Original Article

Global prevention and control of NCDs: Limitations of the standard approach

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Abstract  The five-target ‘25×25’ strategy for tackling the emerging global epidemic of non-communicable diseases (NCDs) focuses on four diseases (CVD, diabetes, cancer, and chronic respiratory disease), four risk factors (tobacco, diet and physical activity, dietary salt, and alcohol), and one cardiovascular preventive drug treatment. The goal is to decrease mortality from NCDs by 25 per cent by the year 2025. The ‘standard approach’ to the ‘25×25’ strategy has the benefit of simplicity, but also has major weaknesses. These include lack of recognition of: (i) the
fundamental drivers of the NCD epidemic; (ii) the ‘missing NCDs’, which are major
causes of morbidity; (iii) the ‘missing causes’ and the ‘causes of the causes’; and (iv)
the role of health care and the need for integration of interventions.

Keywords: non-communicable diseases (NCDs); risk factors for NCDS; mortality

Background

The 2011 United Nations High-Level Meeting on non-communicable diseases (NCDs) saw the world’s leaders commit to action to tackle this emerging global epidemic.1–3 Action was imperative.4–9 The World Health Assembly set a target of a 25 per cent relative reduction in overall mortality from four conditions (cardiovascular disease, cancer, diabetes, and chronic respiratory diseases) by 2025.10 The ‘25×25’ strategy11 is now incorporated into the World Health Organization’s Global NCD Action Plan 2013–202012,13 that lists nine voluntary national targets. Two are overarching: to reduce mortality from the four conditions; and to halt the rise in diabetes and obesity. The others are more specific: focussed on reducing alcohol consumption, increasing physical activity, reducing dietary salt, reducing smoking, improving blood pressure control, and enhancing treatment of those at risk from or suffering from the major NCDs (Table 1).14

Table 1: Voluntary targets set out in the global action plan for the prevention and control of NCDs 2013–2020

(1) A 25 per cent relative reduction in the overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases
(2) At least 10 per cent relative reduction in the harmful use of alcohol, as appropriate, within the national context
(3) A 10 per cent relative reduction in prevalence of insufficient physical activity
(4) A 30 per cent relative reduction in mean population intake of salt/sodium
(5) A 30 per cent relative reduction in prevalence of current tobacco use in persons aged 15+ years
(6) A 25 per cent relative reduction in the prevalence of raised blood pressure or containment of prevalence of raised blood pressure, according to national circumstances
(7) Halt the rise in diabetes and obesity
(8) At least 50 per cent of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes
(9) An 80 per cent availability of the affordable basic technologies and essential medicines, including generics, required to treat major NCDs in both public and private facilities

Source: WHO.12
The Action Plan takes a broad view, acknowledging the social, economic, and political determinants of disease, and the general development agenda. However, it is less clear, particularly in low- and middle-income countries (LMICs), that these statements of intent can be translated into policy, and some previous ambitious ‘calls to action’ have fallen on deaf ears. For example, the Pacific Health Ministers Forum, while strongly supporting the inclusion of mental health in the strategy, nevertheless advocates a narrow and targeted approach to NCDs, stating that “Lessons learnt in dealing with NCDs suggest that we should focus on a small number of prioritized, evidence-based, culturally appropriate, and cost-effective interventions”.

In the first part of this article we discuss four issues that we believe have received insufficient attention in what we term the ‘standard approach’. In the second part, we briefly present an inclusive and complementary approach that we term the ‘comprehensive model’. We concede that the standard approach may be necessary as a first step, but a more ambitious approach is needed both to reach its goals and to extend its scope, addressing NCDs in an integrated way. We highlight key issues that must be addressed in developing a more ambitious and, ultimately, sustainable approach, recognizing that the detail required for a fully developed strategy must be a matter for widespread consultation and discussion.

Issue 1: Insufficient recognition of the fundamental drivers of the NCD epidemic

Margaret Chan, Director General of the WHO, recently argued that “it is not just Big Tobacco anymore. Public health must also contend with Big Food, Big Soda, and Big Alcohol. All of these industries fear regulation, and protect themselves by using the same tactics”. This reflects a growing recognition of the role of these industries in global health, with trade liberalization driving combined epidemics of diseases associated with tobacco, alcohol, and fast food in many LMICs. These industries have been compared with the insect vectors of some communicable diseases, continually adapting to exploit emerging ecological niches, just as mosquitoes exploited the development of the car tyre, using pools of stagnant water they contain to breed, so the tobacco industry has shifted its promotional activities to LMICs, exploiting the
weaker regulatory environment. A similar situation applies with respect to the food and alcohol industries (Box 1).

Globalized preventive measures have not matched the actions of these global industries. Instead, these powerful corporate interests promote programmes aimed at changing individual behaviour, such as education, even though there is little evidence that such programmes work. As Ebrahim and Davey Smith note, with regard to high-income countries (HICs):

The evidence linking risk factors with cardiovascular disease is not disputed, but the best efforts of doctors and nurses working on lifestyle change in individuals and their families appear to be remarkably limited, even when augmented by mass media and community activities.

There is even less reason to believe that such interventions will be successful in LMICs. A recent cluster randomized trial of health education for cardiovascular disease prevention in India produced
disappointing results. In contrast, measures that have worked have involved direct intervention in the market, such as diminished smoking prevalence in Papua New Guinea associated with price increases and a substantial fall in blood cholesterol levels in Mauritius, caused not by health promotion or drugs, but by negotiating trade agreements that enabled imported cooking oil to switch from largely palm oil (high in saturated fatty acids) to almost wholly soya bean oil.

This does not mean that there is no role for actions targeted at individuals. Brief interventions can sometimes be effective in changing behaviour, but there are constraints to using them widely in resource poor settings. Anti-hypertensive medications and cholesterol lowering drugs have already achieved much and could do much more if the very large treatment gap in LMIC could be closed. Yet these can only work as part of contextually appropriate responses. As Jaime Miranda and Zaman note, many systematic reviews do not answer questions about developing countries, so most of the ‘available evidence’ is difficult to apply.

An effective response will require action at the individual and population level, but as has long been realized in HICs, actions directed at the population will bring the greatest gains. The industries that play a causal role in NCDs have a vested interest in supporting weak individual-focused strategies, as this may avoid actions that would affect their operating practices and reduce their profits.

**Issue 2: Morbidity versus mortality (and the missing NCDs)**

The ‘25×25’ strategy focuses on preventable mortality, and the ‘big four’ NCDs that account for 87 per cent of all NCD deaths. When using Disability Adjusted Life Years (DALYs), incorporating both mortality and morbidity, a rather different picture appears, with the ‘big four’ NCDs only accounting for 54 per cent of NCD DALYs. Box 2 describes some other conditions that are excluded from the ‘25×25’ strategy, such as mental disorders, neurological disease, and musculoskeletal disease, that together account for 32 per cent of the NCD DALYs. ‘Other’ NCDs (including visual impairment and hearing loss) account for a further 14 per cent. For some of these ‘missing’ NCDs (for example, asthma, neurological disease), the major causes are currently unknown, so ongoing research is needed. Thus, the ‘25×25’ strategy is at most only a partial response to the burden of NCDs.
Box 2: NCDs that are missing from the ‘25x25’ strategy

The Global Burden of Disease (GBD) study estimated that about 14 per cent of the global burden of NCD DALYs is attributable to psychiatric disorders, largely due to the chronically disabling nature of depression and other common mental disorders, alcohol-use and substance-abuse disorders, and psychoses. Neurological disorders (including epilepsy, multiple sclerosis, Parkinson’s Disease, motor neuron disease, and others) also have an important impact, accounting for 5 per cent of total NCD DALYs. Musculoskeletal problems contribute another 13 per cent. Prince et al. show how mental disorders increase the risks of developing NCDs, and co-morbidity complicates help-seeking, diagnosis, and treatment (particularly adherence), and influence prognosis. Thus, mental disorders are an important cause of long-term disability and dependence. They account for a particularly high proportion of years lived with a disability. In addition, maternal mental disorders, even minor ones that are highly prevalent, affect infant growth and survival. Thus, mental disorders are risk factors for NCDs, and in turn NCDs may increase the risk of developing a mental disorder, or may lengthen episodes of mental illness.

Issue 3: The causes of the causes (and the missing causes)

A more inclusive strategy would also extend the list of ‘key exposures’. Box 3 presents some other key ‘missing causes’, including infections, and occupational and environmental exposures.

Individual lifestyles and exposures to occupational and environmental risk factors do not occur in a vacuum. It is essential to consider the structural (distal) determinants, that is, ‘causes of the causes’. This lesson should have been learned from the struggle against infectious disease, where collective measures were more effective than individual ones. Box 4 presents some key environmental ‘causes of the causes’ – urban design, poverty and development, and air pollution, plus lifestyle and climate change. There are, for example, more than 7 million deaths per year due to air pollution (about half from ambient and half from household air pollution) (www.who.int/mediacentre/news/releases/2014/air-pollution/en/).

Programmes that promote physical activity tend to focus on leisure time activity, including sport, running, going to the gym, and so on. However, as Hu notes “Leisure Time Physical Activity (LTPA) accounts for only a small part of total physical energy expenditure...”.
In recent decades, energy expenditure has decreased markedly because of changes in the urban environment, including urban design, safety concerns, the rise of car use, and near demise of public transport (a particular concern in LMICs). These changes cannot be offset by increased LTPA alone. That requires changes in the environment – promoting public transport, active commuting, and provision

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**Box 3: Causes that are missing from the ‘25×25’ strategy**

Fifteen per cent of cancers are caused by infections – <10 per cent in Europe and >25 per cent in Africa. Key cancers caused entirely or primarily by infectious agents include stomach cancer (helicobacter pylori), cervical cancer (human papilloma virus), and primary liver cancer (hepatitis B virus). All of these infectious causes of NCDs have primarily been discovered or established since 1980. Other infectious causes of NCDs are waiting to be discovered, and are likely to be represent a relatively greater burden of disease in LMICs.

The GBD study estimated that occupational exposures accounted for only about 2.5 per cent of NCD deaths and 4.7 per cent of DALYs in 2010. These, however, are likely to be severe underestimates, because they are based on current exposures only and do not taken into account the effects of earlier high levels of exposure. The GBD study estimated that asbestos accounted for 118,097 deaths and 2,681,000 DALYs globally in 2010. Asbestos-caused cancers are not declining, but rather moving from High-Income Countries (HICs) to LMICs. In India, for example, the use of asbestos has doubled in the last decade to about 300,000 tonnes a year. The industry now employs about 100,000 workers.

Indoor air pollution and outdoor air pollution have both played a major role in increases in NCDs. WHO estimates that there are about 7 million deaths a year due to air pollution (www.who.int/mediacentre/news/releases/2014/air-pollution/en/), about half being from outdoor and half from indoor air pollution. Air pollution is now the world’s largest environmental health risk.

Other environmental exposures contribute to NCDs in LMICs. The predominant source of arsenic exposure in the world is contaminated drinking water, and causes non-melanocytic skin and internal tumours in humans. About 4.5 billion people globally are exposed to aflatoxins – a class of toxic metabolites produced by certain species of fungi. Aflatoxin interacts with hepatitis B virus infection to cause liver cancer in humans.

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Box 4: ‘Causes of the causes’ that are missing from the ‘2.5×2.5’ strategy

Changes in the urban environment have probably played a key role in the global epidemics of obesity and other NCDs. These include design of cities, safety concerns (that discourage walking), the rise of the car, and the near demise of public transport (a particular concern in LMICs), plus labour-saving devices that now permeate daily life. We have (largely unintentionally) produced a society where exercise is no longer an integral part of daily life, either at work or outside of work. Today, exercise is, for much of the world’s population, something we choose to do by engaging in leisure time physical activity.

The main cause of household air pollution is the use of inefficient cookstoves to burn solid fuels such as dung and coal. Poverty and lack of affordable electricity or other clean sources, such as liquefied petroleum gas, aggravate this pollution. Outdoor fine particulate air pollution is due largely to the combustion of fossil fuels, notably coal and diesel fuel. Black carbon emitted from combustion of household fuels is a short-lived climate pollutant, whereas the combustion of fossil fuels is a major driver of climate change.

The ‘causes of the causes’ also affect phenomena other than health. NCDs and other societal problems have common causes and often have common solutions. Societal-level measures to prevent NCDs, achieve sustainable development, and combat climate change, share key features. A reduction in the use of cars, for example, would decrease CO₂ emissions and thus reduce the impact on climate change. It would also increase physical activity and prevent a range of conditions associated with physical inactivity, including heart disease, stroke, and diabetes. The same goals can be achieved by allowing children to play outside (an urban design issue) instead of watching TV for hours. A reduction in meat consumption in high-consuming populations, together with increases in vegetable and fruit consumption, would greatly reduce methane (a powerful greenhouse gas) emissions but also on diet-related diseases. Thus, addressing the ‘causes of the causes’ can have far-reaching positive health and social benefits. A report to the 2014 World Health Assembly noted that the world could combat social inequalities in health by supporting ‘health in all policies’ approaches. The World Health Organization has provided training and technical support for monitoring equity-orientated policies.
of green space. This observation is more valid in LMICs, where emerging cities followed post-1950s multi-centric urban growth suitable only for motorized transportation. Also, in many LMIC cities, climatic factors and urban heat island make exercise uncomfortable. Focusing health promotion efforts on population subgroups has not been very successful.

Interventions need to be undertaken in each generation, and tend to exacerbate health inequalities as they are preferentially adopted by those with resources enabling them to make healthy choices most easily. Changes in the environment are required so that physical activity and a healthy diet once again become “part of daily life.” Dialogue between local communities and urban planners will be required, as will changes in use of existing public space, and greater engagement and involvement between the public and corporate sectors.

**Issue 4: The role of health care and integration of interventions**

Finally, we need to supplement the ‘25x25’ strategy by strengthening existing health systems in LMICs and enabling them to deliver innovative and affordable health care for NCDs, particularly in primary care. Some LMICs, such as India, China, Brazil, Laos, Indonesia, and the Philippines, are markedly increasing health expenditures and extending coverage. This offers a major opportunity for the ‘25x25’ strategy, but the opportunity is at risk of being missed because of the neglect of health care for NCDs.

In Brazil, a nationwide strategy of comprehensive PHC initiated in the 1980s suggests that it is possible to reduce morbidity and mortality from cardiovascular disease in LMICs substantially. In many countries, the increasing numbers of private health-care providers is undermining the ability to respond to NCDs, as these providers tend to avoid caring for those with complex multiple disorders, where the costs of treatment are typically unpredictable.

Atun et al observed that improving the responsiveness of health systems will be particularly challenging in LMICs with health systems characterized by fragmented health-care delivery coupled with shortages of services, inadequate coverage of medications, and an insufficient supply of skilled health professionals. Successful responses to AIDS have shown the need for broad-based governance mechanisms that include civil society, affected communities, and the private sector. HIV can serve
as a model for NCDs, demonstrating innovative approaches to engaging civil societies and the private sector.76 Indeed, for NCDs, limited human capacity ranks as one of the major obstacles to address in many LMICs.79

A More Comprehensive Approach

Prevention activities gain greater credibility and traction if embedded in health services and in society, and with the engagement of civil society, affected communities, and the private sector.20 Health must be included in all policies.80 Prevention strategies will also need to adapt to the changing nature of the NCD threat, as food/tobacco/alcohol/drug industry tactics evolve. Otherwise, even the restricted goals of 25×25 will be difficult to attain.

Health promotion focused on individuals will be insufficient, particularly in LMICs, without structural changes at the societal level. The ban on trans-fatty acids in New York City, for example, together with a policy aiming at preventing obesity, has been much more effective than any individualized health promotion.81 Active travel (that is, walking and cycling) has major benefits both for individual health and for the health services.82 The core elements of an anti-smoking strategy are now recognized as bans on smoking in public places, restrictions on marketing (including standardized packaging), and increased taxes, with individualized approaches such as nicotine replacement playing a subsidiary role.83

These measures are intended to achieve ‘optimal defaults’,84 recognizing that individual choices must be made, but that the environment affects the content of choice. Of course, it should not be assumed that these success stories will work in LMICs – where much of the food industry is small scale and unregulated and lack of enforcement makes bans unworkable – but they do imply that analogous strategies need to be developed for LMICs.

One key area where governments and government agencies must work together is to change the urban environment to one that supports physical activity now and for generations to come, and on changing the way that food is produced,85 marketed, and sold so that eating a healthy balanced diet is affordable and the norm.16 Politicians are, of course, generally reluctant to support environmental changes that could be seen to threaten the corporations that often fund them.
Furthermore, many voters are reluctant to change their current car usage or to support actions portrayed as the ‘nanny state’. For these reasons, we are unlikely to win these arguments on health grounds alone. In many countries, other government agencies have been resistant to attempts by ministries and departments of health to influence their policies. Recognition that health benefits may arise from many non-health public policies may, for non-health reasons, result in greater public and political support for healthy environmental changes (for example, restrictions on traffic in urban areas, provision of walkways and cycleways).\(^\text{16}\)

We can see why, for policymakers, the simplified 25×25 approach may seem preferable.\(^\text{86}\) The desire to ‘keep it simple’, however, is counter-productive when it leads to ‘complexity denial’, and to strategies that ignore a high proportion of NCDs and NCD causes, as well as the societal-level ‘causes of the causes’. The ‘25×25’ strategy avoids complexity, uses narrowly defined targets, and largely ignores what is occurring outside of its simplified framework. The inadequacies of complexity denial are now readily apparent in health systems.\(^\text{87,88}\)

Several additional components are needed, both to make the ‘25×25’ strategy successful and to overcome its limitations (see Boxes 1–4). Any strategy for NCDs must address the issues of the post-2015 Millennium Development Goals, and the global forces affecting health. We recognize that ‘health’ is not pivotal to current development concerns, but we cannot ignore the overwhelming evidence that health is integral to achieving economic and social development and vice versa.\(^\text{89}\) Thus, we recommend that reduction of the disease burden, not just mortality, be the goal and that all NCDs be included, rather than focusing on a select few. We recommend building public health capacity and capability as an integral part of the health sector at all levels, and equipping it to engage effectively in intersectoral dialogue.

The increasing burden of NCDs poses an enormous threat to populations and health systems across the globe.\(^\text{13}\) Climate change is predicted to have profound public health effects and demand urgent transition to low-carbon economies.\(^\text{60,90}\) Thus, there can be considerable health co-benefits of climate change mitigation policies.\(^\text{58}\) Potential synergies exist, but these will require more interaction to generate common-cause agendas. The Sustainable Development Goals represent an important opportunity.\(^\text{13,60}\) The identification of NCDs as a major threat to the global economy\(^\text{91,92}\) provides a lever for moving NCDs from a
peripheral to a central concern for global development. A first step would be to campaign for the global economic community to eradicate tobacco-related diseases by the rejection of the tobacco industry, its supporters, investors, marketers, and economic advisors. Relevant precedents include the abolition of slavery, and the ending of apartheid.

Conclusions
The ‘standard approach’ for NCDs focuses on only four risk factors, drugs for people at high risk of CVD, and four diseases. The comprehensive approach aims to incorporate the standard approach while broadening it to include morbidity, other major NCDs, and other important causes of NCDs, including the ‘causes of the causes’, and health-care system responses. These additions would address NCDs in broader social, economic, and health-care contexts, adaptable to local circumstances.

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