

# Are low-and-middle-income countries using scarce resources effectively to tackle noncommunicable diseases in the pandemic era?

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## Abstract

The noncommunicable disease (NCD) burden continues to grow and is a major threat to socioeconomic development, particularly in low-and-middle-income countries. The COVID-19 pandemic has had a significant negative impact on the prevention and control of NCDs. Pre-existing challenges to the prevention and control of NCDs, including financial and health workforce limitations, have been further intensified by the COVID - pandemic. Despite these barriers, accelerating action to address NCDs is imperative to reduce premature mortality and escalating healthcare costs. In the post-pandemic context, a strong focus on cost and sustainability considerations is essential for making progress on reducing premature mortality by one-third by 2030: Sustainable Development Goal target 3.4. Low and middle income countries (LMIC) can succeed only by prioritizing the implementation and national scale-up of at least 16 very cost-effective NCD interventions. Among them are population-wide policy interventions which address tobacco, harmful use of alcohol, physical inactivity and unhealthy diet. The only health system intervention affordable to all LMICs embraces the total risk approach to tackle hypertension, diabetes, hypercholesterolemia, smoking and overweight in an integrated manner in a primary health care pathway. The burden of sustainability calls for the inclusion of best buy interventions as integral components of the basic benefits package of Universal Health Coverage initiatives.

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## Noncommunicable diseases: a global health challenge

Major noncommunicable diseases (NCD) - cardiovascular disease, diabetes, cancer and chronic respiratory diseases, killed approximately 33.2 million people worldwide in 2019, a 28% increase compared to 2000 (1). More than 20 million of these deaths were in middle-income countries. NCDs continued to be leading causes of ill health worldwide and were responsible for 7 of 10 premature deaths in 2019. The COVID-19

pandemic threatens to worsen that trend. Globally, age-standardized death rates for all ages combined have declined between 2000 and 2019 for chronic respiratory diseases (37%), cardiovascular disease (27%) and cancer (16%). However, deaths due to diabetes increased by 3% in the same period. The age-standardized rate of mortality due to diabetes increased by 5% in upper- middle- income countries and by 13% in lower- middle- income countries (LMIC).

Progress in addressing NCDs has been slow, even

prior to the COVID-19 pandemic. Based on 2010–2016 trends, women in only 17 of 176 (9.7%) countries and men in only 15 of 176 (8.5%) countries were expected to achieve the Sustainable Development Goal target 3.4: one-third reduction relative to 2015 in premature mortality due to NCDs (2).

No country can address the prevention and control of NCDs using piecemeal efforts to target single risk factors/diseases, particularly in the post-pandemic era. There are three essential, complementary and synergistic strategies for tackling the burden of NCDs in a viable fashion (3). They are; **1.** Implementation of healthy public policies that reduce exposure of the population to behavioural and environmental risk factors (population-wide primary prevention through control of tobacco, harmful use of alcohol, unhealthy diet, physical inactivity and air pollution), **2.** Early detection and management of behavioural and biological risk factors using integrated interventions in primary health care and vaccinations for cancer - primary prevention at the individual level, **3.** Prevention of recurrent heart attacks and strokes in individuals with established cardiovascular disease (CVD) - secondary prevention, and early diagnosis and treatment of cancer.

### **Behavioural risk factors that drive the NCD burden**

Major NCDs are driven by aging and exposure to behavioural and environmental risk factors: tobacco, harmful use of alcohol, unhealthy diet, physical inactivity and air pollution. In 2020, an estimated 22.3% of the global population aged 15 years and older were current users of some form of tobacco, down from approximately one-third (32.7%) in 2000. About one-half of men (49.3%) and one sixth of women (16.2%) aged 15 years and older in 2000 were current users of some form of tobacco. By 2020, the proportion of men using tobacco had declined to slightly over one in three (36.7%), while that of women had declined to one in thirteen (7.8%) (4). Analysis of data from demographic and health surveys conducted from 2010 to 2019 in 49 LMICs showed that tobacco smoking among men aged 15–49 years tended to

be higher among the poorest and least educated subgroups. Countries continued to adopt tobacco control measures during 2019 and 2020, with approximately 5.3 billion people in 146 countries protected by at least one demand-reduction measure at best practice level. This is an improvement from 2018 (5).

The average level of alcohol consumption worldwide in 2019 was 5.8 litres [uncertainty interval (UI) 5.5 to 6.2] of pure alcohol per capita (person aged 15 years or older), a slight decline from 6.1 litres (UI 5.8 to 6.5) per capita in 2010. On average, men consumed over three times more alcohol than women (6).

Worldwide, 1 in 4 adults, and 3 in 4 adolescents (aged 11–17 years), do not currently meet the global recommendations for physical activity, set by the World Health Organization (7). High level of physical inactivity is a major contributing factor to the rising trends of obesity and diabetes.

### **Metabolic risk factors of NCDs**

The age-standardized prevalence of obesity among adults aged 18 years and older increased between 2000 and 2016. Prevalence was estimated at 13.1% (UI 12.4 to 13.9) globally in 2016 and ranged from 4.7% (UI 3.9 to 5.6) in the South-East Asia Region to 28.6% (UI 26.6 to 30.5) in the Region of the Americas (8). According to the latest estimates, 6.8% (UI 6.1 to 7.6) of children and adolescents aged 5–19 years worldwide were obese in 2016, up from 2.9% (UI 2.6 to 3.2) in 2000 and 4.9% (UI 4.6 to 5.3) in 2010.

The global prevalence of raised blood pressure (defined as systolic and/or diastolic blood pressure  $\geq 140/90$  mmHg) in adults aged 18 years and over is around 22% (3). The global prevalence of diabetes (defined as a fasting plasma glucose value  $\geq 7.0$  mmol/L) is estimated to be 9%. The global prevalence of raised total cholesterol (defined as total cholesterol  $\geq 5.0$  mmol/L) in adults aged 18 years and over is estimated to be 39% (9).

Notably, the prevalence of hypertension, diabetes and dyslipidemia increases with age. For example,

the prevalence of hypertension rises to 70% in adults  $\geq 65$  years (10). As populations age in LMICs, numbers requiring treatment for metabolic risk factors will continue to increase the demands for care. Hence the critical need to move away from costly approaches targeting single risk factors in isolation based on risk factor cut-offs to more cost-effective interventions such as treatment based on total risk assessment (WHO best buy).

### The impact of the COVID-19 pandemic

The COVID-19 pandemic has upended the global health, socioeconomic and political landscape (11, 12). As of 3<sup>rd</sup> November 2022, 628 million cases and 6.5 million deaths have been reported (13). Many countries have limited testing capacity and lack functioning vital statistics systems to provide accurate mortality data and causes of death. WHO excess mortality estimates show that the actual death toll associated with the COVID-19 pandemic between 1<sup>st</sup> January 2020 and 31<sup>st</sup> December 2021 was approximately 14.9 million worldwide. People in many LMICs remain critically underserved by vaccination programmes (14). Globally, there is a downward trend in newly reported weekly cases. The SARS-CoV-2 virus continues to mutate. The Omicron variant of concern accounted for 99.9% of sequences reported to the World Health Organization (WHO) in October 2022 (15).

The impact of the pandemic has widened health inequities worldwide. Moreover, it has aggravated pre-pandemic resource constraints and health workforce shortages in countries of all levels of development. However, LMICs are less well-placed to cope with these adverse effects. Hence progress made towards tackling NCDs and sustainable development might be reversed.

Abundant evidence shows that people with NCDs are more vulnerable to contracting COVID-19 and becoming seriously ill with the SARS-CoV-2 virus (16). The long-term impact of COVID-19 on cardiovascular health and mortality is an emerging concern. Post-acute sequelae of COVID-19) a condition characterized by the persistence of COVID-19 symptoms beyond three months, is

anticipated to affect many people. Cardiovascular symptoms, including chest pain, shortness of breath, fatigue, and autonomic manifestations are common. In addition, a range of cardiovascular abnormalities has been reported among patients beyond the acute phase and include myocardial inflammation, myocardial infarction, right ventricular dysfunction, and arrhythmias (17).

The COVID-19 pandemic has significantly disrupted the prevention and control of NCDs, particularly in LMICs (18). The provision of essential health services was adversely affected for cardiovascular disease, diabetes, cancer, kidney disease and other NCDs. Pandemic mitigation measures such as travel bans and national lockdowns restricted access to inpatient and outpatient services. Patients were reluctant to seek care for fear of being exposed to infection. The main reasons for disruptions were intentional service delivery modifications (40% of countries), such as temporary closures or postponement of services, and shortages of staff, medicines, diagnostics, and health facility infrastructure (19). These disruptions will result in delayed diagnosis, suboptimal treatment and postponement of rehabilitation services and surgery (20). The downstream effects will likely include more advanced disease and non-fatal and fatal complications.

In terms of disruption of activities, out of 163 countries surveyed, 77% reported some disruption to the Ministry of Health NCD activities (18). There was disruption in public screening programmes for NCDs and NCD Surveys (39%) and suspension of mass communication campaigns (37%). The WHO Package for Essential NCDs (PEN) training and implementation in primary health was disrupted in 65% of low-income countries (LICs) and 49% of LMICs. A quarter (26%) of countries indicated that other ministry of health NCD activities were also impacted, including policy and guideline development and training of health personnel.

Further, government funding initially allocated for NCDs had been reassigned to non-NCD services in 20% of countries due to COVID-19 response efforts, with just seven countries (4%) reporting a

loss of more than 50% of funds.

### **Injustice and inequalities in global health: a reality**

Timely access to physical and mental health care services is a fundamental human right that should not be affected by social determinants of health (21). Yet, as of 25<sup>th</sup> April 2022, 74% of persons in high-income and upper-middle-income countries were vaccinated compared to 51% in LMICs and only 12% of persons in LICs. In LICs, only 30% of healthcare workers had been fully vaccinated against COVID-19 by April 2022, compared to a global average of 80%. In African countries, only one-fourth of adults aged over 60 years and only 11% of people with comorbidities were fully vaccinated. Tackling the pandemic and its aftermath requires global cooperation and solidarity in the form of development assistance. Yet, support for development assistance is likely to be dampened by domestic economic and political concerns of high-income countries.

The pandemic has also aggravated the disparities in health workforce distribution that existed before the pandemic (22). In 2016, WHO had projected a global shortfall of 18 million health care workers by 2030, particularly in the WHO Africa and South-East Asia region. Africa, which bears almost one quarter of the world's disease burden, has only 3% of the world's healthcare workers (23).

The growing burden of NCDs will continue to be a major threat to the socioeconomic development of LMICs. Delays in addressing NCDs will worsen the negative impact of the pandemic in LMIC economies due to the high healthcare costs of NCDs and loss of productivity. Further, established risk factors of NCDs (obesity, hypertension and diabetes) and end-organ damage of the heart, brain, lung and kidney are both accelerators and consequences of severe COVID-19 (24), and might also adversely influence the efficacy of COVID-19 vaccines (25). In addition, NCDs may also increase the vulnerability of populations to emerging and re-emerging viral infections that emerge in the future (26). Thus, regardless of the new challenges to NCD prevention and control that have arisen due to the COVID-19 pandemic, LMICs need to prioritize action to address them. In order to do so,

now more than ever, NCD interventions have to be selected based on cost considerations, scalability and long-term sustainability.

### **Cost, scalability and sustainability of NCD interventions: WHO best-buy interventions**

Healthcare expenditure in LMIC, even before the negative impact of the COVID-19 pandemic on economies, was inadequate to sustain comprehensive national NCD programmes (27). The share of health in government spending is two and a half times greater in high-income countries (14%) compared to LICs (5.4%) (28). The share of health in government spending in high-income countries grew steadily from 2000 to 2019 while it stagnated and later declined in LMIC. In addition, out-of-pocket spending on health accounts for 44% of health expenditure on average and continues to be the largest source of health expenditure in LICs (1).

Prioritized implementation of 16 very cost-effective NCD interventions with a high return (best buys) is the strategic response recommended by WHO to address the critical resource limitations in LMICs (29) (Table 1). Thirteen best-buys are policy interventions that address tobacco (5), harmful use of alcohol (4), unhealthy diet (3) and physical inactivity (1). Two interventions target cancer. Health system interventions are more costly than population wide policy interventions. They need to be implemented in such a way as to target limited financial and workforce resources at individuals at medium to high risk (30). Only an integrated health system intervention can tackle established cardiovascular disease, hypertension and diabetes using a total-risk approach. These 16 interventions are affordable to all LMIC, and their implementation can help reduce premature mortality from heart attacks, strokes, end-stage renal disease and cancer.

Seventy-two other NCD interventions that are less cost effective are also available, which can be implemented after the national scale-up of best buy interventions if the government is prepared to increase health care spending. However, introducing them early will result in opportunity

costs, particularly in countries with competing public health priorities such as maternal and child health and communicable diseases.

### **How to improve the outcomes of hypertension and diabetes despite growing resource challenges and competing health priorities**

The metabolic risk factors of NCDs—obesity, diabetes, hypertension and hyperlipidemia are intertwined and often coexist as comorbidities. For example, up to 75% of adults with diabetes also have hypertension, and patients with hypertension alone have features of insulin resistance (31). Further, detection, treatment and control of hypertension, diabetes, hyperlipidemia, smoking and overweight must be improved. However, the long-term nature of these highly prevalent risk factors means that sustainability and affordability of detection, treatment, and control programmes need to be ensured (32). Vertical national programmes targeting single risk factors may be appropriate for high-income countries (33) but they significantly reduce cost effectiveness of programme implementation and service delivery (34). Further, they also aggravate out-of-pocket spending on health, negatively impacting poverty alleviation (35). Thus, they are unsustainable and unaffordable to LMICs unless public spending on health is increased substantially (30).

The very cost effective total risk approach intervention (a WHO best-buy), estimates the overall risk of hypertension, diabetes, hyperlipidemia, tobacco smoking and overweight for treatment and referral decisions. Tools (36) and simplified protocols (37) available for implementing this intervention in primary health care also identify individuals with previous heart attacks and strokes to ensure the continuation of drug treatment (secondary prevention). The total risk approach is being implemented in many LMICs (38-51) and already included in the basic benefit packages in some universal health coverage initiatives (3).

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The cost of medicines is a major component of health system expenditure. Notably, the treatment of low-risk stage 1 hypertensives comes at a high cost and limited added benefit unless treatment costs can be minimised (52). The four very cost-effective interventions to reduce population salt consumption can help to reduce expenditure on antihypertensive medicines. Providing access to an affordable set of essential medicines (aspirin, statin, angiotensin-converting enzyme inhibitor, beta blocker, calcium channel blocker, metformin and insulin), at all levels of the health system should be one of the targets of multisectoral national NCD plans (3). New drug treatment guidelines recommend combination therapy, with a single-pill combination, as the initial treatment of hypertension (53). However, most single-pill combinations used for treatment of hypertension contain an angiotensin converting enzyme inhibitor or an angiotensin receptor blocker. Whatever the advantages, they should not be prescribed to women of child bearing age in LMICs because they may cause harm due to delays in pregnancy detection and low health literacy. These drugs have been reported to cause miscarriage, oligohydramnios, foetal growth retardation, foetal malformations, neonatal renal failure, hypotension and death (54).

### **Overcoming challenges to NCD prevention and control**

The financing needs for tackling NCDs in LMICs have been estimated and translated into health and economic return. Every dollar invested in NCD best buys gives returns of USD 7 (55). However, there are other challenges besides resource limitations that need to be overcome for NCD prevention and control in LMICs. A range of policy

**Table 1** - Very cost-effective NCD interventions (source: World Health Organization (29) )

Risk factor/disease	'Best buys': effective interventions with cost effectiveness analysis (CEA) $\leq$ I\$100 per DALY averted in LMICs
Reduce tobacco use	Increase excise taxes and prices on tobacco products. Implement plain/standardized packaging and/or large graphic health warnings on all tobacco packages. Enact and enforce comprehensive bans on tobacco advertising, promotion and sponsorship. Eliminate exposure to second-hand tobacco smoke in all indoor workplaces, public places, public transport. Implement effective mass media campaigns that educate the public about the harms of smoking/tobacco use and second-hand smoke.
Reduce the harmful use of alcohol	Increase excise taxes on alcoholic beverages. Enact and enforce bans or comprehensive restrictions on exposure to alcohol advertising (across multiple types of media) Enact and enforce restrictions on the physical availability of retailed alcohol (via reduced hours of sale).
Reduce unhealthy diet	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. 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. Reduce salt intake through a behaviour change communication and mass media campaign. Reduce salt intake through the implementation of front-of-pack labelling.
Reduce physical inactivity	Implement community wide public education and awareness campaign for physical activity which includes a mass media campaign combined with other community based education, motivational and environmental programmes aimed at supporting behavioural change of physical activity levels.
Manage cardiovascular disease and diabetes	Drug therapy (including glycaemic control for diabetes mellitus and control of hypertension using a total risk approach) and counselling to individuals who have had a heart attack or stroke and to persons with high risk ( $\geq 30\%$ ) of a fatal and non-fatal cardiovascular event in the next 10 years (feasible in all resource settings including by non-physician health workers). Drug therapy (including glycaemic control for diabetes mellitus and control of hypertension using a total risk approach) and counselling to individuals who have had a heart attack or stroke and to persons with moderate to high risk ( $\geq 20\%$ ) of a fatal and non-fatal cardiovascular event in the next 10 years (Applying lower risk threshold increases health gain but also increases implementation cost).
Manage cancer	Vaccination against human papillomavirus (2 doses) of 9–13 year old girls. Prevention of cervical cancer by screening women aged 30–49, either through: Visual inspection with acetic acid linked with timely treatment of precancerous lesions, Pap smear (cervical cytology) every 3–5 years linked with timely treatment of precancerous lesions, Human papillomavirus test every 5 years linked with timely treatment of precancerous lesions.

options to overcome them are outlined in the global NCD action plan 2013-2030 (56). Further, in 2022, the 75<sup>th</sup> World Health Assembly adopted several resolutions and action plans to accelerate the global progress needed for addressing NCD. These include; a) a roadmap to guide countries to reorient and accelerate their domestic action plans to place themselves on a sustainable path to meet the nine global NCD targets and SDG target 3.4 (57), b) an acceleration plan for prevention and management of obesity (58), and c) an action plan to effectively implement the global strategy to reduce the harmful use of alcohol as a public health priority (59).

## Conclusion

Before the COVID 19- pandemic, only a few countries in the world were on track to reduce premature mortality due to NCDs by one-third by 2030: SDG target 3.4. Given the substantial negative impact of the COVID-19 pandemic on financial and health workforce resources, actions taken to accelerate national NCD responses in the pandemic era need to accord the highest priority to very cost-effective NCD interventions. They can be implemented and adequately scaled-up with limited resources. Failure to do so will result in LMICs falling further behind in the pursuit to attain the SDG target 3.4 by 2030.

## Article information

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