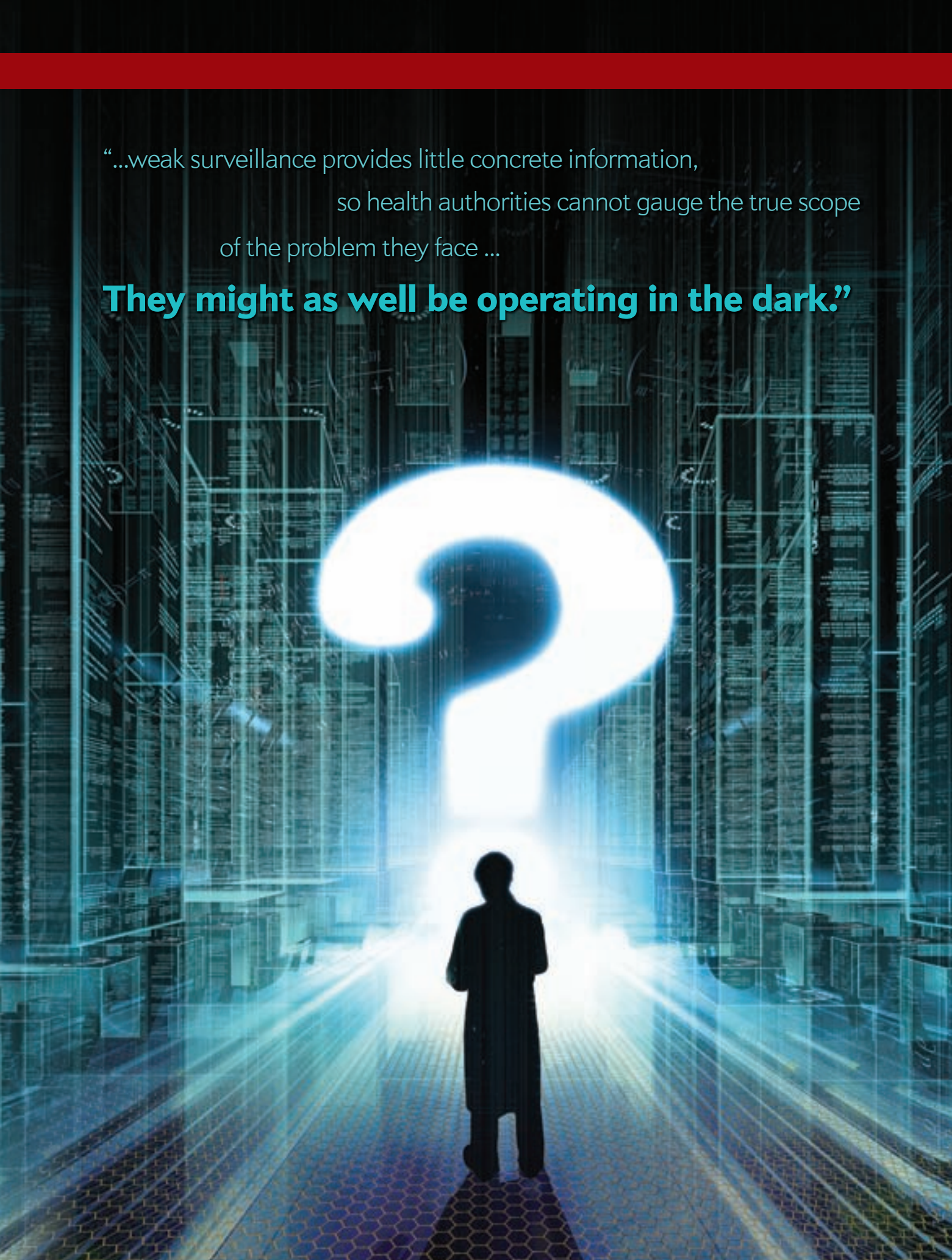
Similar stories are playing out in many of the world's developing countries. It is a narrative that underscores a need to redirect the focus of many existing health programs. Typically, they focus heavily on infectious childhood killers and maternal health while ignoring the escalating epidemic of heart disease and stroke. In many nations, weak surveillance provides little concrete information, so health authorities cannot gauge the true scope of the problem they face or prioritize efforts to combat it. Nor can they accurately evaluate whether public health interventions are working. They might as well be operating in the dark, and without reliable data it's difficult for policy makers to meet the needs of their people. The greatest danger is the failure to take action.

In countries with effective health information networks, data is readily available on how often diseases occur, how many lives they take, the disabilities they cause, the risk factors that foster them—and the economic impact. Monitoring programs can reveal new trends, such as rising obesity rates. They can also pinpoint groups whose health may be at risk because of social, economic or environmental factors that may include poverty, poor education or heavy environmental pollution.

The World Health Organization (WHO) and other global health agencies are assisting developing nations to establish surveillance programs that track heart disease,

“...weak surveillance provides little concrete information,
so health authorities cannot gauge the true scope
of the problem they face ...

They might as well be operating in the dark.”

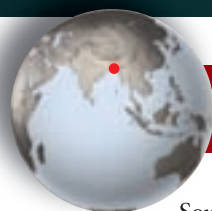


stroke and other chronic illness. These agencies are helping translate Western expertise into projects that can be implemented by countries with cash-strapped budgets and few resources. For those that can't set up a nationwide system—the ideal scenario—a small network of local health registries and surveys collect

valuable data. In the end, limited high-quality information is far better than an overambitious system that generates poor data. To generate accurate data, WHO devised a standardized protocol to measure risk factors for chronic diseases. Their “STEPS” framework questionnaire tallies potential health risks

such as socioeconomic status, poor diet, tobacco use and exercise habits; physical exams measure weight, height and blood pressure; while blood tests measure glucose levels and cholesterol.

Unreliable information not only drains limited health coffers, but may also prompt misguided policy choices



Bangladesh: Small steps toward a sustainable surveillance system

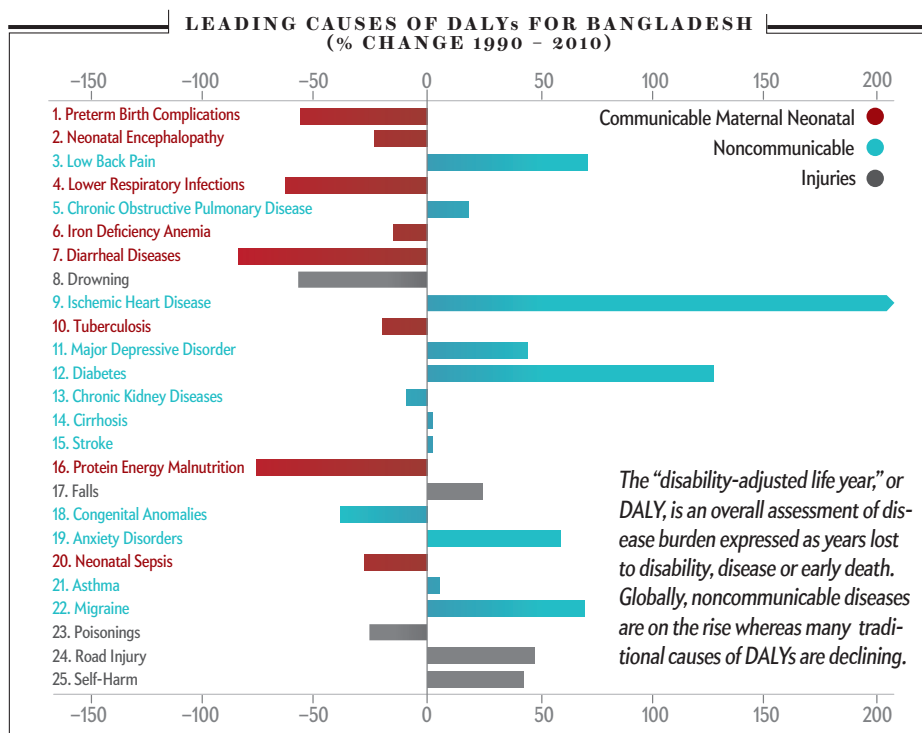
Aging populations in Bangladesh and across South Asia are increasingly falling prey to noncommunicable diseases. The years of healthy life lost to ischemic heart disease—the type that clogs arteries and triggers heart attacks—soared by more than 200 percent between 1990 and 2010 in Bangladesh, according to a recent estimate from the Global Burden of Disease, Injuries and Risk Factors Study by

part of the larger INDEPTH global network of health and demographic surveillance systems. In all, 42 INDEPTH centers observe the life events of millions of people in 20 developing countries in Africa, Asia and Oceania. Four of these sites are in Bangladesh. Although INDEPTH data have mirrored a general trend of escalating chronic disease, specific details of the epidemic are not always the same in different regions.

Other projects have also helped fill the information gaps. One of those, the 2006 Bangladesh Urban Health Survey, interviewed more than 12,000 households in Dhaka, Chittagong and four other cities, discovering that more people living in slums were overweight than those living in higher income neighborhoods.

In 2007, the government made noncommunicable diseases an official priority. That year, the Ministry of Health and Family Welfare developed a three-year strategic plan to monitor and prevent chronic illnesses. They started by calling for government hospital cooperation in reporting chronic disease cases to a central records database, though progress has been slow.

Three years later, the health ministry and the Bangladesh Society of Medicine incorporated the STEPS protocol to gain a country-wide perspective on the cardiovascular health problem. Researchers discovered that 99 percent of the population had at least one heart disease risk factor, while many Bangladeshis had multiple strikes



SOURCES: World Bank, 2011; Institute for Health Metrics and Evaluation, 2013

the Institute for Health Metrics and Evaluation in Seattle.

Bangladeshis now develop heart disease about 10 years earlier than in the West, and cardiovascular illnesses account for more than a quarter of all deaths. But there is no formal national program that regularly tracks cardiovascular problems or their risk factors. The current picture has been largely pieced together from disparate, often small or limited ad hoc studies in various locales conducted by various government departments, NGOs and research institutes.

The Matlab surveillance, which is overseen by the International Center for Diarrhoeal Disease Research, Bangladesh, is

against them: about 77 percent had two risk factors, while 28 percent had three. The most common problems were a poor diet lacking sufficient fruits and vegetables, not enough exercise—and smoking was rampant among men.

Bangladesh has a strong tradition of health research. An updated plan for 2011–2015 aims to establish strict data collection standards and better linking of various monitoring projects through the Bangladesh Network for NCD Surveillance and Prevention. By taking formal policy steps toward better surveillance of heart health, they are setting an example for other countries in South Asia.

with major health or economic repercussions. Without sound data on how often people seek or follow medical treatments, for example, a program that provides free hypertension drugs might well fail because patients don't sign up or don't take their medication regularly,

continued on next page

TYPES OF SURVEILLANCE SYSTEMS FOR CVD			
	CENSUS-BASED	SURVEY-BASED	STUDY-BASED
Inclusion	Whole population	Representative sample of the population	Selected population (convenience sample)
Advantages	No need for statistical inference	Cost-efficiency	Possibility of intense data collection
Disadvantages	Expensive to implement and maintain	Complex to reach high validity	Lack of external generalizability



Iran: Lessons from Golestan Province

Over the past quarter century, dramatic economic growth has ushered in a higher standard of living across Iran. Today this middle-income nation is in the intermediate phases of a growing chronic disease epidemic. Monitoring by both government and university research groups has provided a reasonably good assessment of the problem: Heart attack and stroke are the culprits in close to half of all deaths.

Twelve years ago, the Center for Disease Control in Iran's Ministry of Health and Medical Education began implementing large-scale projects to monitor heart health. But academic research centers such as Tehran University, Shiraz University and the Isfahan Cardiovascular Research Institute have helped drive nationwide health surveillance projects, where local health registries gather data on patients with heart disease or other noncommunicable illnesses.

One such program, a long-term study of 50,000 adults in the northeastern province of Golestan, was launched in 2004 by Reza Malekzadeh, Paolo Boffetta and their colleagues in a broad collaboration between the International Agency for Research on Cancer, WHO, the U.S. National Cancer Institute, Tehran University of Medical Sciences and Icahn School of Medicine at Mount Sinai. Perched on the Caspian Sea, Golestan is dominated by wheat and rice fields that are tended by descendants of Turkmen nomads. Collecting data there is relatively straightforward because of a fairly well developed rural public health network, which employs *behtarz*—community health workers.

With their help, field research teams invited all 40- to 75-year-old residents in 326 villages to come to their local health center to answer health questionnaires and give blood, hair and urine samples. They also surveyed urban residents in the provincial capital of Gonbad. This cohort has now been followed for a decade, including careful documentation of deaths using verbal autopsies and hospital records.

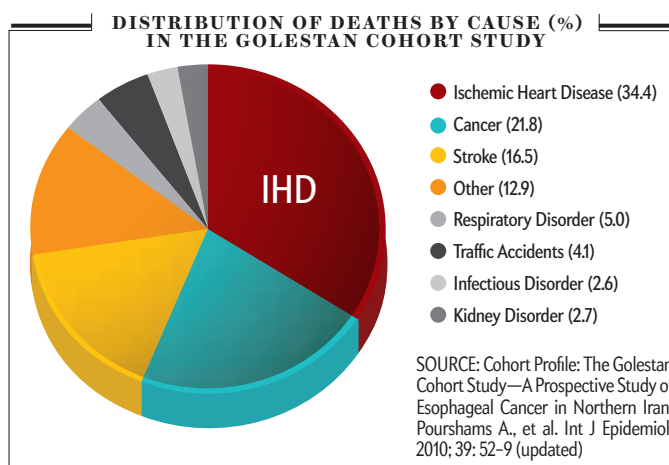
Although the investigators originally went into Golestan to study esophageal cancer, they were shocked to discover the large numbers of residents, especially women, who were overweight or obese. Their survey revealed alarming impacts from cardiovascular illnesses. Amongst every 100,000 women, 435 died from heart attack and stroke each year; 614 out of every 100,000 men met the same fate.

The reasons are clear. With rapid modern progress, Irani-

ans are eating more. Everyone drives to work or school rather than walking. Farming machinery has replaced manual labor. Several studies have estimated that more than half of all Iranians are overweight or obese and about 25 percent have hypertension. About one third have high cholesterol and triglyceride levels; 10 percent suffer from diabetes.

Motivated by such statistics, several public health initiatives have promoted heart-healthy habits, such as eating less salt and exercising more. Unfortunately, changing people's lifestyles and daily habits is not easy.

Malekzadeh and Boffetta realized that the Golestan project was the perfect venue for testing an alternative strategy.



The “polypill” was first proposed in 2003 by U.K. preventive medicine specialists Nicholas Wald and Malcolm Law: A way of preempting heart attacks and strokes by treating all older adults with a single, inexpensive daily pill that combines low-dose aspirin, a cholesterol-lowering statin drug and blood pressure-lowering medications. Iran's rural community health workers were trained at little cost to deliver the polypill in a way that adhered to strict guidelines. In 2011, the research team launched a five-year clinical trial in 7,000 older adults in Golestan using a domestically manufactured experimental polypill. The investigators expect preliminary trial results in 2014. Their projections: This preemptive treatment could prevent half of premature cardiovascular disease cases and extend the average adult life span by 10 years in Iran.

Good health data sparked this prevention trial, illustrating how health monitoring research can spur public health measures that may reverse the trends of rising cardiovascular disease.

wasting resources and losing an opportunity to improve health. And without surveillance data, governments can simply choose not to act against disease threats.

Amassing valid information on the leading causes of death is crucial for public health policy makers. That's not easy in many countries, where a death certified by a doctor can be a rare thing.

But those data can be gathered by trained fieldworkers who interview family members or neighbors about the symptoms that led up to a loved one's death. Physicians or other health personnel can then review these "verbal autopsies" and categorize each case within broad groups, distinguishing, for example, a heart attack from a respiratory ailment.

Emerging technologies are changing surveillance systems, making it possible to now capture and transmit data with cell phones, pinpoint locations with GPS devices and maintain electronic health records. Matlab stands as a model. For decades, field staff recorded their data within big books of color-coded forms. In 2008, they began using handheld personal digital assistant (PDA)



Chile: From national surveillance to comprehensive health policies

The heart disease epidemic in Chile, an upper middle income country, is much akin to that of western Europe where cardiovascular disease is the biggest killer. From 1960 to 2009, the number of overall deaths induced by cardiovascular and related diseases more than tripled, jumping from 8.7 to 27 percent, according to the Chilean Department for Health Statistics and Information. But with earlier diagnosis and treatment, the numbers are looking better than they did a decade ago. In 1997, 162 out of every 100,000 Chileans died of heart-related problems, but by 2007, that number had dropped to 137. Ministry of Health statistics showed. While risk factors continue to rise, the Chilean government has generated the information needed to build comprehensive health policy and intervention efforts.

Since 2000, the Ministry of Health has used a new countrywide health surveillance system dedicated to noncommunicable diseases. It built on previous efforts that had assessed lifestyle habits, diseases and health risk factors, most importantly, the Encuesta Nacional de Salud, (National Health Survey) that was launched in 2003. When it was repeated in 2009-2010, fieldworkers interviewed 5,434 people aged 15 and older in a random, representative sampling of Chilean residents. The surveyors used PDAs to gather data about participants' health status and living conditions; they also measured height, weight and blood pressure and collected blood and urine samples.

This study discovered a nation rife with heart attack and stroke risk factors: 67 percent of Chileans are overweight or obese and more than 80 percent do not exercise enough. Some 27 percent have high blood pressure and nearly 10 percent are diabetic. A huge proportion smokes: 40 percent, with one of

the highest rates of smoking among teen girls worldwide.

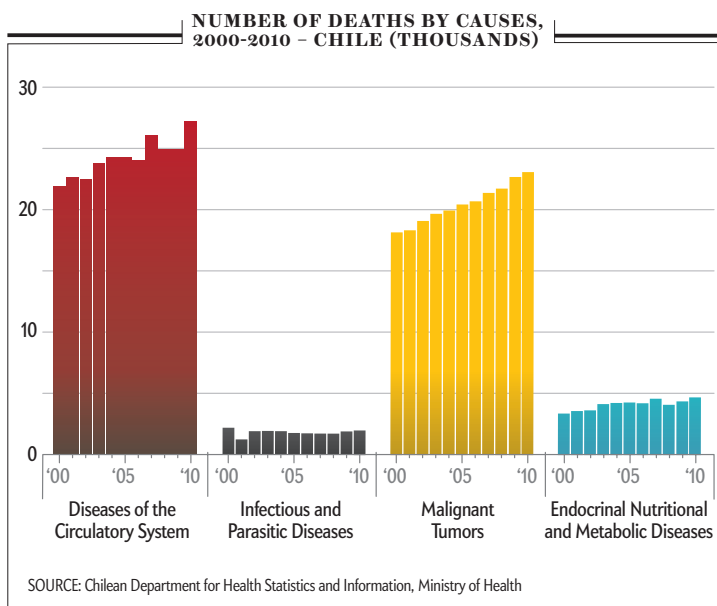
The odds of cardiovascular trouble generally grow, hand in hand, with inequities in income, resources, social status and political power. The national survey found that less educated Chileans tend to be sedentary, overweight and have elevated blood pressure. Another survey found that nearly one third of girls under age seven who lived in extreme poverty were overweight or obese, compared with 5 percent of girls from wealthy families.

With substantial information in hand, the next step was to craft comprehensive public policies to both lower health risks and address the inequities associated with them. In 2011, then-

First Lady Cecilia Morel launched *Elige Vivir Sano* (Choose to Live Healthy). It's an initiative that weaves together policies and programs developed by various ministries and public agencies that influence behaviors and reduce risk factors associated with cardiovascular diseases. It promotes healthy habits, like nutritious eating, exercise and spending more time outdoors with family, and improves access to healthy lifestyles and habits among disadvantaged populations.

This policy was signed into law in 2013 to better coordinate initia-

tives from across government ministries, with support from the private sector. School physical education classes were increased from three to four hours per week for seven- to 10-year-olds. Over 270 new playgrounds were built across 172 districts. Hundreds of healthy lifestyle workshops and sporting events were held across the country, financed with help from private companies. From 2009 to 2012, participation in sports and other physical activity increased significantly while those who remained sedentary fell by 3.7 percent, according to data from Universidad de Concepción. However, the challenge of whether *Elige Vivir Sano* is improving the health of the Chilean population can only be answered with long-term data.



devices, and have recently switched to computer tablets. Digitizing data not only saves time and reduces errors, but allows researchers to map village and household coordinates, making it simple to analyze spatial patterns of death and disease.

Across the globe, both poor and middle-income nations are mounting varied responses to the cardiovascular disease

epidemic. Programs in Bangladesh, Iran and Chile offer snapshots into various initiatives to improve surveillance data from countries that are at very different stages of development, with very different health resources—thus offering examples across the spectrum of developing countries. Their efforts are guided by WHO's regional arms that share both research and practices from richer nations.

There are many ways to embed good surveillance programs for heart disease and other chronic diseases within national health systems. But reliable monitoring data is, of course, just the starting point for making informed plans and establishing policies to improve public health. Ultimately, it is what we do with the information that matters most.



Americas Region: Coordinating surveillance to promote healthy hearts

Chile's progress is ahead of the curve compared with many other nations across the Americas where a huge crisis is unfolding. Heart attack and stroke is expected to jump by 145 percent among Latin Americans from 1990 to 2020, in sharp contrast to a projected 28 percent increase for women and a 50 percent increase for men in developed countries. In countries that are still undergoing demographic transition, the worst is possibly yet to come unless major, decisive action is taken in countries including Guyana, Peru, Paraguay and Guatemala.

To help countries assess the extent of the problem, the Pan American Health Organization (PAHO) established a program in 1995 to track, prevent and control chronic diseases which offers a good model for other regions. Public health authorities already had decades of reasonably reliable and complete numbers on death rates in the region's 35 countries from Canada to Argentina, including the Caribbean island states, but data was needed on risk factors.

The organization, which serves as a regional branch of the World Health Organization, also teaches technical workshops and provides a how-to tool kit for establishing health surveillance systems. That includes guidance on a "minimum data set," crucial information that quantifies chronic disease deaths, diagnosed cases and specific risk factors and health indicators. The tool kit also includes a Latin American / Caribbean version of WHO's

STEPS protocol, PanAm STEPS, which is tailored to the region's needs while contributing to WHO's global database. Other surveys target teenagers, smoking habits and more.

By 2012, at least 18 countries from Jamaica and Costa Rica to Chile and Argentina had established systems to collect and analyze chronic disease data. Twenty-seven countries have reported on the national prevalence of these diseases, helping to raise political and public awareness and secure more funding for solutions.

This regional effort produced such compelling evidence on skyrocketing cardiovascular and related diseases that in 2012, PAHO launched a regional "Salt Smart Americas" initiative to lower salt intake, modeled on an ongoing Trans Fat Free Americas initiative. A consortium of governments, universities, NGOs and food and beverage manufacturers collectively pledged to help cut salt consumption in the Americas in half—down to the maximum recommended intake, five grams per day by 2020.

Salt-reduction programs in Argentina are both noteworthy and crucial, because the average Argentine consumes a whopping 13 grams of sodium each day and one in three adults has high blood pressure. The national bakers union has committed to gradually lowering the salt content in baked goods by 25 percent over five years, a huge step because bread is the single largest source of sodium in the Argentine diet. Also, some 25 companies have agreed to reduce salt in their products. Meanwhile, the health ministry of Buenos Aires has reached an agreement with the hotel and restaurant federation to remove saltshakers from tables at their eateries.

ABOUT THE AUTHORS

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What Will It

Case studies can provide a much clearer picture of

AUTHORS

Rachel A. Nugent and Celina Gorre

A 55-year-old man living in a major U.S. city feels short of breath and a squeezing pain blooms in his chest. He reaches for the phone, calls 911 and then takes an aspirin from the medicine cabinet to chew as he waits for the ambulance to arrive. A short time later, he is at the hospital undergoing an operation to implant a stent to save his heart—and his life.

This scenario plays out daily in industrialized nations like the U.S., but in developing countries the story is quite different. In poor regions, heart disease often goes undetected, especially in the young. A 30-year-old man might never have had a blood pressure cuff on his arm and has no idea that he is suffering from severe hypertension. And if a heart attack strikes, he might not have access to a stocked medicine cabinet or an emergency room. Instead, he may live in a remote village without transportation or the funds to pay for a bus or a taxi if one were available. In places like this, a heart attack spells an almost certain death sentence, and preventative medications, such as statins, are unheard of.

Historically, low- and middle-income countries have put few of their scant resources toward addressing the suite of so-called “noncommunicable diseases” (NCDs) that include cardiovascular disease, diabetes, chronic respiratory ailments and cancer. That’s a big problem because together, they account for almost two thirds of deaths worldwide. And, by some estimates, low- and middle-income countries account for 80 percent of the burden of heart disease.

But the tide is beginning to change. A key turning point came in 2007, when a series of articles published in *The Lancet* sounded the alarm, drawing the global health community’s attention to the many lives claimed by these diseases in the developing world. That same year, a group of Caribbean countries, under the auspices of the Caribbean Community and Common Market (a regional alliance for trade and cooperation), proposed that the United Nations address this health

crisis at the highest levels. Their goal: to make U.N. agencies aware of the fact that badly equipped health systems in poor countries are unable to handle the rising tide of NCDs—and to prompt them to act.

The Caribbean countries calling for change were all too familiar with the devastating effects of these diseases when left untreated. A paper published a few years before had documented unusually high rates of lower limb amputations in diabetes patients in Barbados—around 9.4 cases per 1,000 people, some 2,500 such amputations a year in this country of 280,000 people. The study noted special challenges beyond just treating diabetes. “Inadequate footwear independently tripled amputation risk,” the authors wrote. “The Caribbean climate favors use of casual footwear or walking around barefoot outdoors.”

Ultimately, the Caribbean Community’s efforts culminated in a high-level U.N. meeting on noncommunicable diseases in 2011. A subsequent U.N. General Assembly meeting asked member countries to establish national commissions that could develop a time line and coordinate programs to control and treat NCDs.

Against this backdrop of growing awareness of the problem, the U.S. Institute of Medicine (IOM) produced a consensus report on heart disease in developing countries in 2010. It called for case studies to assess the needs of these countries, a crucial step toward developing priorities and plans for allocation of precious resources.

Case studies offer an important window into cardiovascular disease. Heart attack, hypertension and stroke remain key concerns as waistlines around the globe continue to expand and other lifestyle changes spread. Developing countries are certainly not immune to the growing obesity epidemic. The driving factors behind obesity in poor regions are manifold: Access to cheap packaged foods can increase empty calorie

Take to Do More?

the resources countries need to tackle chronic diseases

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epidemic.”***



*Some
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to be overweight because
they view thinness
as a sign of
HIV/AIDS.*

including building better health systems and employing public health and policy approaches. These presentations were from Kenya, Grenada, Bangladesh and Rwanda—widely diverse countries with a range of approaches to handling this suite of diseases.

LOCAL NEEDS AND COSTS

Consensus is growing that low- and middle-income countries should develop their own programs to address their national NCD disease burden. In many countries, simply reallocating resources toward more cost-effective interventions would save untold sums and greatly improve health. In southwestern India's Karnataka State, switching to more cost-effective services in the basic health care package would drop per capita public health spending by half—and reduce total deaths by 28 percent. In China, providing a combination of drugs for those at high risk of heart disease would cost \$1.02 per year per person. Meanwhile, it would cost just 35 cents a year per person to target obesity in India through a mass media campaign—coupled with better food labeling and marketing restrictions on high-fat and sugary foods.

But it is not always simple to discern a developing country's needs when it comes to NCDs. For example, less than half of countries surveyed by the World Health Organization (WHO) tally deaths or risk factor data from these diseases in their national health reporting; only about a quarter collect and publish such data. Many developing countries have no idea of the scope of the problem, associated costs, the burden on the health system or how well certain interventions



intake, while safety concerns in certain densely populated urban areas can discourage physical activity. And although it might be difficult for some in the West to fathom, in some places, a slim figure is something to be actively avoided. For example, some people in South Africa strive to be overweight because they view thinness as a sign of HIV/AIDS. Given the country-specific conditions that contribute to heart disease, case studies are especially helpful in designing solutions that work within a given area's culture, beliefs and traditions. "You have to have the right interventions for the right context," said Anjali Gupta, an international program manager for the Boston-based aid organization Partners In Health. "As we design large-scale interventions, we can learn a lot from case studies."

As an important step toward the kinds of case studies recommended by the IOM, several case presentations were made at a workshop they coordinated that focused on decision-making at the country level for control of chronic diseases,

will translate into local settings.

WHO created a data collection template to help countries collect crucial information. Their "STEPwise approach to Surveillance of NCD Risk Factors", or STEPS survey, asks questions such as: Do you currently use any smokeless tobacco products such as snuff, chewing tobacco or betel? During the past 30 days, how many times did you have six or more standard drinks in a single drinking occasion? On average, how many meals per week do you eat that were not prepared at home? The questionnaire provides a way to monitor disease trends and compare them with those of other countries. For example, preliminary numbers from Rwanda's Ministry of Health STEPS survey of 7,241 people showed that only 2.9 percent had high cholesterol while 16 percent had systolic blood pressure readings of 140 to 155—stage 1 hypertension—which can lead to deadly or disabling stroke, heart attack, aneurysms and more. But some low-income countries cannot even afford to hire the staff to conduct a survey.

In 2012, an Institute of Medicine report, “Exploring Country-Level Decision Making for Control of Chronic Diseases,” summarized reflections on the persistent paucity of data and resources for data collection from the case presentations at the workshop held the prior year. It found, for example, that in Bangladesh, the country’s Urban Health Survey collects data on tobacco use among men, but excludes women. “The reason,” the authors explained, “is that smoking is viewed as extremely inappropriate for women in Bangladesh, so few of them are thought to smoke; nonetheless, the precise numbers cannot be known if the data are not collected.”

Lack of funding impacts the system in myriad ways. In 2001, the government of Kenya formed a new division to address chronic noncommunicable disease. However, more than a decade later, the division remains grossly understaffed, according to information provided in the Institute of Medicine case report by Gerald Yonga, chair of medicine and cardiology at Aga Khan University in Nairobi. Countries also face real challenges in keeping programs running over the long term. For example, in Grenada, the Retina Resources Foundation did a great deal of surveillance and screening and even treated some patients with diabetic retinopathy, but the program was not sustained.

In some countries, the biggest challenge to accurately gauging NCD program costs is that the relevant services, providers, drugs and supplies are not yet a standard part of the health care system. This means that information on costs might need to come from other sources, such as estimates of disease burden made on the basis of local hospital admissions and data collected from research studies. Health officials may also use implementation costs from other types of health programs to assess the cost of getting a heart disease or diabetes program off the ground. For example, an initial assessment of a country’s maternal-child health programs could offer statistics on the number of trained medical personnel, such as surgeons, that might be available for NCD procedures.

To help countries project the costs of local health interventions, the World Health Organization produced a user-friendly tool for Microsoft Excel that estimates the cost of potential programs, making it compatible with even very basic computers. The default spreadsheet includes country-specific demographic and epidemiological data compiled by WHO—and shares their standardized protocols for disease management. By inputting more specific data on the disease burden and local treatment guidelines, countries can tailor cost to their own situation and estimate cost-effectiveness to decide which programs to prioritize.

Another WHO initiative, the CHOICE project (Choosing Interventions that are Cost-Effective) provides health officials with information that can help them decide which programs

will most improve their nation’s health—programs that are within their budgets. A 2010 study using this model found that the best investment for lowering cardiovascular disease in Vietnam would be health education that urged people to lower salt intake, costing about \$118 per disability-adjusted life year (DALY) avoided, meaning that it would cost \$118 for every year of healthy life saved. For individual patients, researchers found that treatment of systolic blood pressure above 160 cost just \$78 per DALY averted.

This tool has also been used to estimate staffing costs. For example, a registered nurse’s yearly salary in Mali, Nigeria, and parts of West Africa is about \$12,409. But across the African continent and in parts of the Middle East, costs are drastically different. In Egypt, Yemen and Iraq, that same nurse is paid \$3,047. In contrast, the cost for one minute of television advertising—which could be used for public health awareness campaigns—is far cheaper in West Africa, \$2,235, compared with \$4,824 in Africa’s northeast. This illustrates that it’s important for countries to develop information about costs in their own

health system to help them decide how to allocate their scarce health dollars among the NCD prevention and treatment choices.

MOVING FORWARD

Given the enormity of the problem, countries need to move forward now using the best available data. Some have already initiated programs to tackle the NCD epidemic. Some 92 per-

cent of countries have a plan or policy in place, but only about two thirds of those are funded or implemented, according to WHO. Many focus only on a single disease or risk factor. For instance, more than 80 percent of countries have policies in place addressing tobacco use—but lack a holistic strategy for mitigating and treating noncommunicable diseases.

Countries will approach the NCD problem in many ways. Rwanda is planning to integrate prevention and control of noncommunicable diseases into its primary health care system. The country is starting with a real advantage. It has at least four sources for health data and already collects routine information in its health management information system, in addition to data from population-based surveys such as STEPS and routine surveillance using WHO guidelines as well as ad hoc estimates from different sources.

Ultimately, real progress will require a wide range of actions. Those measures include training health care providers to detect and diagnose chronic ailments, educating patients and the general public, having affordable medications available and outfitting clinics and hospitals with needed equipment and supplies such as blood pressure cuffs and glucose monitoring test strips.

With more information, more lives can be saved. Clogged coronary arteries are a common cause of heart attacks in plac-

“You have to have the right interventions for the right context. As we design large-scale interventions, we can learn a lot from case studies.”



Anjali Gupta, NCD Synergies Program Manager, Partners In Health

es such as the U.S., but that's not always the case in sub-Saharan Africa. A 2008 study there found that even though 44 percent of patients with newly diagnosed cardiovascular disease ultimately had heart failure, only 10 percent had the blocked arteries seen in coronary heart disease. According to a 2013 report in the *Journal of the American College of Cardiology*—"Heart Failure," "In rural Rwanda, the causes of heart failure are almost exclusively nonischemic [not caused by a blockage] even though patients often present with advanced symptoms." Researchers are working to discover why.

What is known is that untreated strep throat causes rheumatic heart disease much more frequently in sub-Saharan Africa than in industrialized nations with easy access to penicillin. In Rwanda, many parents first seek treatment for their children from traditional healers; even if a clinic is nearby, delayed access to antibiotics may allow rheumatic heart disease to set in, causing permanent heart damage.

Meanwhile, researchers from Rwanda's Ministry of Health and Harvard Medical School noted in 2013 in the *SA Heart Journal*, the official publication of the South African Heart Association, that while the country established treatment guidelines for congenital heart disease in 2012, minimal medical infrastructure made it difficult—or impossible—to examine children for rheumatic heart disease as part of routine pediatric care. Although most hospitals had x-ray machines, only three specialist facilities in major cities had electrocardiograph machines that were consistently available.

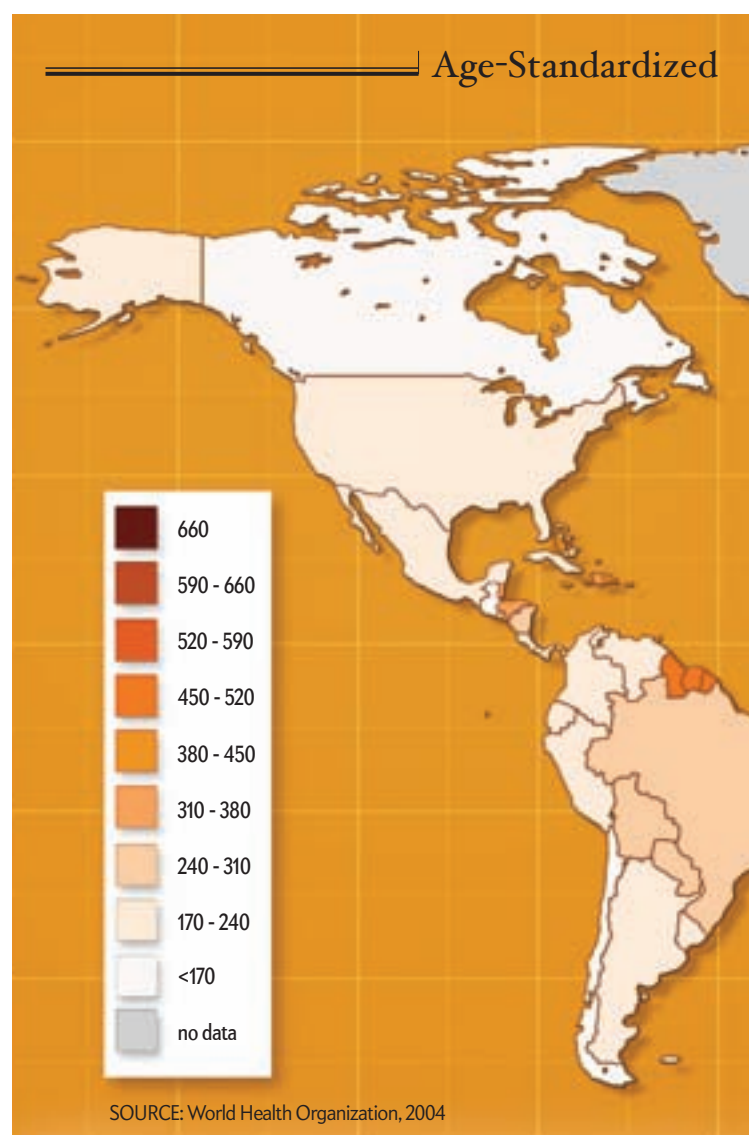
That same article proposed that the country should install a digital medical records system for heart disease patients similar to the nation's existing HIV/AIDS "TRACnet" informatics system. Doing so, they say, "would lessen the time between research and action and improve long-term prognoses," particularly for those suffering from rheumatic heart disease.

RESEARCH REMEDY

In the quest for solutions to improve cardiovascular health, formal clinical trials can generate key information about successful interventions. Toward that end, the Global Alliance for Chronic Diseases will certainly help. The primary objective of this young organization, formally launched in 2012 and funded by entities including the U.S. National Institutes of Health and U.K. Medical Research Council, is to jointly develop, fund and manage collaborative research programs across the spectrum of chronic disease worldwide. The ethos of the organization is to "get on with it" and get studies up and running in order to inform health policies.

The alliance's first program addresses hypertension, with 15 studies launched in 11 low- and middle-income countries; its next program will look at type 2 diabetes in a similar fashion. The hypertension initiative is analyzing interventions ranging from salt reduction and educational programs to mobile technology and the repurposing of existing HIV infrastructure. In India, for example, the program is helping to coordinate a clinical trial testing a combination blood pressure pill in place of the standard three-pill treatment to see if the simplified drug regimen yields better results.

The alliance embeds policy makers within the process. Research teams are required to have a relevant policy partner.

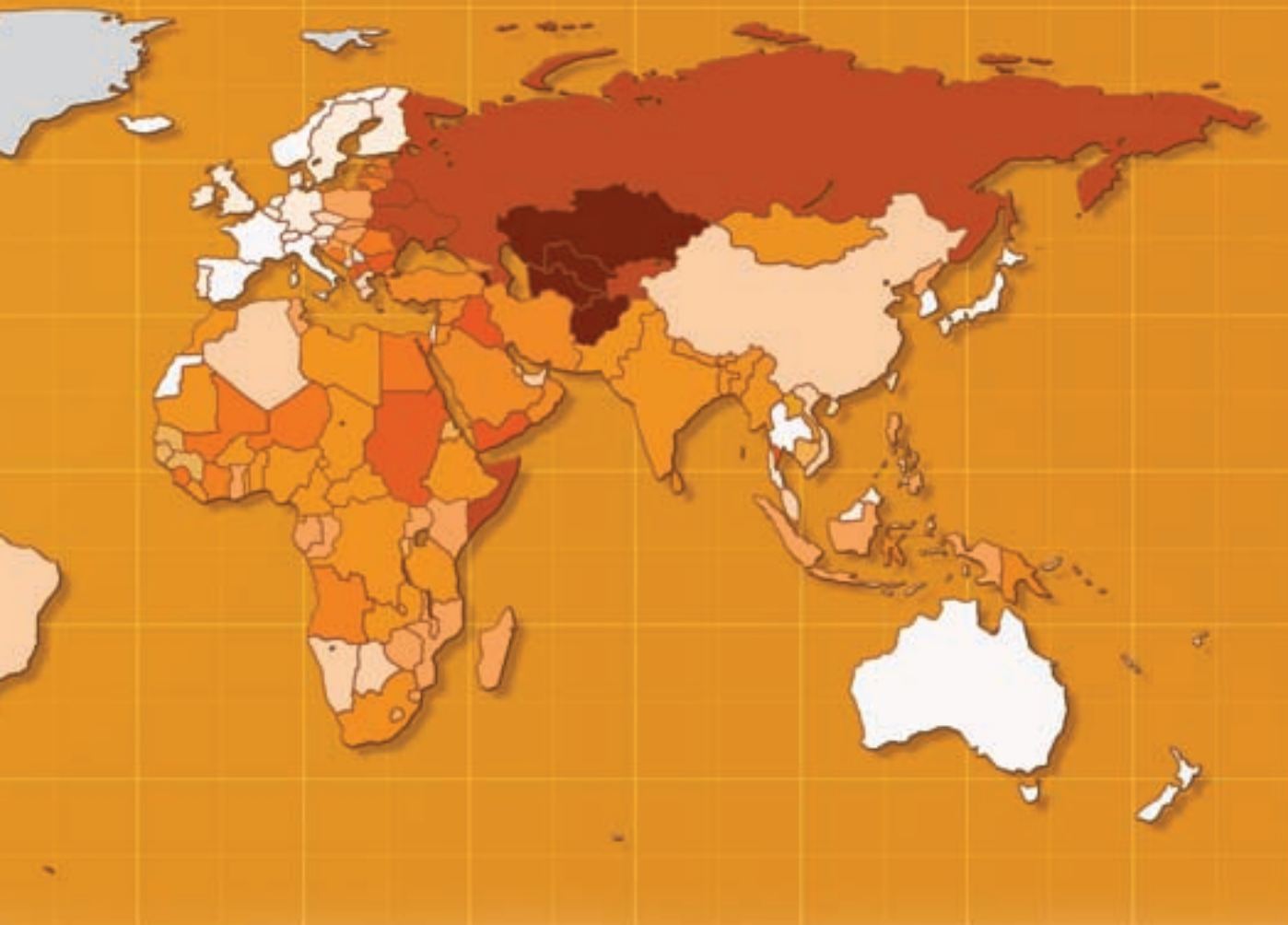


It's a way to increase the chances that discoveries will impact policy, bringing health programs to the most affected communities.

It is important to note that members of the alliance collectively represent over 85 percent of the world's public funding for medical and health research. The active participation of three important developing countries—China, India and South Africa—has resulted in a more robust, culturally appropriate research agenda and a more internationally inclusive grant-making and peer review processes. In 2014, the alliance will be chaired by China and represented by the Chinese Academy of Medical Sciences, with the World Health Organization acting as an observer to help ensure the flow of information between these two global institutions.

Addressing noncommunicable diseases in developing countries will not be easy. In 2010, more than one third of low-income countries had absolutely no designated funds for NCDs. Making matters worse, there's a persistent lack of interest by donors in supporting care for these diseases, partic-

Deaths Due to Cardiovascular Disease (per 100,000), 2004



ularly for low-income nations. Ministries of health in some developing nations have reached a saturation point with HIV/AIDS funds that they can spend efficiently, yet they struggle to provide even basic care for high blood pressure and cancer screening because the basic interventions that would work for these noncommunicable illnesses are so poorly defined and understood in low-resource settings.

Given this situation, we must strive to improve access to care for cardiovascular disease and other chronic diseases. The Institute of Medicine committee concluded that it is “eminently possible to achieve better control of CVD and related diseases in developing countries.” Indeed, it is not only possible—but imperative.

ABOUT THE AUTHORS

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one SIZE does not fit all

A New Paradigm for Global Cardiovascular Disease Research

— AUTHORS —

Cristina Rabadán-Diehl, Evan Bennett, Carlos Peyra and Silvia Fuster

In 1948, researchers quietly enrolled their first patient in the Framingham Heart Study, launching an observational investigation “that changed forever how society looked at its number-one killer, heart disease,” wrote cardiologist Henry Greenberg in *Progress in Cardiovascular Disease*. “The validity, robustness and clarity of the Framingham data became a beacon for the world.”

This multidecade epidemiological study of a Massachusetts community identified risk factors and showed that reducing them postpones—and prevents—heart disease. It sparked major community-based preventive programs, the first of which, Finland’s North Karelia Project, launched in 1972. Finland had the highest cardiovascular disease (CVD) death rate in Europe, but by improving dietary and exercise habits and reducing smoking, within 30 years they ranked lowest. In 2004, the 52-nation INTERHEART study showed that the nine risk factors linked with 90 percent of heart disease cases are the same for both developed and developing countries.

TAILORING INTERVENTIONS

However, lessons learned from these studies must be applied cautiously. There are vast differences between the regional and cultural settings of middle-class Massachusetts and the mountain villages of Peru or Guatemala, towns in northeastern Spain, cities in India or rural hamlets in China. In order to effectively address cardiovascular and related diseases, interventions must fit the lifestyles and habits of local people.

The importance of this hit home for Cristina Rabadán-Diehl in rural Kenya, where she visited a small village to observe a program that replaced traditional smoky stoves with clean ones. (Indoor pollution from cook fires poses great cardiovascular risk for women in developing countries.) When she arrived, she thought one of the houses was burning. Smoke billowed from the kitchen. Inside, a woman was seated on a low stool, cooking. Next to her was a new, efficient cook stove—unused. “Why aren’t you using your new stove?” Rabadán-Diehl asked. “It’s not practical, too small and with only space for one pot,” she said, “and when I cook, I sit. I don’t stand!” Regardless of health benefits, providing this type of stove had been a huge mistake: It didn’t fit within cultural norms.

Tailoring interventions to vastly different societies is a challenge that is often compounded by a lack of data as well as insufficient health care services and personnel. For those suffering from heart disease, diabetes or lung diseases in many regions, living in poverty may take a further toll on health. For example, in sub-Saharan Africa, someone with hypertension may also be fighting tuberculosis, malaria, HIV or other serious illnesses. They may also have a poor diet and live amidst political turmoil or street violence that makes it difficult to get exercise needed for coronary health. Conducting research in such complex settings requires that doctors and other health care workers understand patients, their families, communities, societies and countries in order to draw a complete picture of the social, cultural and political environment.

NEW RESEARCH MODELS

As Rabadán-Diehl left that smoky Kenyan kitchen, a local researcher remarked, “It’s a shame the manufacturer of these stoves never consulted us. We would have told them the design wouldn’t be accepted.”

Such errors haven’t been uncommon in programs led by well-intentioned researchers from developed nations who knew little about local culture. To avoid these problems going forward, an innovative, 21st-century paradigm is building global research teams. Resident investigators who are intimate with regional customs are at the helm, partnering with universities and research institutes in developed countries.

Eleven Collaborating “Centers of Excellence” in Asia, Africa and Latin America (with partners in the U.S., Europe, Canada and Australia) are building a system capable of monitoring, preventing and controlling chronic diseases, particularly those affecting the heart and lungs. The initiative, launched in June 2009, is co-funded by The U.S. National Heart, Lung and Blood Institute (NHLBI) and the UnitedHealth Group. Eighty researchers from 25 nations are working together across borders and sometimes across continents. Investigators in Kenya and Peru, for example, share data on indoor air pollution.

Researchers are also studying high blood pressure reduction in China and Kenya and community health worker training in Mexico, Bangladesh, South Africa and Guatemala. Other centers are testing technological interventions, such as cell phone applications that transmit health data to regional data banks.

Over the past five years, the centers have also provided training in medicine and clinical research for more than 700 researchers. At Kenya’s Eldoret Center of Excellence, for example, training local physicians in clinical cardiology and research has allowed the clinic to triple in size. In-country training counters the “brain drain” of recent decades when local researchers left for opportunities in developed nations, rarely returning home.

In 2009, Centers of Excellence researchers formed a model that was almost entirely new to science. They established subcommittees to compare research on epidemiology, community health and other topics, and agreed to pool their national data and do multinational meta-analysis before publishing results in order to contrast and combine results to identify patterns. It is likely that over the next few years, a flood of articles will appear in peer-reviewed journals, publishing data from joint studies on the use of mobile health technology in China and India, the

“Why aren’t you using your new stove?” Rabadán-Diehl asked. “It’s not practical, too small and with only space for one pot,” she said, “and when I cook, I sit. I don’t stand!”



effectiveness of using community health workers in South Africa, Bangladesh, Mexico and Guatemala, and research that reveals which cardiovascular interventions work in which settings.

TRACKING TRENDS

Early data from an epidemiological study at Peru's Universidad Peruana Cayetano Heredia echoes studies from Argentina and India: Cardiovascular-related disease in developing countries may be higher than previously estimated—and disease patterns may be more complicated. A good example is Argentina, where a new, 30-year study of 8,000 people aged 35 to 74 is finding that up to three quarters of disability and death from cardiovascular diseases are in people under 70—compared with about one third in developed countries.

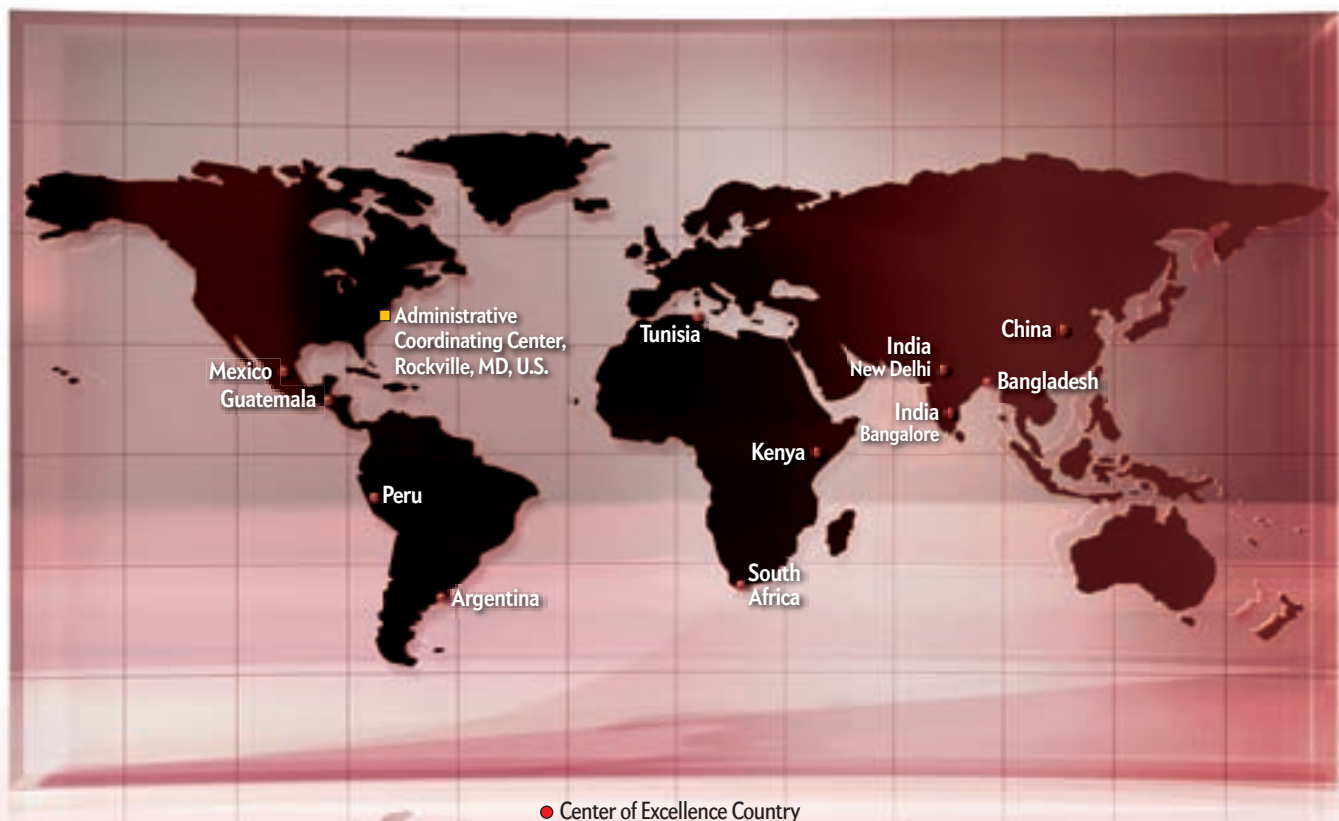
Based on studies in wealthy countries, researchers in Peru expected urban areas to have the greatest incidence of high blood pressure and diabetes. While hypertension followed this pattern, diabetes was far more prevalent in the small, underdeveloped city of Tumbes (around 12 percent) than in a major metropolis like Lima (8 percent). Both rates are sharply higher

than Peru's 5.4 percent listing in the International Diabetes Federation atlas. "The take-home message," said principal investigator Jaime Miranda, "is that applying a national average for a geographically diverse country like Peru won't work. You have to pay attention to what's happening on the ground."

These studies are revealing that successful treatment of hypertension and diabetes is far lower in developing countries. Using the Western world's so-called "rule of halves," roughly half of all high blood pressure and diabetes cases remain undetected, half of those detected remain untreated—and half of those treated are not controlled. But in Peru, researchers found the situation was far worse. Of 205 people with elevated blood pressure, nearly half knew they had the problem, 40 percent treated it and 30 percent controlled it. Of 33 diabetes sufferers, 71 percent had been diagnosed, 40 percent were under treatment—but just 7.7 percent controlled the disease. "Overall, there are considerable unmet needs in diagnosing, treating and controlling both hypertension and diabetes," the researchers wrote, posing "major public health challenges" and "significant economic losses" for Peru.

UnitedHealth and NHLBI Collaborating Centers of Excellence

To help combat chronic diseases in developing countries, the UnitedHealth Chronic Disease Initiative and the National Heart, Lung and Blood Institute support a global network of Collaborating Centers of Excellence. Each center includes a research institution in a developing country paired with at least one partner academic institution in a developed country.



SOURCE: The National Heart, Lung and Blood Institute

FINDING APPROPRIATE INTERVENTIONS

A fundamental strategy for tackling this global crisis is working on a local level. Toward this end, Centers of Excellence trials in Africa and Latin America are tackling the indoor air pollution problem. Peruvian researchers are studying women's resistance to new kitchen technology, trying out alternative cookstoves and gathering data on preferences. In Kenya, investigators are studying how smoky stoves cause disease. "We've been baffled by the high number of women we see at the Eldoret clinic disabled by right-sided heart failure," said Gerald Bloomfield, a professor of medicine and global health at Duke University Medical Center. It's a condition where the heart's right side loses its ability to pump. The research is possible because of a new portable echocardiogram device that can be used in remote areas to run heart ultrasounds, testing both women

**"I've learned:
If you want to know, go to
the people and ask,"**

Gerald Bloomfield, Duke University Medical Center



who use traditional stoves and those who have replaced them.

Half a world away, China's International Center for Chronic Disease Prevention is studying sodium intake and hypertension. Unlike the U.S. where 80 percent of salt comes from processed foods, in rural China, Latin America and Africa, most is added during cooking. It's a taste preference common in nations that once used salt to preserve food. This "China Rural Health Initiative" study involves 120 villages, engaging families, household cooks, shopkeepers and village doctors in an investigation of taste preference, the use of salt substitutes and community-wide education.

This same program trains cardiology specialists to better manage high-risk patients. The specialists then train village doctors to diagnose those patients, conduct follow-up visits, give lifestyle advice, write prescriptions and keep case management records. Then, said initiative Director Lijing L. Yan, "We digitize the records and do performance feedback for the village doctors."

In resource-strapped rural areas, partnerships are critical. Bloomfield notes that although their clinical research is an international partnership between the United States and Kenya, it also engages local chiefs, subchiefs, schools and churches, along with "community leaders [who] help introduce projects, give us feedback and good advice." For example, leaders helped researchers fine-tune house-to-house health surveys. "They told us, 'This is the rainy season, so it's not a good time' or 'This is harvest time, so... men won't be represented because they'll be in the fields,'" Bloomfield said. "I've learned: If you want to know, go to the people and ask."

In another novel program in western Kenya, researchers are using existing HIV infrastructure to diagnose cardiovascular disease. "HIV testers are welcome in many Kenyan communities and homes," Bloomfield said. "We piggyback on that. We're testing...not only for HIV, but for hypertension and diabetes—all in one visit, and providing education, too."

Community involvement takes another form in Argentina. Community health workers are given short, intense training, taught to do lifestyle and dietary counseling, to measure blood pressure and to teach hypertensives and their families to take their own readings. "Task-shifting moves us from a traditional clinic-based setting to a community care-based model,

ARGENTINA

South American Center for Cardiovascular Health, Institute for Clinical Effectiveness and Health Policy, Buenos Aires

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BANGLADESH

International Center for Diarrheal Disease Research, Dhaka

Partner: Johns Hopkins University, Bloomberg School of Public Health, Baltimore, Maryland, U.S.

CHINA

The George Institute, Beijing

Partner: Duke Global Health Institute, Durham, North Carolina, U.S.

GUATEMALA

Institute of Nutrition of Central America and Panama, Guatemala City

Partner: Johns Hopkins University, Bloomberg School of Public Health, Baltimore, Maryland, U.S.

INDIA (BANGALORE)

St. John's Research Institute, Bangalore, Karnataka

Partner: Population Health Research Institute, Hamilton Health Sciences, McMaster University, Hamilton, Ontario, Canada

INDIA (NEW DELHI)

Public Health Foundation of India, New Delhi

Partner: Emory University, Atlanta, Georgia, U.S.

KENYA

Moi University, School of Medicine, Eldoret

Partner: Duke University Medical Center, Durham, North Carolina, U.S.

MEXICO

Center for Health Promotion of Northern Mexico, Hermosillo

Partner: University of Arizona, Mel & Enid Zuckerman College of Public Health, Tucson, Arizona, U.S.

PERU

Universidad Peruana Cayetano Heredia, Lima

Partner: Johns Hopkins University, Bloomberg School of Public Health, Baltimore, Maryland, U.S.

SOUTH AFRICA

University of Cape Town, Cape Town

Partners: Harvard Medical School, Brigham and Women's Hospital, Boston, Massachusetts, U.S.

TUNISIA

University Hospital Farhat Hached, Sousse

Partner: Department of Chronic Disease Prevention and Health Promotion, National Public Health Institute of Helsinki, KTL, Finland

reaching the most vulnerable people," said Adolfo Rubinstein, who heads the program. "This developing-world approach also has potential for developed nations."

Mobile health (mHealth) technology helps stretch scant resources. Because nearly everyone in Argentina uses a mobile phone, Rubinstein is exploring ways to harness mHealth technology. In a hypertension trial, interactive cell phones send short educational text messages or remind patients to take medications or show up for medical appointments. "We think cell phones can be a powerful ally for changing lifestyles and supporting interventions," he said. Smartphones are also being tested in Tibet, where a cardiovascular health app is used by village doctors.

Another innovative application helps determine cause of death, which in developing countries typically comes from "verbal autopsies"—interviews with families recorded on paper. A Centers of Excellence study is using computer tablets and cell phones loaded with a standardized electronic questionnaire; graphics will eventually be added, giving practitioners a powerful tool for identifying lesions and other signs of disease.

COLLABORATIONS AMONG GLOBAL FUNDERS

The collaborating centers' approach to cardiovascular research is just one example of widening partnerships. Another worldwide research initiative, this one focusing specifically on hypertension, was launched in June 2012 under the umbrella of the Global Alliance for Chronic Diseases (GACD). The alliance includes the world's eight biggest publicly funded research agencies—including the U.S. National Institutes of Health, the European Commission and agencies from Australia, India, China, South Africa, the United Kingdom and Canada. Together, they're funding 15 research teams to address hypertension in the developing world. Each pairs a lead researcher from a developing country with an expert from a high-income country.

About a billion people suffer from high blood pressure, contributing to more deaths worldwide than any other risk factor, according to the World Health Organization (WHO). "We're looking specifically at how we can bring research into rural settings where little research has been done on salt reduction,



smartphone support, primary health care worker support, hypertension drug regimens and more," GACD Executive Director Celina Gorre said. "It is still quite early to talk about what works in what settings, but that is exactly the question GACD is seeking to answer."

BUILDING "A CULTURE OF HEALTH"

In the village of Cardona, a town of 5,000 inhabitants in northeastern Spain, the Cardona Integral Project aims to build "a culture of health and fitness." It uses a three-pronged approach, including events, programs and urban design, engaging with the town's social systems, physical environment and the school system to spark healthy behavioral changes. Its Web site will serve as a portal for the area's health-related initiatives.

The goal is to create a model for community-driven health promotion that can be replicated in other communities, both nationally and internationally. Cardona stands as a microcosm of Spain, where 62 percent of all Spaniards are overweight and over half have high cholesterol. Physical inactivity is a significant problem for more than 50 percent of the population. One recent Spanish study found that teenagers from 12 to 16 with sedentary parents were four times more likely to follow suit.

The Cardona Integral Project is using a series of events to raise awareness. Seminars will target young physicians, while a lecture series will educate the public on nutrition and fitness.

In addition to selling locally grown food, a monthly farmer's market will promote active living, with bicycle repair clinics, yoga classes, cooking demonstrations and more.

Other programs specifically target health. The Si! Program, piloted in Bogotá, Colombia, in 2009 and in Cardona the next year, now teaches healthy habits to 45,000 school children of all ages in those cities using a curriculum developed in conjunction with *Sesame Street's* Sesame Workshop. Research shows that experiences gained in preadolescence establish lifelong preferences and motivations, so early health education should, in theory, encourage better nutrition and physical fitness.

Another initiative, The Fifty-Fifty Programme, puts small groups of adults together in regular meetings to support healthier eating, weight loss, exercise and efforts to quit smoking. The program, first tested on the Caribbean island



Participants of The Fifty-Fifty Programme in front of a medieval castle in Cardona, Spain.



As part of Cardona's "Healthy City" plan, a fitness loop for walking, running and cycling has been outfitted with fitness stations.

of Grenada and in Cardona, is based on the Alcoholics Anonymous peer-to-peer model. In the first year, one out of every four smokers stopped smoking, half lost weight and nearly three quarters exercised for more than 150 minutes per week.

A mapping study will use GPS devices to map participants' fitness activities, and Cardona Integral will use this spatial data to improve recreational opportunities. On that list are the town's soccer field, which is being adapted for other uses, and creation of three "fitness loop" pathways for walking, running and cycling.

Researchers will measure the success of the entire Healthy City "action package" by crunching demographic and public health data alongside information from questionnaires and evaluation of target groups. Oversight comes from collaborating institutions: the SHE Foundation, The Mount Sinai Hospital, the New York Institute of Medicine, the American Heart Association and Spain's National Center for Cardiovascular Investigation.

The plan is to take the SI! and Fifty-Fifty programs nationwide under the direction of Valentin Fuster—who directs three major cardiovascular centers at New York City's Mount Sinai Hospital—in conjunction with the Health Ministry.

A NEW AGE FOR CHRONIC DISEASE RESEARCH WORLDWIDE

A new age is dawning for cardiovascular research. The lessons learned in Framingham are being applied and adapted by principle investigators in developing nations who are building self-sustaining research institutions that are supported by international partners and funders who have networks connecting them to similar work in other countries. A new cadre of cardiovascular and pulmonary researchers—alongside seasoned investigators—are forging a global research network that will make discoveries benefiting not only their own nations but people around the globe.

With the release of the WHO Global Action Plan for the Prevention and Control of NCDs 2013–2020, it is expected that other innovative platforms will proliferate, sparking new collaborative opportunities for the global health research community and providing data that will help policy makers better respond to the health needs of their people.

Over time, these new research collaborations will likely become comprehensive, extending investigations to other forms of chronic disease. Each participating institution, operating nationally, will be part of a greater whole. As we build this national and international research infrastructure, we are cre-

ating a global community of investigators without borders, where trust is central, data is shared and benefits are universal.

The value of this new paradigm may best be expressed by Duke University's Gerald Bloomfield: "I spend about six months out of every year working in Eldoret, Kenya," he said. "I quickly discovered that some approaches we use in the U.S. just aren't applicable. As importantly, there are areas where we, in the developed world, can learn a lot from how research is performed and care is administered in developing country settings." He notes the value of engaging the local community and laypeople in investigations to assure the success of long-term patient therapies and drug regimens. "That's something we haven't done much of in developed countries, but perhaps we should," he said. "Overall, the importance of working with partners internationally, nationally and at the community level cannot be overstated."

Clearly this is a global partnership from which all nations and all people can benefit.

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Share What Works

AUTHORS

Shanthi Mendis, C. James Hospedales
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In 2008, San Francisco's mayor, Gavin Newsome, promoted a radical plan to shut down several miles of the city's streets to car traffic on one weekend day so that walkers, joggers and bikers could take over the roads from morning until early afternoon. The so-called "Sunday Streets" scheme even involved "activity pods"—stopping points where people could participate in dance classes, do yoga, play hopscotch, jump rope and more. The idea was to help residents get up off the couch and become more physically active.

But even though San Francisco is known for its forward-thinking ethos, Newsome readily admitted that the Sunday Streets program was an imported idea. He brought it back from the yearly World Economic Forum meeting in Davos, Switzerland, where then-London Mayor Ken Livingstone sang the praises of the *ciclovia* concept that had been pioneered in Latin America. The *ciclovia*, or "bike path," program was pioneered in Bogotá, Colombia, in the 1970s, and it has swelled dramatically since then. It has become so popular that some two million people now take to the city's blocked-off streets on Sundays and holidays. Over the years the idea has been adopted and has taken off in places such as Lima, Mexico City and as far away as Winnipeg and Brussels.

The *ciclovia* shows that a good idea can really set the wheels in motion toward well-being. That is the guiding concept that lies at the heart of a key recom-





“The *ciclovía*, or “bike path” program,
was pioneered in Bogotá, Colombia in the 1970s,
and it has swelled dramatically since then.”

Reversing the trend of rising global obesity will require everything from local interventions to regional and global approaches.



mendation by the U.S. Institute of Medicine's 2010 consensus report on cardiovascular health: the need for countries to share information about interventions and innovations that most effectively lower the prevalence of hypertension, obesity, heart disease, diabetes and related ailments. It's an approach that works especially well when knowledge is shared among places with similar resources and similar characteristics. For urban cities in a range of countries, the *ciclovia* concept was an inspiration. For more rural environments or cities with different cultural lifestyles, a different approach might emerge as the spark that works and can be shared.

THE NEED FOR SOLUTIONS

It's clear that new solutions are needed. The global obesity epidemic continues to spread, placing an ever-increasing number of people in poor countries at risk of both diabetes and heart attack. From 1980 to 2008, the number of overweight or obese individuals in developing countries has nearly quadrupled, mushrooming from 250 million to 904 million.

With an estimated 44 million toddlers under the age of five overweight in 2012 and more than 10 percent of 13- to 15-year-olds in low-income countries using tobacco, the risk of developing cardiovascular disease (CVD) is beginning earlier for many people. It is becoming mandatory to intervene as early as during pregnancy and early childhood, and to continue prevention efforts throughout life.

Reversing the trend of rising global obesity—and the skyrocketing incidence of cardiovascular and other diseases—will require everything from local interventions to regional and global approaches.

GLOBAL MILESTONES

Last year, the world reached two significant milestones in the global response to the massive and growing problem of chronic disease. On May 27, 2013, ministers from 194 World Health Organization (WHO) member states adopted the Global Action Plan for the Prevention and Control of NCDs 2013–2020 at the 66th World Health Assembly. Two months later, the United Nations Economic and Social Council adopt-

ed a resolution requesting that the U.N. secretary general establish an Interagency Task Force on the Prevention and Control of NCDs.

The task force, convened and led by WHO, would help coordinate U.N. organization activities to implement the initiative. The action plan outlined nine voluntary global targets to lower the incidence of cardiovascular disease, cancer, diabetes and chronic respiratory diseases—and lower the rate of the premature deaths they cause by 25 percent within 12 years.

The plan also provided a concrete menu of policy options to reach these targets. To do so, cardiovascular and related diseases need greater prominence on national agendas and will require collaborations between WHO member states, U.N. organizations, government agencies, nonprofits and patient advocates, among others. For example, the plan recommends that member states legislate for 100 percent smoke-free environments in offices, restaurants, on public transportation and other indoor environments. Policy makers looking for a legal precedence for this type of measure, it notes, can find support in the WHO Framework Convention on Tobacco Control, specifically Article 8, which guarantees protection from exposure to tobacco smoke. It's worth noting that smoking can double or triple the risk of death from coronary heart disease.

As requested by heads of state in the U.N. political declaration, WHO is also taking steps to establish a mechanism to facilitate implementation of the global NCD action plan. The purpose of this mechanism is to facilitate and enhance coordination of activities, multistakeholder engagement and action across sectors at the local, national, regional and international levels in order to contribute to the implementation of the initiative.

Meanwhile, WHO has also rallied industry cooperation to support national action, for example to promote healthy diets and to prevent obesity. The International Food and Beverage Alliance (IFBA), which includes members such as The Coca-Cola Co., General Mills and Unilever, along with certain other global private sector entities, were given an opportunity to discuss the action plan. The IFBA had previously committed to listing clear and fact-based nutritional information on its prod-

ucts, and members agreed to reformulate products to help improve diets. These promises have just begun to show some results, including Unilever's global reduction of sodium content across its product platform.

HEALTH IS LOCAL

Former U.S. Speaker of the House Tip O'Neill famously said that "all politics is local," but all health is local as well. Global cooperation alone won't stem the rising tide of cardiovascular disease. It's as important to expand regional mechanisms for reporting on CVD disease trends, to disseminate information on how to make successful intervention approaches work in different local environments and to capitalize on regional programs.

MAKING IT EASIER TO SHARE SOLUTIONS

Prior to creation of the Global Action Plan 2013–2020, WHO identified a core set of cost-effective preventive and curative interventions that are feasible for implementation even in "resource constrained" settings. In 2010 WHO also developed the Package of Essential Noncommunicable Disease Interventions (WHO PEN), a resource that is chock-full of details on how doctors working in developing countries might treat cardiovascular disease and other chronic illnesses in primary care facilities. The WHO PEN report notes that, "Selecting the appropriate mix of the most cost-effective technological applications is particularly challenging when investment in health is small and inadequate as is the case in

many low-resource settings."

WHO PEN offers basic information on affordable drug treatment to prevent heart attacks and strokes (including anti-hypertensive drugs for patients with blood pressure readings higher than 160/100 and statins to lower cholesterol in people at high risk). It also lists the equipment that primary care facilities need to have on hand: blood glucose test strips for diabetes monitoring, blood pressure cuffs and other basics that are often lacking, such as scales and stethoscopes. When resources permit, it advises stocking items such as nebulizers, blood cholesterol assays and defibrillators.

One of WHO's core functions is providing resources that provide health care guidance that meets global, regional and country-level needs—in a range of formats and languages. Many developing countries lack key information on NCDs, despite the need to exchange data, experiences and hard-won solutions across borders. Relevant knowledge may exist unused, may not be stored in acceptable formats—or additional research may be required to generate and harness that knowledge.

To address this problem, WHO offers electronic library services, provides document repositories, statistical databases, global status reports and more—all to help promote shared information on the fight against global killers such as heart

CARICOM leaders signed a declaration in 2007 that outlined measures to improve heart health. That included promoting a healthier diet with lower fat content and less added sugar—because fast food has become the world's diet.



attack and stroke. For example, its cardiovascular disease Web site portal contains a wide array of publications that include a 2013 global brief on hypertension, a 2010 global status report on noncommunicable diseases, a global atlas on cardiovascular disease and implementation tools for WHO PEN including cardiovascular disease risk prediction charts. A Web portal devoted to noncommunicable diseases and risk factors points to fact sheets on tobacco, diet, alcohol and recommended physical activity for different age groups. WHO Web sites provide multilingual access for millions of users worldwide. In addition, WHO's global status report 2014 will be published later this year to provide new data on noncommunicable diseases as well as practical guidance on how to implement and scale up affordable interventions.

These tools provide a treasure trove for all those who play a role in prevention and control of noncommunicable diseases: national policy makers, professional organizations, health professionals, the academic and research communities, nonprofit organizations and the general public, among others. The goal is to provide equitable access to knowledge and innovations.

THE BIRTH OF CARMEN

For more than a decade, countries in the Americas have shared strategies for fighting diseases such as obesity and hypertension through the CARMEN Initiative (a Spanish acronym meaning an Initiative for Integrated Noncommunicable Disease Prevention in the Americas). It's grown from three founding members in 1996 into a network of the entire region's ministries of health as well as vital players from universities, nonprofit organizations and others.

The CARMEN initiative was launched by the world's oldest international public health agency, the Pan American Health Organization (PAHO), which was founded in 1902. Part of its current mission is to collect, analyze and distribute information as well as share knowledge about the chronic disease problem and successful strategies for creating, executing and evaluating policies and programs that address it. PAHO serves as the network's secretariat, and operates a Listserv to disseminate updates to members. The CARMEN "Policy Observatory"—a platform for countries and institutions to share information—emerged



On June 18, 2007, U.S. Secretary of State Condoleezza Rice hosted the CARICOM Ministerial Meeting at the U.S. State Department in Washington, D.C.

as a useful forum for the spread of proven health policies.

The CARMEN network forms the core of the Pan American Forum for Action on NCDs. The forum's first meeting took place in Brasilia, Brazil, in May 2012 with 260 participants, including government officials from all 36 PAHO member countries and representatives from 24

companies. Last year, the forum helped convene a "Salt Smart Consortium" meeting, a group that raises awareness about the health impacts of high salt intake and tries to align targets and timelines for salt reduction across the region.

LOCAL GOVERNMENTS CAN TAKE COLLECTIVE ACTION

Another way to share what works among places with similar needs and resources is to come together for collective action. For example, Caribbean countries were the first to eliminate measles, thanks in part to local governments coordinating unprecedented mass vaccinations in 1988 when members of the Caribbean Community and Common Market (CARICOM) pledged to eliminate the virus from the region. May 1991 became "Measles Immunization Month," with the goal of immunizing every child—from nine-month-old infants to 15-year-olds—in 18 countries, nearly 1.8 million children. This joint action was made possible, in part, by existing ties between health ministries in nations such as Antigua, Jamaica and Barbados.

Although measles may not have much in common with heart disease, the underlying idea is that nations within the same region can jointly tackle tough health challenges. English-speaking Caribbean countries are hardest hit by the epidemic of cardiovascular and other noncommunicable diseases

of any of the countries in the Americas. The figures are striking: In Trinidad and Tobago, the rate of death from diabetes is 600 percent higher and from cardiovascular disease 84 percent higher than it is in North America.

Faced with these realities, CARICOM leaders came together to take collective action against these diseases. They signed a declaration at a 2007 summit in Port of Spain that outlined measures to improve heart health—from promoting an improved diet and reducing tobacco use to heightened physical education requirements in schools



Over the past 40 years as the number of overweight and obese individuals in developing countries has tripled, diabetes cases have skyrocketed—increasing the need for population-wide monitoring and treatment programs.

and better food labeling, among other goals. Tax revenues from the sale of alcohol would help pay for these disease prevention programs. One small step forward is the creation of “Caribbean Wellness Day” on September 13th each year, when nearly all Caribbean nations set aside the day for programs that showcase and promote exercise and healthy eating.

Another group, the Healthy Caribbean Coalition, conducted a highly innovative “Get the Message” campaign in partnership with phone, media and insurance companies. They used mobile phones to disseminate information about chronic disease to millions of people in 17 Caribbean countries via free cell phone messages, and generated almost one million text signatures encouraging political leaders to attend the United Nations High Level Meeting on NCDs in 2011. The campaign generated huge media attention, was widely discussed and promoted in newspapers, on TV and on the airwaves, was tweeted, and received 20,000-plus Facebook “likes.”

Other efforts have lagged, perhaps due to poor funding. For example, only 10 percent of Caribbean countries have mandatory labeling of packaged foods, and a mere 3 percent have a trans fat-free food supply. But there are many initiatives in the works that will spark further progress, such as efforts to institute food and nutrition plans and promote smoke-free indoor public places.

MOBILIZING ACTION THROUGH KNOWLEDGE

Quick and easy access to information is all the more important in today's fast-paced world where medical policy needs to react to the changing challenges of public health. Take salt, for example. For many years, iodized salt has been a supplement for those who live in areas where the local diet lacks sufficient iodine, which can lead to goiter—a public health issue for 1.9 million people in 54 countries, according to a 2006 WHO report. At the same time there is growing awareness that too much salt presents a major risk for hypertension and cardio-

More than 10 percent of
13- to 15-year-olds
in developing countries
are using tobacco
in some form.



vascular disease. However, salt reduction and salt iodization are compatible public health interventions. Monitoring of salt intake at the country level is needed to adjust salt iodization over time as necessary, depending on observed salt intake in the population. The goal is to ensure that individuals consuming the recommended amount of salt (five grams a day, about a teaspoon), continue to consume sufficient iodine.

Regional health partners are working together to implement these public health interventions, using methods that offer a window into how information-sharing has leaped beyond the confines of meet-

ing rooms and entered the modern age of social networks: Those interested in keeping tabs on the latest PAHO-related salt reduction news can now log on to Twitter and follow #saltreduction.

Even with widely available ways to explore existing solutions to the NCD epidemic, not all are applied, leading to what is known as the “know-do” gap. Health inequalities between developed and developing countries (and within them) are widening despite known, effective interventions. Sharing knowledge and innovation is vital to bridging the know-do gap by fostering research, dissemination of good practices and translation of knowledge into policies that promote action.

Decision makers, health professionals and communities—as well as everyone who has the potential to contribute to the NCD agenda—need to be empowered to find, use, manage and share knowledge and innovation. This includes everyone from women (who are often the change agents in families and communities), human rights organizations and faith-based organizations, to labor organizations, groups focused on children and youth, intergovernmental and nonprofit organizations, academia, the media and corporations, among others. However, “knowledge of what is does not open the door directly to what should be,” noted Albert Einstein. It's what we do with that knowledge that will change the trajectory of this current health crisis—or not.

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The **WHO** *Monitoring Model*

—| AUTHORS |—

Shanthi Mendis and Oleg Chestnov

I n 2011, United Nations General Assembly delegates agreed to pursue a formidable global goal: They proposed to cut deaths from noncommunicable diseases—including heart disease, diabetes, respiratory diseases and cancer—25 percent by the year 2025. The body had convened just once before over its 68-year history to devote its attention solely to a health issue. But an often overlooked, yet imminent epidemic threatens to devastate both populations and economies. Of the 36 million deaths caused by noncommunicable diseases in 2008, 80 percent occurred in developing nations.

But how will nations and their health workers go about meeting this enormous challenge, especially when many countries lack resources, strong health delivery systems, funding for drug therapy and even basic registries to record death statistics? The World Health Organization (WHO) was tasked with developing a global action plan with benchmarks that are both achievable and flexible enough to allow for progress in every nation, regardless of socioeconomic status. That plan contains nine targets for preventing some of the world's biggest killers—heart disease, diabetes, chronic respiratory diseases and cancer—and addresses the behaviors that contribute to them. It allows countries to set their own realistic national goals while collaborating on more complex multi-national challenges, such as reducing smoking.

WHO also developed a framework that, beginning in 2015, will help nations monitor progress. It identifies the lifestyle choices that feed these diseases, including salt intake, obesity and others while highlighting areas that are not keeping pace.

In essence, this is a public health roadmap offering a way forward for nations currently overwhelmed by chronic disease. When implemented, the plan will save millions of lives.

STEMMING AN UNACCEPTABLE DEATH TOLL

By 2025, WHO's goal is for all nations to cut the current 36 million deaths from noncommunicable diseases by 25 percent. Some 14 million people die prematurely from these killers—

The nine voluntary global targets for prevention and control of noncommunicable diseases to be achieved by 2025



before the age of 70, with great impact both on families and nations. Meeting this “25 by 25” target would save at least two million lives per year in people between the ages of 30 and 70, based on 2010 mortality data.

The medical and public health community knows how to prevent many of these diseases. Many of the targets identified by WHO reinforce one another, making it possible to achieve wide-scale health improvements through progress on linked actions, such as increasing activity and losing weight.

There has been a dramatic cut in mortality from heart disease and stroke in industrialized countries, including the United States, due to improved awareness and treatment. A public health program in Finland—which once had the world’s highest rate of heart disease—lowered death rates from stroke and heart disease by nearly 80 percent. The program encouraged manufacturers to improve the nutritional content of food. Public information programs also taught Finns to consume less butter and whole milk, stop smoking and seek treatment for high blood pressure. This type of effective initiative has lessons for other countries.

MAKE SMOKING HISTORY

Nearly 15 percent of the planet’s adult population smokes. Tobacco is the world’s leading preventable cause of death, responsible for the demise of some six million people yearly. About one in 10 of those deaths are caused by cardiovascular disease. Smoking impacts circulation by narrowing arteries, damaging the lining of blood vessels and increasing the risk of blood clots. This more than doubles the risk of having a heart attack or stroke and shortens a smoker’s life by about a decade.

As tobacco use continues to fall in industrialized nations, tobacco manufacturers have shifted their attention to the developing world, with dramatic result. Between 1990 and 2009, as smoking decreased 26 percent in western Europe, it increased by more than double that in West Africa, jumping by 57 percent. In China, more than 300 million men now smoke more than one third of the world’s cigarettes.

WHO is calling for countries to reduce smoking by nearly one third and to conduct national surveys to track tobacco use. Many nations have curbed smoking through increased taxes, graphic ads and warning labels as well as bans on public smoking and sales of tobacco to minors. In Poland, where the smoking rates in men were once very high, tobacco use dropped by 10 percent between 1990 and 1998 after the government passed landmark antismoking legislation.

GET PEOPLE MOVING

By increasing the risk of cardiovascular disease, diabetes and some cancers, physical inactivity contributes to some 3.2 million deaths per year, mostly in low- and middle-income countries.

Just two and half hours of moderate activity per week—even walking—can drop the likelihood of developing heart disease by one third. Moderate exercise even drives down risk in those with high blood pressure or diabetes. Yet WHO statistics show that 31 percent of those older than 15 don’t get this half hour of exercise each day. In general, women are the least active, along with both men and women living in high-income countries where everyday lifestyles mean driving rather than walking, and sedentary jobs are common.

WHO’s goal is to get one in 10 of each country’s inactive adults up and moving, which is more than possible. Well-designed programs work. Among them is an exercise and education program launched in Brazil in 2002. Over the next six years, the numbers of inactive adults in Sao Paulo decreased by 7 percent, though half of the country’s adults are still not sufficiently active.

CURB ALCOHOL USE

WHO’s concept of harmful alcohol use is drinking that causes detrimental health and social consequences for the drinker, the people around him or her

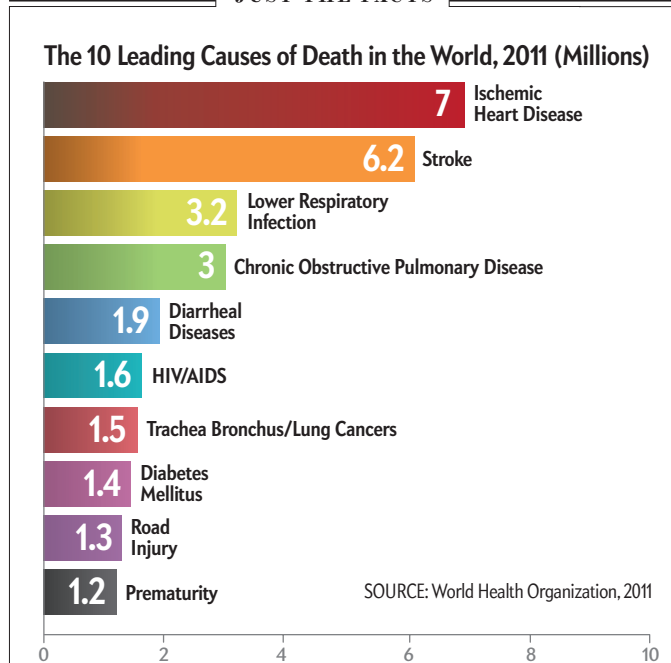
and society at large—as well as drinking habits that adversely impact health.

It’s a massive problem. Each year, alcohol kills more people than AIDS and tuberculosis combined, about 2.5 million in all, including more than 300,000 individuals who have not yet reached their 30th birthday. The problem is worst in western and eastern Europe and the Russian Federation; one in five Russian men die an alcohol-related death.

Those deaths are due to injury, cirrhosis of the liver, cancer and heart disease. Heavy drinking can raise blood pressure and increase the risk of stroke. It enlarges the heart and raises harmful triglycerides. While alcohol consumption is relatively low in many developing nations, a steep rise is occurring in Africa and Southeast Asia. Even in countries where abstention is the religious or cultural norm, those who do drink often imbibe large amounts. WHO seeks to cut harmful use of alcohol by 10 percent by one of two tacks—either by reducing the average six-plus quarts of pure alcohol consumed per person per year or by reducing the prevalence of binge drinking episodes.

A variety of tools can help, including raising the price of alcohol, raising the minimum drinking age to 21, restricting the

JUST THE FACTS



sale of alcoholic beverages in grocery stores—and instituting harsher penalties for drunk driving.

SHAKE THE SALT HABIT

There is strong evidence that high salt intake raises blood pressure. Each year, an estimated 2.3 million heart attack and stroke deaths are linked to salt-heavy diets.

WHO recommends a maximum intake of under two grams of sodium per day, which is about a teaspoonful of salt. But globally, the average person ingests twice that. In parts of central Asia, per capita daily salt consumption is triple the recommendation.

In industrialized countries, three quarters of dietary salt comes from processed food. Bread is the leading source in the U.S., followed by cured meats and pizza. In developing countries, most salt is added during cooking, using soy sauce, fish sauce or soup cubes, such as the salt- and MSG-filled soup cubes that are ubiquitous across Africa. WHO is recommending that the world consume 30 percent less.

In the United Kingdom, salt use fell nearly 15 percent following an initiative that included food producers voluntarily lowering salt content in their products. Another successful effort, in Tianjin (China's fourth-largest city), was a door-to-door education effort that offered smaller spoons to measure salt, a measure that lowered sodium intake—and along with it, lowered residents' blood pressure.

LOWERING BLOOD PRESSURE

Over the last three decades, the numbers of people with high blood pressure have skyrocketed, jumping from 600 million in 1980 to one billion in 2010, with the highest rates seen in Africa. With more people on the planet, a larger aging population and increasing global obesity, at least half of the 17 million deaths due to cardiovascular disease each year are caused by effects of elevated blood pressure. Hypertension is often a silent killer, with no symptoms or warning signs.

Globally, 40 percent of people over the age of 45 have hypertension, which is defined as systolic blood pressure of 140 mmHg or higher and/or diastolic blood pressure of 90 mmHg or above. WHO is targeting a reduction of 25 percent in every country.

This can be achieved by dovetailing with other goals, the most critical of which is reducing salt intake. But improving nutrition is also important: eating more fruits and vegetables and less saturated fats, and lowering harmful use of alcohol.

CURB OBESITY LEVELS

Obesity is among the most visible—yet most neglected—public health problems. Without immediate action, millions will suffer from an array of serious health disorders because of

the growing global overweight and obesity epidemic—also known as “globesity.” In 2008, 1.4 billion adults aged 20 and older were overweight, a full 35 percent of the population. About 500 million, or 11 percent, were obese. But even the young are affected: About 44 million toddlers under the age of five were overweight in 2012.

These numbers pale in comparison to rates in the United States, where nearly 70 percent of adults are overweight and more than 30 percent are obese. But as U.S. obesity rates creep upward, those in the rest of the world are galloping ahead, rising in high-, middle- and low-income countries, particularly in urban settings. Globally, obesity rates doubled between 1980 and 2008. Many nations now find themselves battling both obesity and malnutrition: In India, two in five children are undernourished, yet one in five is overweight. According to recent U.N. statistics, Mexico—where per capita consumption of sugary drinks is a staggering 163 liters (43 gallons) per year—recently surpassed the U.S. as the fattest nation in the world.

Obese populations have a 69 percent higher risk of coronary heart disease and a 47 percent greater chance of suffering a stroke than those carrying normal weight. Carrying excess weight kills 2.8 million people each year—exceeding the number of deaths from malnutrition. Obesity is also closely linked to diabetes, which can cause blindness, limb amputation, kidney failure and death. In 2008, some 10 percent of the world had diabetes, killing about 1.3 million; worldwide, rates are expected to double by 2030.

WHO's goal for diabetes is for each nation to halt the rise of both the disease and weight gain in their populations, using fasting blood sugar levels and body mass index as indicators of progress.

Studies show that even moderate weight loss can significantly lower risk for both diabetes and heart disease. Evidence suggests it is critical to control weight early in life in order to prevent obesity in adulthood. In a 2013 article published in *The Lancet*, the authors wrote that amidst burgeoning obesity, public health officials must use the tools they have in hand to avert “a potentially massive worldwide increase of cardiovascular disease.”

PREVENT HEART ATTACK AND STROKE

Decades of medical research show that half of those dying from heart attacks and stroke could be saved if risk factors were addressed and patients were given relatively inexpensive drugs, such as aspirin and cholesterol-lowering statins.

But very few people in the developing world receive the simple, cheap interventions that save lives. In a 2011 study of patients from 17 low- and middle-income countries who had heart disease or who had suffered a stroke, four fifths had not received drug treatment, something the report's author, Salim

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Yusuf, professor of medicine at Canada's McMaster University, called "a global tragedy."

In many countries, screening is so limited that most people live unaware that they are at risk. A study in 2013 showed that more than half of people with hypertension worldwide do not know they have the condition (compared with 20 percent of Americans). To address this, WHO seeks to increase drug therapy for those at high risk of heart attack and stroke by 50 percent. Goals also include counseling and help in controlling blood sugar.

One way to meet this target is to strengthen primary care services in developing nations—especially screening, early detection and treatment. That will require an expanded medical workforce that is capable of monitoring blood pressure and blood sugar. A pilot study of health care workers in rural and urban India showed that personnel who trained for only two days could reliably use digital blood pressure monitors. An HIV/AIDS care program in western Kenya, AMPATH (Academic Model Providing Access to Healthcare), is transitioning its HIV clinics into more comprehensive health centers that now offer diabetes treatment to more than 2,000 patients who could not otherwise afford it.

INCREASE ACCESS TO DRUGS AND DIAGNOSTICS

The short list of therapies and tools that are most critical for preventing heart disease and diabetes contains cheap items that are commonplace in the developed world, drugs like aspirin, statins, diuretics and insulin as well as basic equipment that includes devices to measure blood sugar, blood pressure and weight. But in poorer countries, these simple items remain scarce. Studies show that nearly two thirds of public clinic patients in the developing world do not have access to safe, affordable generic drugs to treat noncommunicable diseases and only 55 percent of privately treated patients can get generics. Some health care advocates consider this lack of access to basic, lifesaving drugs to be a human rights issue.

The ultimate goal is to provide essential technologies and medicines to 80 percent of patients in both public- and private-care settings. This will require an overhaul of systems used to procure and distribute medicines. Developing countries could see huge cost savings if they could manufacture their own generic medicines and simple diagnostic tests. Bangladesh is one country that has developed a full-fledged pharmaceutical industry, producing hundreds of generic drugs that meet 97

percent of the country's medication demands.

OUR GLOBAL CHALLENGE

The challenge ahead is ambitious, and looms larger for nations that have long lacked financial and human resources to improve health outcomes. Outside aid is limited. According to a 2010 report "Where Have All the Donors Gone?" from the Center for Global Development, less than 3 percent of the \$22 billion in health funding goes toward noncommunicable disease.

Other problems include the lack of effective health systems to deliver basic primary care and the lack of the most basic vital registration systems for health surveillance. Powerful marketing forces of multinational corporations that promote tobacco, alcohol, sugary drinks and processed foods throughout the developing world are also contributing to poor nutrition and increased health risks.

Despite these roadblocks, we feel these benchmarks are achievable—and must be met. If these lifestyle diseases with their long incubation periods continue unchecked, this "slow-motion disaster" (a term coined by WHO Director General Margaret Chan) could bankrupt struggling nations and leave many of their citizens further entrenched in poverty.

The cost of preventing these diseases has been estimated at less than one dollar a year per person in low-income countries and a mere three dollars in middle-income countries where overhead is higher. The cost of inaction is too high, an unimaginable \$47 trillion over the next 20 years in health care costs and lost productivity, according to a 2011 report by the World Economic Forum.

What is needed to meet these targets is long-term financial investment, enough skilled health workers to diagnose and treat these diseases, and the political muscle not just of health ministers but also of high-level political leaders. On this front, progress is being made. Mexico's Congress recently passed a one-peso-per-liter tax on soft drinks and President Enrique Peña Nieto recently appeared on TV to urge citizens to exercise and make a "change of culture."

The good news is, we know what works to prevent and control these global killers. We know prevention is relatively cheap. The actions we recommend here are not new or startling. But one thing is new—this plan includes a method that allows nations to check their progress. Countries are now conscious of the fact that if they don't take action, it will be devastating at home and evident to the world.

ABOUT THE AUTHORS

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Shanthi Mendis and Oleg Chestnov of the World Health Organization contributed this paper in their personal capacity. The contents of the paper do not necessarily represent the decisions or the policies of WHO.

MORE TO EXPLORE

Political Declaration of the High-Level Meeting of the General Assembly on the Prevention and Control of Noncommunicable Diseases, Resolution 66/2. United Nations General Assembly. Available at http://www.who.int/nmh/events/un_ncd_summit2011/political_declaration_en.pdf

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