

# Noncommunicable Diseases in Low- and Middle-Income Countries

## A Strategic Approach to Develop a Global Implementation Research Workforce

Michael M. Engelgau\*, Joshua P. Rosenthal<sup>†</sup>, Bradley J. Newsome\*, LeShawndra Price\*, Deshree Belis\*, George A. Mensah\*

Bethesda, MD, USA

### ABSTRACT

Globally, most of the burden from noncommunicable disease is now evident in low- and middle-income countries (LMICs). At the same time, many effective noncommunicable disease interventions are now available and recommended for implementation and scale-up across LMIC health systems—yet are not being widely implemented. Understanding optimal and sustainable implementation strategies for these interventions within the LMIC context will need locally led and conducted implementation research—a research capacity which currently is lacking. The National Institutes of Health institutes, centers, and offices work with the Fogarty International Center to support biomedical research and research training across the globe. The National Heart, Lung, and Blood Institutes' Center for Translation Research and Implementation Science has a strategic focus on implementation research in global health. The Center for Translation Research and Implementation Science is considering strategies for developing research capacity and skill sets to conduct this priority research along with National Institutes of Health institutes and centers and other key global institutions that highly value implementation research. Short-term and medium-term strategies will be needed along with building on current efforts and investments and considering new efforts to address gaps. Developing and sustaining this research workforce will present many challenges and require much effort, but the returns could be transformative in advancing the prevention, treatment, and control of noncommunicable diseases within LMICs.

### RESPONDING TO THE NONCOMMUNICABLE DISEASE BURDEN IN LOW- AND MIDDLE-INCOME COUNTRIES

We have strong evidence that health is improving across the globe with declines in morbidity and mortality from noncommunicable diseases (NCDs) in high-income countries (HICs), but this is much less evident in many low- and middle-income countries (LMICs) [1]. Globally, this results in a substantial morbidity and mortality burden in LMICs where over 80% of cardiovascular and diabetes deaths and almost 90% of chronic obstructive pulmonary disease deaths occur [2,3]. These deaths are not limited to elderly populations—each year an estimated 15 million people die from NCDs between the ages of 30 and 69 years with over 80% of these premature deaths in LMICs [3].

Fortunately, many effective NCD interventions are now available and recommended for implementation and scale-up across health systems, but they are not being widely implemented in LMICs. However, to study optimal and sustainable implementation strategies for these interventions in LMICs, local implementation research capacity is needed [4]. Yet, research infrastructure and

outputs in LMICs are often insufficient, and the data from these settings are scarce [5–7]. Many globally focused institutions—including the World Health Organization (WHO) [8], World Bank [9], academia [10], US Agency for International Development [11], National Institutes of Health (NIH) [12–18], and others—appreciate the importance of locally driven in-country implementation research. Understanding and including country context challenges is critical for delivering high quality research. As the research community considers options, here we identify some challenges and opportunities ahead and propose a strategy to foster development of needed capacity and skills for implementation research—research that takes effective interventions and studies their optimal and sustainable implementation—that could be transformational in tackling NCDs within LMICs.

### OPPORTUNITIES AND CHALLENGES

Implementation research conducted in LMICs offers unique opportunities to understand key barriers in the adoption, scale-up, and sustainment of evidence-based interventions in LMICs as well as in low-resource settings

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TABLE 1. WHO best buys\*

Modifiable risk factors	
Reduce tobacco use	<ul style="list-style-type: none"> <li>• Increase excise taxes and prices on tobacco products</li> <li>• Implement plain/standardized packaging and/or large graphic health warnings on all tobacco packages</li> <li>• Enact and enforce comprehensive bans on tobacco advertising, promotion, and sponsorship</li> <li>• Eliminate exposure to secondhand tobacco smoke in all indoor workplaces, public places, public transport</li> <li>• Implement effective mass media campaigns that educate the public about the harms of smoking/tobacco use and secondhand smoke</li> </ul>
Reduce the harmful use of alcohol	<ul style="list-style-type: none"> <li>• Increase excise taxes on alcoholic beverages</li> <li>• Enact and enforce bans or comprehensive restrictions on exposure to alcohol advertising (across multiple types of media)</li> <li>• Enact and enforce restrictions on the physical availability of retailed alcohol (via reduced hours of sale)</li> </ul>
Reduce unhealthy diet	<ul style="list-style-type: none"> <li>• Reduce salt intake through the reformulation of food products to contain less salt and the setting of target levels for the amount of salt in foods and meals</li> <li>• Reduce salt intake through the establishment of a supportive environment in public institutions, such as hospitals, schools, workplaces, and nursing homes, to enable lower sodium options to be provided</li> <li>• Reduce salt intake through a behavior change communication and mass media campaign</li> <li>• Reduce salt intake through the implementation of front-of pack labeling</li> </ul>
Reduce physical inactivity	<ul style="list-style-type: none"> <li>• Implement community-wide public education and awareness campaign for physical activity that includes a mass media campaign combined with other community-based educational, motivational, and environmental programs aimed at supporting behavioral change of physical activity levels</li> </ul>
Disease management	
Manage cardiovascular disease and diabetes	<ul style="list-style-type: none"> <li>• Drug therapy (including glycemic control for diabetes mellitus and control of hypertension using a total risk<sup>†</sup> approach) and counseling to individuals who have had a heart attack or stroke and to persons with high risk (<math>\geq 30\%</math>) of a fatal and nonfatal cardiovascular event in the next 10 years</li> </ul>
Manage cancer	<ul style="list-style-type: none"> <li>• Vaccination against human papillomavirus (2 doses) of 9- to 13-year-old girls</li> <li>• Prevention of cervical cancer by screening women ages 30 to 49 years, either through: <ul style="list-style-type: none"> <li>- Visual inspection with acetic acid linked with timely treatment of precancerous lesions</li> <li>- Pap smear (cervical cytology) every 3 to 5 years linked with timely treatment of precancerous lesions</li> <li>- Human papillomavirus test every 5 years linked with timely treatment of precancerous lesions</li> </ul> </li> </ul>
*Modified from Vázquez and Ghebreyesus [21]. Includes all effective interventions with cost-effectiveness analysis $\leq$ \$100 per disability-adjusted life years averted in low- and middle-income countries.	
<sup>†</sup> Total risk is defined as the probability of an individual experiencing a cardiovascular disease event (for example, myocardial infarction or stroke) over a given period of time, for example, the next 10 years.	

in HICs. Research that galvanizes patients, communities, nongovernmental organizations, and academia together with ministries of health and ministries of finance has the potential to find sustainable solutions tailored to local in-country context. An example of our recent National Heart, Lung, and Blood Institute (NHLBI) focus on implementation research in LMICs is our participation in the Global Alliance for Chronic Diseases [19], a global partnership of 14 leading biomedical research funders. For the Global Alliance for Chronic Diseases' next research call starting in 2018, the focus will be on implementation

research to scale-up hypertension prevention and control [20].

In 2011, the World Economic Forum and WHO studied the economic toll of NCDs and the cost of scaling-up a small core set of proven-effective interventions, so-called best buys (Table 1) [22]. This report was targeted to decision makers, civil society, and the private sector—key stakeholders for adopting, implementing, and sustaining delivery of these recommended intervention. In 2013, when the World Health Assembly endorsed WHO's Global Action Plan for the Prevention and Control of NCDs

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