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

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Abstract

The five-target "25x25" strategy for tackling the emerging global epidemic of 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% by the year 2025. The 'standard approach' to 25x25 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.

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% relative reduction in overall mortality from four conditions (cardiovascular disease, cancer, diabetes and chronic respiratory diseases) by 2025[10]. The "25x25" strategy[11] is now incorporated into the World Health Organization's Global NCD Action Plan 2013-2020[12,13]. This 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, increased physical activity, reduced dietary salt, reduced smoking, improved blood pressure control, and enhanced treatment of those at risk from or suffering from the major NCDs[14].

The Action Plan takes a broad view, acknowledging the social, economic, and political determinants of disease, and the general development agenda[13,15]. However, it is less clear, particularly in low-and-middle income countries, that these statements of intent can be translated into policy[16,17], and some previous ambitious 'calls to action' have fallen on deaf ears[18]. 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[19], 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 paper we discuss four issues that we believe have received insufficient attention in what we term the 'standard approach'[17]. In the second part, we briefly present an inclusive and complementary approach which 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. [20 To encourage this process, we highlight key issues that must be

addressed in developing a more ambitious and, ultimately, sustainable approach, recognising that the detail required for a fully-developed strategy must be a matter for widespread consultation and discussion[20].

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."[21] This reflects a growing recognition of the role of these industries in global health, with trade liberalisation driving combined epidemics of diseases associated with tobacco, alcohol, and fast food in many LMICs[22]. These industries have been compared with the insect vectors of some communicable diseases, continually adapting to exploit emerging ecological niches[23]. ; just as mosquitoes exploited the development of the car tyre, using the pools of stagnant water they contain to breed in, so the tobacco industry has shifted its promotional activities to LMICs, exploiting their weaker regulatory environment[24]. A similar situation applies with respect to the food and alcohol industries[25](Box 1).

These global industry developments are not matched by similarly globalized preventive measures. Instead, these powerful corporate interests promote programmes aimed at changing individual behaviour, such as education, even though there is little evidence that such programmes actually work[26]. As Ebrahim and Davey Smith note, with regards to 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, with a recent cluster randomized trial of health education for cardiovascular disease prevention in India producing disappointing results[27]. In contrast, measures that have worked have involved direct intervention in the market, such as falls in smoking prevalence in Papua New Guinea associated with price increases[28] 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[29].

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[30]. Antihypertensives and cholesterol lowering drugs have already achieved much and could do much more if the very large treatment gap in LMIC could be closed[31,32]. Yet these can only work when part of contextually appropriate responses and, as Miranda et al note, many systematic reviews do not answer south-relevant questions, so most of the "available evidence " is difficult to apply[33].

Consequently, an effective response will require action at the individual and the population level, but as has long been realized in high income countries[34], it is the latter that will bring the greatest gains. The industries that play a causal role in NCDs have a vested interest

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in supporting weak individual-focused strategies as this may avoid actions that would reduce their profits and ways of operating.

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

The 25x25 strategy focuses on preventable mortality[35–37], and the 'big four' NCDs that account for 87% of all NCD deaths (table 1)[37,38]. When using Disability Adjusted Life Years (DALYs), incorporating both mortality and morbidity, a rather different picture appears[35], with the 'big four' NCDs only accounting for 54% of NCD DALYs. Box 2 describes some of these other conditions that are excluded from the 25x25 strategy. They include mental disorders, neurological disease, and musculoskeletal disease, which account for 32% of the NCD DALYs; 'other' NCDs (including visual impairment and hearing loss) account for a further 14%. For some of these 'missing' NCDs (e.g. asthma, neurological disease), the major causes are currently unknown, so ongoing research is needed[39]. Thus, the 25 x 25 strategy is at most only a partial response to the burden of NCDs.

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, occupational exposures and environmental exposures.

Furthermore, exposures to individual lifestyle, occupational and environmental risk factors do not appear in a vacuum, and it is also essential to consider the structural (distal) determinants, i.e. 'causes of the causes'[40]. This is a lesson that should have been learned from the struggle against infectious disease, in which collective measures were more effective than individual measures[41]. Box 4 presents some key environmental 'causes of the causes' including urban design, poverty and development, and air pollution, lifestyle and climate change[42]. For example,, there are more than seven million deaths per year due to air pollution (about half from ambient and half from household air pollution) (http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/).

Programmes which promote physical activity tend to focus on leisure time activity including sport, running, and going to the gym, etc.[16]. However, as Hu[43] 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 the car, and the near demise of public transport (a particular concern in LMICs)[44,45]. These changes cannot be offset by increased LTPA alone[46]. What is also required is changes in the environment through promoting public transport, active commuting[47], and provision of green space[25]. This is even more valid in LMICs where emerging cities followed post-1950s multi-centric urban planning suitable only for motorised transportation[48]. Also, in many cities in LMIC, climatic factors and the urban heat island make exercise uncomfortable[49], and focusing health promotion efforts on population subgroups has not been very successful[50–53]. Furthermore, such interventions need to be undertaken in each generation, and tend to exacerbate health inequalities as they are preferentially adopted by those with the resources that enable them to make healthy choices most easily[54].

Changes in the environment are required so that physical activity and a healthy diet once again become ‘part of daily life’[55]. This will require dialogue between local communities and urban planners, changes to 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[56]. 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 substantially reduce morbidity and mortality from cardiovascular disease in low-and-middle income countries[57]. In many countries, the growth of private health care providers is undermining the ability to respond to NCDs, as these providers tend to avoid those with complex multiple disorders, where the costs of treatment are typically unpredictable[58].

Atun et al.[56] have observed that improving the responsiveness of health systems will be particularly challenging in LMICs with weak health systems characterized by fragmented health-care delivery coupled with shortages of services, coverage of medications, and skilled health professionals. The successful AIDS response has 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 in demonstrating innovative approaches to engaging civil societies and the private sector[56]. Indeed, limited human capacity ranks as one of the major obstacles to address, in practice, NCDs in many LMICs[59].

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], i.e. health must be included in all policies[60]. Prevention strategies will also need to adapt to the changing nature of the NCD threat as food/tobacco/alcohol/drug industry tactics evolve (see Table 2). Otherwise, even the restricted goals of 25x25 will be difficult to attain.

Health promotion focused on individuals will be insufficient, particularly in LMICs, without structural changes at the societal level. For example, the ban of trans-fatty acids in New York, together with a policy aiming at preventing obesity, has been much more effective than any individualized health promotion[61]. Active travel (i.e. walking and cycling) has major benefits both for individual health and for the health services[62]. 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[63]. These measures are intended to achieve ‘optimal defaults’[64], 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 often 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[65], sold and marketed so that eating a healthy balanced diet is affordable and the norm[16]. Of course, politicians are 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 support what those opposed to effective action have 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 from Ministries and Departments of Health to influence their policies. Recognition that health dividends may arise from a range of non-health public policies may result in greater public and political support for healthy environmental changes (e.g. restrictions on traffic in urban areas, provision of walkways and cycleways) for non-health reasons[16].

We can see why, for policy makers, the simplified 25 x 25 approach may be preferable[66]. However, the desire to 'keep it simple' is counter-productive when it leads to 'complexity denial', and leads to a strategy which ignores the needs of such a high proportion of NCDs and NCD causes, as well as the societal-level 'causes of the causes'. The 25 x 25 strategy avoids complexity, uses narrowly defined targets, and largely ignores what is occurring outside of the simplified framework. The inadequacies of complexity denial are now readily apparent in health systems[67,68].

Several additional components are needed, both to make the 25x25 strategy successful and to overcome its limitations (see Boxes 1-4). In particular, it is important that any strategy for NCDs addresses the issues of the post-2015 Millennium Development Goals (MDG), and the global forces affecting health. We recognise 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[69]. 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 the building of public health capacity and capability as an integral part of the health sector at all levels to equip it to engage effectively in intersectoral dialogue.

The increasing burden of NCDs poses an enormous threat to populations and health systems across the globe[13]. The impacts of climate change are predicted to have profound public health effects and demand urgent transition to low-carbon economies[70,71]. Thus, there are considerable health co-benefits of climate change mitigation policies[72]. Potential synergies exist, but require more interaction to generate common-cause agendas. The Sustainable Development Goals (SDGs) represent an important opportunity [13,71]. The identification of NCDs as a major threat to the global economy[73,74] 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

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diseases by the rejection of the tobacco industry, its supporters, investors, marketers and economic advisors[75]. Relevant precedents include the abolition of slavery, and the ending of apartheid.

Conclusions

The ‘standard approach’ for NCDs, focusses only on four risk factors, drugs for people at high risk of CVD, and four diseases. The comprehensive approach aims to incorporate the standard approach by 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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Box 1

How industry is combating the 25x25 strategy

While the public health community has been focusing on changing health behaviours, the corporate sector has: (i) recruited key public health leaders, such as those who led the World Health Organization's Framework Convention of Tobacco Control, to ensure that the food discourse is constructed from the food companies' perspective[76]; (ii) identified their own vulnerabilities in how public discourse is generated by the public health community, and resourced interventions and evidence syntheses to interrupt or 'muddy the waters' so that there is a greater illusion of policy choices[77] and responsibility for action is displaced from themselves; (iii) shifted the focus of the debate from health to trade, exploiting the enforcement mechanisms of the World Trade Organization, while pushing for bilateral and regional trade and investment liberalisation mechanisms such as the Trans Pacific Partnership, where economic imperatives are more likely to take precedence over health[78,79]; and (iv) anticipated the growing wealth, sales potential and weak regulatory regimes of LMIC markets. In this context, it is important to consider the corporate capture of some governments that make action on social and political factors almost impossible[80].

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Box 2

NCDs that are missing from the 25x25 strategy

The GBD study[36] has estimated that about 14% of the global burden of NCD DALYs is attributable to psychiatric disorders[81,82], mostly 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 neurone disease, and others) also have an important impact, accounting for 5% of total NCD DALYs. Musculoskeletal problems contribute another 13%. Prince et al[83] show how mental disorders increase the risks of developing NCDs, and co-morbidity complicates help-seeking, diagnosis and treatment (particularly adherence), and influences prognosis. Thus, mental disorders are an important cause of long-term disability and dependence, and account for a particularly high proportion of years lived with a disability. In addition, maternal mental disorders, even minor ones that are highly prevalent in any population, 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.

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Box 3

Causes that are missing from the 25x25 strategy

Fifteen percent of cancers are caused by infections, but this proportion is <10% in Europe and >25% 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). Notably, 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[84] estimated that occupational exposures accounted for only about 2.5% of NCD deaths and 4.7% of DALYs in 2010. However, these are likely to be severe underestimates, because they are based on current exposures only and do not taken into account the current effects of previous high levels of exposure. The GBD study estimated that asbestos accounted for 118,097 deaths and 2,681,000 DALYs globally in 2010[84]. Furthermore, the problem is not declining, but rather has simply been moved from HICs to LMICs[85,86]. In India, for example, the use of asbestos has doubled in the last decade to about 300,000 tonnes a year by an industry that 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 seven million deaths a year due to air pollution (http://www.who.int/mediacentre/news/releases/2014/air-pollution/en/), about half being from outdoor air pollution and half from indoor. Air pollution is now the world's major environmental health risk. Other environmental exposures are also of considerable importance for NCDs in LMICs. The predominant source of arsenic exposure in the world is from contaminated drinking water, causing non-melanocytic skin and internal tumors in humans. Aflatoxins are a class of toxic metabolites produced by certain species of fungi, and 4.5 billion people are exposed globally. Aflatoxin strongly interacts with hepatitis B virus in causing liver cancer in humans[87].

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Box 4

‘Causes of the causes’ that are missing from the 25x25 strategy

Changes in the urban environment have probably played a key role in the global epidemics of obesity and other NCDs[16]; these include urban design, safety concerns (which discourage walking), the rise of the car, and the near demise of public transport (a particular concern in LMICs), as well as the many labour-saving devices that now permeate daily life[45]. We have (largely unintentionally) produced a society in which exercise is no longer an integral part of daily life, either at work[44] or outside of work[45]. Now, 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. This is largely a consequence of poverty and lack of access to affordable electricity or other clean sources such as LPG. Outdoor fine particulate air pollution is largely due 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, and the combustion of fossil fuels is a major driver of climate change.

Furthermore, the ‘causes of the causes’ also affect phenomena other than health, i.e. NCDs and other societal problems have common causes and therefore common solutions. The societal level measures to prevent NCDs, achieve sustainable development, and combat climate change, all have key features in common. For example, a reduction in the use of cars would decrease CO_2 emissions and thus reduce the impact on climate change, but also increase physical activity and prevent a range of conditions associated with physical inactivity including heart disease, stroke and diabetes[72,88] 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 have a great impact on methane (a powerful greenhouse gas) emissions but also on diet-related diseases[71,89,90]. Thus, addressing the ‘causes of the causes’ can have far-reaching positive health and social benefits. Substantial progress in increasing actions to combat social inequalities in health through supporting ‘health in all policies’ approaches was reported at the 2014 World Health Assembly[91]. World Health Organisation has provided training and technical support for monitoring equity-orientated policies[92].

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Table 1

Voluntary targets set out in the Global Action Plan for the Prevention and Control of Non-communicable Diseases 2013−2020[12]

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