Health Policy

Quick buys for prevention and control of noncommunicable diseases

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Summary

Despite their established effectiveness, uptake of the WHO best buys for tackling non-communicable diseases (NCDs) has been uneven and disappointing. Here we introduce the "quick buys", an evidence-based set of cost-effective interventions with measurable public health impacts within five years. We reviewed 49 interventions previously established as cost-effective (<$I20,000 per disability-adjusted life-year averted) to identify the earliest possible detectable effect on high-level population health targets. Using a strict evidence hierarchy, including Cochrane and systematic reviews, we estimated the effects of each intervention against global targets agreed upon by countries. Quick buys were defined as those interventions that could exhibit measurable effects within 5 years, aligning with average electoral cycles in across the WHO European Region. Of the 49 interventions, 25 qualified as quick buys, including those relating to tobacco (n = 5), alcohol (n = 4), unhealthy diet (n = 3), physical inactivity (n = 1), cardiovascular disease (n = 3), diabetes (n = 4), chronic respiratory disease (n = 1), and cancer (n = 4). These findings not only offer guidance to policymakers deciding on interventions that align with short-term political cycles but also have the potential to accelerate progress to global health targets, particularly the 2030 Sustainable Development Goal of reducing premature NCD mortality by one-third.

Keywords: NCD; Best buy; Quick buy; SDG

Introduction

In 2010, WHO developed a package of evidence-based, cost-effective interventions that could reduce the burden of non-communicable diseases (NCDs).[1] Acting at the individual and population level, these interventions targeted the leading NCD risk factors (tobacco and alcohol use, unhealthy diet, and physical inactivity) and four disease groups (cardiovascular disease, diabetes, chronic respiratory disease, and cancer). The resulting list was known as the 'NCD best buys', and helped focus both NCD advocacy worldwide and policymaking at the country level.

However, a decade and a half later, implementation and enforcement of the best buys has been disappointing. Progress towards the nine global voluntary targets agreed to in the NCD Global Monitoring Framework is slow and uneven.[2,3] It is estimated that without increased uptake of these effective interventions, half of all countries will miss the 2030 Sustainable Development Goal (SDG) Target 3.4 to reduce NCD-related premature mortality by one-third.[4] The reasons for slow progress are multiple but may include the false perception that the benefits of NCD interventions take too long to realise and are thus misaligned with short-term political cycles.[5,6] Politicians are likely to favour measures that yield results that they can take credit for, although empirical research shows that this varies with their career stage.[7] In addition, the best buys need to be more relevant to higher-income countries, given that they were initially envisioned and promoted to apply to low-income and middle-income countries.

To address these misconceptions, we undertook a review of the best buys and other recommended interventions for preventing and controlling NCDs to determine when the soonest public health impact would become apparent and to construct clear and measurable timelines to support action by policymakers. Although countries should primarily focus on the epidemiological need and cost-effectiveness of interventions when deciding priorities, this paper adds the dimension of time to impact. We also recognise that policymakers will consider other factors, including whether a single intervention might bring multiple benefits over different timescales. With an eye on the 2030 SDG deadline, we sought to identify, from among the best buys and other recommended interventions, those that

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can be expected to demonstrate impact on population health within five years or less—and in some cases immediately; these are the quick buys.

The methods used to identify NCD best buys has been described in detail elsewhere, including updates in 2017 and 2022.[8,9] Cost effectiveness of those best buys has been determined using the WHO-CHOICE methodology.[10] All costs are expressed in International Dollars (Int$), a hypothetical unit of currency with the same purchasing power parity as the US Dollar in the US at the same time. These methods projected cost-effectiveness for low-middle, lower-middle, and upper middle-income countries, but not high-income countries, even though the underlying evidence primarily came from high-income countries.[9,11] While it is beyond the scope of this paper to review how the best buys were selected, the challenges involved, and any critiques of them, we note that they do not include certain other WHO products, such as the menu of cost-effective interventions for mental health, the recommended interventions to address the impact of air pollution, and the menu of cost-effective interventions for oral health. Furthermore, we are limited to those interventions that have been evaluated using WHO-CHOICE, so the exclusion of other interventions does not mean that they are not cost-effective, affordable, or feasible.

Identifying quick buys

Our approach started with a systematic review of the canonical 'best buys' (<Int$ 100 per disability-adjusted life-year [DALY] averted) and interventions with a cost-effectiveness ratio between Int$100/DALY and Int$500/DALY (previously referred to as 'good buys') through to interventions up to $120,000 per DALY averted, as taken from Appendix 3 of the WHO Global NCD Action Plan 2013–2030 as updated in December 2022.[9] An intervention was included only if it met the best buy criteria in at least one country income stratum. This yielded 49 candidate interventions addressing tobacco (n = 7), alcohol (n = 5), unhealthy diet (n = 7), physical inactivity (n = 2), cardiovascular disease (CVD, n = 6), diabetes (n = 7), chronic obstructive pulmonary disease (COPD, n = 4) and cancer (n = 11).

For each candidate quick buy, we then sought to ascertain the earliest possible detectable effect on population health defined as the identification of significant effect in either a meta-analysis or a study contained in a systematic review.

Our search followed the standard evidence hierarchy but recognised that natural experiment designs are often more appropriate for population-level interventions.[12] Where possible, we first sought a Cochrane Review, followed by a PubMed search for systematic reviews, with pre-registration if available. For interventions for which systematic reviews were unavailable, we searched for published peer-reviewed literature reviews. Thus, we only used the review that occupied the highest position in this evidence hierarchy. Taking alcohol as an example, for the five alcohol interventions, we identified two associated Cochrane Reviews pertaining to restrictions on alcohol advertising in both adults and adolescents as well as on brief alcohol interventions. A systematic review was used to identify the effect of price increases from excise taxes and for the effect of sobriety checkpoints (see Appendix 1 flow diagram for inclusion).

We then searched each review for the earliest possible significant effect on a UN or other established high-level, multi-country target for reducing risk factor exposure or disease outcomes. These targets included, where possible, the SDG 2030 targets relevant to NCDs[13] (which covered premature mortality, alcohol and tobacco) or the WHO NCD Global Monitoring Framework 2025 targets[14] (which were used for unhealthy diet, physical inactivity and CVD), the Global Strategy to Eliminate Cervical Cancer[15] and the global initiatives on breast cancer[16] and on childhood cancer[17] (for cancer targets) or the Global Diabetes Targets.[18] Of note, some of these targets focused on consumption- or treatment access metrics while others focused on prevalence or mortality targets, making them not directly comparable. However, these global targets were used for the analysis given the political commitments made by countries to achieve them. Finally, we categorised a quick buy as an intervention that could exert an effect within 5 years, whether at individual or population levels, chosen to reflect the timing of average electoral cycles in high-income, European countries and the time remaining before the deadline of the SDGs and Global Action Plan in 2030.

The 25 quick buys

Tables 1–8 present the findings for each of the 49 candidate interventions. Of these, 25 were identified that met the criterion for a quick buy of having a detectable effect within 5 years.

We disaggregate these findings by NCD risk factor or diseases (tobacco, alcohol, unhealthy diet, physical activity, cardiovascular disease, diabetes, chronic respiratory diseases, and cancer) below, starting with tobacco.

Tobacco

Five out of seven tobacco interventions had evidence of impacts within 5 years in the included review articles (Table 1). The fastest effect was for eliminating exposure to second-hand smoke, which had immediately detectable effects.[19,20] This was followed by increasing excise taxes and prices, which demonstrated a significant effect at 4 months[21,22]; followed by nicotine replacement therapy (6 months), graphic health warnings (14 months), and enacting and enforcing comprehensive bans on tobacco advertising, promotion or sponsorship (2 years).

Two interventions did not meet the 5-year threshold for inclusion. Implementing media campaigns to educate the public about tobacco-related harms had an

Intervention	Quick buys	Evidence of earliest possible effect on UN-linked targets	UN target/indicator	Review source(s)
Increase excise taxes and prices on tobacco products	Yes	4 months[19]	Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate. 3.a.1. Age-standardized prevalence of current tobacco use among persons aged 15 years and older	Wilson et al. 2012[20]
Implement large graphic health warnings on all tobacco packages, accompanied by plain/standardized packaging	Yes	14 months[21]	Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate. 3.a.1. Age-standardized prevalence of current tobacco use among persons aged 15 years and older	McNeill et al., 2017; Pang et al., 2021[22,23]
Enact and enforce comprehensive bans on tobacco advertising, promotion and sponsorship	Yes	2 years[24]	Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate. 3.a.1. Age-standardized prevalence of current tobacco use among persons aged 15 years and older	Henriksen 2012[25,26]
Eliminate exposure to second-hand tobacco smoke in all indoor workplaces, public places, public transport	Yes	Immediate[27]	Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate. 3.a.1. Age-standardized prevalence of current tobacco use among persons aged 15 years and older	Frazer et al., 2016a and 2016b[28,29]
Implement effective mass media campaigns that educate the public about the harms of smoking/tobacco use and secondhand smoke, and encourage behavior change	No	≤7 years	Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate. 3.a.1. Age-standardized prevalence of current tobacco use among persons aged 15 years and older	Bala et al., 2017[30,31]
Provision of cost-covered effective population-wide support (including brief advice, national toll-free quit line services and mCessation) for tobacco cessation to all tobacco users	No	>7 years	Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate. 3.a.1. Age-standardized prevalence of current tobacco use among persons aged 15 years and older	Silagy et al., 2001; Lancaster et al. 2017[32,33]
Provision of cost-covered effective pharmacological interventions to all tobacco users who want to quit through the use of nicotine replacement therapy (NRT), Bupropion and Verenicline	Yes	6 months[34]	Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate. 3.a.1. Age-standardized prevalence of current tobacco use among persons aged 15 years and older	Bergen et al. 2014[35]

Table 1: **Empirical evidence of the timing of best buys and recommended interventions' effects related to tobacco.**

earliest identified effect within 7 years.[30,31] Similarly, providing population-wide support, such as brief advice, national toll-free quit lines and m-cessation (using messaging) services to all tobacco users, had an earliest potential effect estimated at beyond 7 years.[32,33]

Alcohol

All three interventions affecting alcohol price and availability had immediate effects (Table 2). Increasing excise taxes,[19,36] enacting and enforcing bans or comprehensive restrictions on exposure to alcohol

Intervention	Quick buys	Evidence of earliest possible effect on UN-linked targets	UN target/indicator	Source(s)
Increase excise taxes on alcoholic beverages	Yes	Immediate[19,36]	SDG 3.5.2 Alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol	Kilian et al. 2023[36]
Enact and enforce bans or comprehensive restrictions on exposure to alcohol advertising (across multiple types of media)	Yes	Immediate[37]	SDG 3.5.2 Alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol	Siegfried et al. 2014[37]
Enact and enforce restrictions on the physical availability of retailed alcohol (via reduced hours of sale)	Yes	Immediate[36]	SDG 3.5.2 Alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol	Kilian et al. 2023[36]
Enact and enforce drink-driving laws and blood alcohol concentration limits via sobriety checkpoints	No	n/a	SDG 3.5.2 Alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol	Bergen et al. 2014[38]
Provide brief psychosocial intervention for persons with hazardous and harmful alcohol use	Yes	12 months	SDG 3.5.2 Alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol	Kaner et al. 2018[39]

Table 2: **Empirical evidence of the timing of best buys and recommended interventions' effects related to alcohol.**

Intervention	Quick Buys	Evidence of Earliest Possible Effect on UN-linked targets	UN Target/Indicator	Source(s)
Reformulation policies for healthier food and beverage products (e.g., elimination of trans-fatty acids and/or reduction of saturated fats, free sugars and/or sodium)	Yes	1 year[40,41]	WHO NCD 2025 Targets: A 30% relative reduction in mean population intake of salt/NCD Voluntary 2025 target: 30% reduction in salt/sodium intake	McLaren et al. 2016[40]
Front-of-pack labelling as part of comprehensive nutrition labelling policies for facilitating consumers' understanding and choice of food for healthy diets	Yes	Immediate[42]	WHO NCD 2025 Targets: A 30% relative reduction in mean population intake of salt/NCD Voluntary 2025 target: 30% reduction in salt/sodium intake	An et al., 2021; Croker et al. 2020[43,44]
Public food procurement and service policies for healthy diets (e.g., to reduce the intake of free sugars, sodium, and unhealthy fats, and to increase the consumption of legumes, whole grains, fruits and vegetables)	No	n/a	WHO NCD 2025 Targets: A 30% relative reduction in mean population intake of salt/NCD Voluntary 2025 target: 30% reduction in salt/sodium intake	McLaren et al. 2016[40]
Behaviour change communication and mass media campaigns for healthy diets (e.g., to reduce the intake of energy, free sugars, sodium, and unhealthy fats, and to increase the consumption of legumes, whole grains, fruits and vegetables)	Yes	3 years[40,45]	WHO NCD 2025 Targets: A 30% relative reduction in mean population intake of salt/NCD Voluntary 2025 target: 30% reduction in salt/sodium intake	McLaren et al. 2016[40]
Policies to protect children from the harmful impact of food marketing on diet	No	Not identified	Not identified	Not identified
Protection, promotion and support of optimal breastfeeding practices	No	Not identified	Not identified	Not identified
Taxation on sugar-sweetened beverages as part of fiscal policies for healthy diets	No	Not identified	WHO NCD 2025 Targets: Halt the rise in diabetes and obesity	Pfinder et al. 2020[46]

Table 3: **Empirical evidence of the timing of best buys and recommended interventions' effects related to unhealthy diet.**

advertising,[37] and enacting and enforcing restrictions on the physical availability of alcohol had immediate impacts on alcohol per capita consumption in persons aged 15 or older.[36] Brief psychosocial interventions for persons with hazardous and harmful alcohol use also met our criterion, with detectable impacts under 12 months post-intervention.[39] However, we could not identify the timing for an effect of the WHO-recommended intervention to enact and enforce drunk-driving laws at sobriety checkpoints on blood alcohol concentrations. Although we identified systematic reviews finding positive effects on alcohol-related car crashes and fatalities, studies were insufficient to support an effect on per capita alcohol consumption.

Unhealthy diet

Unhealthy diet interventions were, unless otherwise specified, linked to the WHO NCD Global Monitoring Framework targets of 30% relative reductions in the mean population salt intake. Three of the seven met the criteria for quick buys (Table 3). These were: reformulation policies for healthier food and beverage products (achieving impact within 1 year)[40,41]; front-of-pack labelling as part of comprehensive nutrition labelling policies for facilitating consumers' choices (immediate)[42–44]; and mass media campaign and behavioural change communication for healthy diets (within 3 years).[40,45]

Three recommended interventions with an average cost-effectiveness ratio > Int$100 did not have identified effects on UN targets within the 5-year timeline. For policies to protect children from the harmful effects of food marketing and protection, promotion and support of optimal breastfeeding practices, the link to health outcomes was non-specific. In contrast, for taxes on sugar-sweetened beverages, the corresponding target from WHO NCD Global Monitoring Framework goals[14] was to halt the rise in obesity. Although systematic reviews identified effects on sugar consumption, and this would plausibly translate into obesity reductions, the reviews included provided insufficient evidence of an impact on obesity prevalence within five years.[46]

Intervention	Quick buys	Evidence of earliest possible effect	UN target/indicator	Source(s)
Brief counselling intervention on physical activity in primary health care	Yes	4 weeks	WHO NCD Target 2025: a 10% relative reduction in the prevalence of insufficient physical activity	Lamming et al. 2017[47]
Physical activity public education and awareness campaign	No	Not identified	WHO NCD Target 2025: a 10% relative reduction in the prevalence of insufficient physical activity	Baker et al. 2015[48]

Table 4: **Empirical evidence of the timing of best buys and recommended interventions' effects related to physical inactivity.**

Intervention	Quick buys	Evidence of earliest possible effect on UN-linked targets	UN target/indicator	Review source(s)
Pharmacological treatment of hypertension in adults using either of the following: thiazide and thiazide-like agents; angiotensin converting enzyme inhibitors (ACE-Is)/angiotensin-receptor blocker (ARBs); calcium channel blockers (CCBs)	Yes	10 days[49]	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	Perez et al. 2009[49]
Drug therapy (treatment with an antihypertensive and statin) to control CVD risk using a total risk approach and counselling to individuals who have had a heart attack or stroke and to persons with high risk (≥20%) of a fatal and nonfatal cardiovascular event in the next 10 years using the updated WHO CVD risk charts Drug therapy (treatment with an antihypertensive) to control CVD risk using a total risk approach and counselling to individuals who have had a heart attack or stroke and to persons with high risk (≥10%) of a fatal and non-fatal cardiovascular event in the next 10 years using the updated WHO CVD risk charts	No	Not identified	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	Bahiru et al., 2017; Wang et al. 2020[50,51]
Treatment new cases of acute myocardial infarction with acetylsalicylic acid initially treated in a hospital setting with follow up carried out through primary health care facilities at a 95% coverage rate Treatment new cases of acute myocardial infarction with acetylsalicylic acid and thrombolysis, with patients initially treated in a hospital setting with follow up carried out through primary health care facilities at a 95% coverage rate Treatment of new cases of acute myocardial infarction with acetylsalicylic acid, thrombolysis and clopidogrel, with patients initially treated in a hospital setting with follow up carried out through primary health care facilities at a 95% coverage rate	Yes	Immediate	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	Husted et al. 1989[52]
Treatment of acute ischemic stroke with intravenous thrombolytic therapy	Yes	3 months	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	Wardlaw et al. 2014[53]
Primary prevention of rheumatic fever and rheumatic heart diseases by increasing appropriate treatment of streptococcal pharyngitis at the primary care level	No	Not identified	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	Not identified
Secondary prevention of rheumatic fever and rheumatic heart disease by developing a register of patients who receive regular prophylactic penicillin	No	Not identified	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	Not identified

Table 5: **Empirical evidence of the timing of best buys and recommended interventions' effects on cardiovascular disease.**

Physical inactivity

Two interventions related to physical inactivity were examined (Table 4): public education and awareness campaigns and brief counselling interventions in primary care. We were unable to identify a detectable effect of public education and awareness within the 5-year

Intervention	Quick buys	Evidence of earliest possible effect on UN-linked targets	UN target/indicator	Source(s)
Foot care to prevent amputation in people with diabetes (including educational programmes, access to appropriate footwear, multidisciplinary clinics)	No	Not identified	Not identified	Not identified
Diabetic retinopathy screening for all diabetes patients and laser photocoagulation for prevention of blindness	No	Not identified	Not identified	Not identified
Glycaemic control for people with diabetes, along with standard home glucose monitoring for people treated with insulin to reduce diabetes complications	Yes	Immediate	Global diabetes target 2: 80% of people with diagnosed diabetes have good control of glycaemia (fasting plasma glucose <9.9 mmol/l)	Hemmingsen et al. 2011[54]
Screening of people with diabetes for albuminuria and treatment with angiotensin-converting enzyme inhibitor for the prevention and delay of renal disease	Yes	<4.5 years	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	HOPE Investigators, 2000[55]
Control of blood pressure in people with diabetes	Yes	12 months[56]	Global diabetes target 3: 80% of people with diagnosed diabetes have good control of blood pressure (<140/90 mmHg)	Brunstrom et al. 2016[56]
Secondary prevention of rheumatic fever and rheumatic heart disease by developing a register of patients who receive regular prophylactic penicillin	No	Not identified	Not identified	Not identified
Statin use in people with diabetes >40 years old	Yes	Immediate	Global diabetes target 4: 60% of people with diabetes of 40 years or older receive statins	Yang et al. 2022[57]

Table 6: **Empirical evidence of the timing of best buys and recommended interventions' effects on diabetes.**

Intervention	Quick buys	Evidence of earliest possible effect on UN-linked targets	UN target/indicator	Source(s)
Acute treatment of asthma exacerbations with inhaled bronchodilators and oral steroids	No	Not identified	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	O'Byrne et al. 2019[58]
Acute treatment of COPD exacerbations with inhaled bronchodilators and oral steroids	Yes	6 months	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	Salpeter et al. 2006[59]
Long-term management of asthma with inhaled bronchodilator and low-dose beclometasone	No	Not identified	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	O'Byrne et al. 2019[58]
Long-term management of COPD with inhaled bronchodilator	No	>7 years	SDG Target 3.4: reduce premature mortality from NCDs by one-third by 2030	Walters et al. 1996[60]

Table 7: **Empirical evidence of the timing of best buys and recommended interventions' effects on chronic respiratory diseases.**

timeline, consistent with other evidence that education campaigns, often advocated by producers of harmful products, have little effect. However, brief counselling interventions did meet our criteria for a quick buy, with evidence of a significant improvement in physical activity within 4 weeks.

Intervention	Quick buys	Evidence of earliest possible effect on UN-linked targets	UN target/indicator	Source(s)
Vaccination against human papillomavirus (1–2 doses) of 9–14 year old girls	Yes	Immediate	Global Strategy to Eliminate Cervical Cancer 90-70-90 Targets: 90% of girls fully vaccinated with the HPV vaccine by the age of 15	Staley et al. 2021[61]
Cervical cancer: HPV DNA screening, starting at the age of 30 years with regular screening every 5–10 years (using a screen-and-treat approach or screen, triage and treat approach)	Yes	Immediate	Global Strategy to Eliminate Cervical Cancer 90-70-90 Targets: 70% of women screened using a high-performance test by the age of 35, and again by the age of 45	Staley et al. 2021[61]
Cervical cancer: early diagnosis programs linked with timely diagnostic work-up and comprehensive cancer treatment	Yes	Immediate	Global Strategy to Eliminate Cervical Cancer 90-70-90 Targets: 90% of women with pre-cancer treated and 90% of women with invasive cancer managed.	Staley et al. 2021[61]
Breast cancer: early diagnosis programs linked with timely diagnostic work-up and comprehensive cancer treatment	Yes	Immediate	WHO Global Breast Cancer Initiative: reduce breast cancer mortality by 2.5% per year	n/a
Breast Cancer: screening with mammography (once every 2 years for women aged 50–69 years) linked with timely diagnostic work-up and comprehensive breast cancer treatment in setting where mammographic screening programme is recommended	No	>10 years	WHO Global Breast Cancer Initiative: reduce breast cancer mortality by 2.5% per year	Gotzsche et al. 2013[62]
Colorectal cancer: early diagnosis programs linked with timely diagnostic work-up and comprehensive cancer treatment	No	Not identified	Not identified	Not identified
Colorectal cancer screening: population based programme including through stool-based tests, as appropriate, at age >50 years, linked with timely treatment in settings where screening programme is recommended	No	Not identified	Not identified	Not identified
Prevention of liver cancer through hepatitis B immunization	No	Not identified	Not identified	Not identified
Childhood cancer: early diagnosis programs linked with timely diagnostic work-up and comprehensive cancer treatment, focusing on 6 index cancers of WHO Global Initiative for Childhood Cancer	No	Not identified	Not identified	Not identified
Prostate cancer: early diagnosis programmes linked with timely diagnostic work-up and comprehensive cancer treatment	No	Not identified	Not identified	Not identified
Early detection and comprehensive treatment of cancer for those living with HIV	No	Not identified	Not identified	Not identified

Table 8: **Empirical evidence of the timing of best buys and recommended interventions' effects on cancer.**

Cardiovascular disease

Six interventions were evaluated for reducing premature CVD mortality (Table 5). Of these, three had evidence of impacts on UN targets within 5 years. Treating hypertension in adults reduced CVD mortality in as few as 10 days, and there was a virtually immediate reduction in mortality associated with administering acetylsalicylic acid to those experiencing a myocardial infarction. Finally, trials of treatment of acute ischaemic stroke with thrombolytic therapy typically use 3-month mortality as an early endpoint, finding significant benefits by then in the included review, given the mechanisms of action the effects can be expected to arise immediately.

Three of the interventions included did not achieve an effect on CVD outcomes within 5 years. These were primary prevention of rheumatic fever through treating streptococcal pharyngitis (likely because rheumatic heart valve damage is a late complication); and secondary prevention of rheumatic fever and rheumatic heart disease by developing a register of patients who receive regular prophylactic penicillin. Additionally, we were unable to find evidence for effects on CVD mortality within the 5-year timeline for one intervention: combined drug therapy and counselling to control CVD risk using a total risk approach for to individuals who either had a stroke or heart attack or were at high risk for a CVD event in the next decade.

Diabetes

We analysed seven diabetes interventions (Table 6), including four with an average cost-effectiveness ratio > Int$100 and one best buy. Four met criteria for quick buys. We found significant mortality reductions linked to blood pressure control in people with diabetes at 12 months. However, other interventions had results that were inevitable. Thus, statin use in people with diabetes >40 years old had immediate effects on the WHO diabetes statin use target of 60 and, glycaemic control for people with diabetes had immediate effects on achieving WHO targets for 80% of persons with diagnosed diabetes meeting targets for HbA1c (<8%). Screening people with diabetes for albuminuria and treatment with angiotensin-converting enzyme to delay and prevent renal disease was linked to mortality reductions at 4.5 years.

Three interventions did not have a corresponding UN target: foot care to prevent amputation; diabetic retinopathy screening and laser photocoagulation for preventing blindness; and secondary prevention of rheumatic fever by developing a register of patients who receive regular prophylactic penicillin.

Chronic respiratory diseases

The chronic respiratory disease candidate interventions involved acute and long-term management of asthma and chronic obstructive pulmonary disease (COPD) exacerbations with inhaled bronchodilators and oral steroids (Table 7). The four interventions were evaluated for their ability to achieve the NCD premature mortality target. None of the asthma interventions had a detectable effect on COPD mortality endpoints within 5 years. Although this may seem surprising given the immediate symptomatic benefits of treatment, trials and observational studies have produced conflicting results[63] and few studies have evaluated models of care designed to increase uptake of these treatments.[64] A further consideration is that asthma mortality is an uncommon event, making it difficult to identify in small trials of short duration.[58] Alternatively, treating COPD with anticholinergic drugs was linked to a significant reduction in mortality rates at 6 months.[59]

Cancer

Interventions related to cancer (Table 8) focused on cervical cancer, breast cancer, colorectal cancer, liver cancer, childhood cancer, and cancers in people living with HIV. All interventions for cervical cancer showed immediate effects on the 90-70-90 targets (90% of girls fully vaccinated with HPV vaccine by age 15; 70% of women screened using a high-performance test by age 35 and again by age 45; 90% of women with pre-cancer treated and 90% of women with invasive cancer managed) set out in the Global Strategy to Eliminate Cervical Cancer. These included vaccinations against human papillomavirus (1–2 doses) for 9–14 year-old girls and screening for human papillomavirus DNA every 5–10 years from age 30. Mammography for breast cancer did not exhibit significant effects in the included review within the 5-year time limit for reducing breast cancer mortality by 2.5% per year. We were unable to identify UN-linked targets for programmes for early diagnosis of childhood cancer, programmes for early detection and comprehensive treatment of cancer for those living with HIV, population-based colorectal cancer or prostate cancer screening, and prevention of liver cancer through hepatitis B immunisation.

Towards faster progress

From a public health perspective, all interventions that are cost-effective should be implemented but, in reality, we need to convince often sceptical politicians faced with multiple demands for action. Recognising the incentives they face, such as the desire to be re-elected, as well as the time preferences that everyone incorporates in their decisions, it is intuitive that measures that achieve results faster will be more attractive, all else being equal, and we know that myriad factors are taken into account, many involving the commercial determinants of health.[65] In making this case, it is also important to emphasise that interventions that exploit reductions of demand for hazardous products by raising taxes will generate revenue, although we caution against

Panel 1: **Quick Buys**

Tobacco
- Increase excise taxes and prices on tobacco products
- Implement large graphic health warnings on all tobacco packages, accompanied by plain/standardized packaging
- 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
- Provision of cost-covered effective pharmacological interventions to all tobacco users who want to quit through the use of nicotine replacement therapy (NRT), Bupropion and Verenicline

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)
- Provide brief psychosocial intervention for persons with hazardous and harmful alcohol use

Unhealthy diet
- Reformulation policies for healthier food and beverage products (e.g., elimination of trans-fatty acids and/or reduction of saturated fats, free sugars and/or sodium)
- Front-of-pack labelling as part of comprehensive nutrition labelling policies for facilitating consumers' understanding and choice of food for healthy diets
- Behaviour change communication and mass media campaigns for healthy diets (e.g., to reduce the intake of energy, free sugars, sodium, and unhealthy fats, and to increase the consumption of legumes, whole grains, fruits and vegetables)

Physical inactivity
- Brief counselling intervention on physical activity in primary health care

Cardiovascular disease
- Pharmacological treatment of hypertension in adults using either of the following: thiazide and thiazide-like agents; angiotensin converting enzyme inhibitors (ACE-Is)/angiotensin-receptor blocker (ARBs); calcium channel blockers (CCBs)
- Treatment new cases of acute myocardial infarction with acetylsalicylic acid initially treated in a hospital setting with follow up carried out through primary health care facilities at a 95% coverage rate; Treatment new cases of acute myocardial infarction with acetylsalicylic acid and thrombolysis, with patients initially treated in a hospital setting with follow up carried out through primary health care facilities at a 95% coverage rate; Treatment of new cases of acute myocardial infarction with acetylsalicylic acid, thrombolysis and clopidogrel, with patients initially treated in a hospital setting with follow up carried out through primary health care facilities at a 95% coverage rate
- Treatment of acute ischemic stroke with intravenous thrombolytic therapy

Diabetes
- Glycaemic control for people with diabetes, along with standard home glucose monitoring for people treated with insulin to reduce diabetes complications
- Screening of people with diabetes for albuminuria and treatment with angiotensin-converting enzyme inhibitor for the prevention and delay of renal disease
- Control of blood pressure in people with diabetes
- Statin use in people with diabetes >40 years old

COPD
- Acute treatment of COPD exacerbations with inhaled bronchodilators and oral steroids

Cancer
- Vaccination against human papillomavirus (1–2 doses) of 9–14 year old girls
- Cervical cancer: HPV DNA screening, starting at the age of 30 years with regular screening every 5–10 years (using a screen-and-treat approach or screen, triage and treat approach)
- Cervical cancer: early diagnosis programs linked with timely diagnostic work-up and comprehensive cancer treatment
- Breast cancer: early diagnosis programs linked with timely diagnostic work-up and comprehensive cancer treatment

linking these funds for prevention or treatment as it can create perverse incentives to maintain this funding stream.[66]

Out of 49 potential interventions, we identified 25 showing an effect within 5 years Panel 1, and in some cases immediately, on a UN-linked target. These quick buys have 'face validity' as having plausible, rapid effects given the natural history of the NCDs in question. Yet, as with the WHO best buys, they have several important limitations.

First, consistent with the dominant paradigm in evaluating health interventions, we have used the conventional evidence hierarchy that privileges randomised controlled trials. Yet, when evaluating population-level interventions, which include many of those we have examined, this will rarely be the most appropriate approach, either because of feasibility or the ability to generalise from specific contexts.[67] Rather, it will be more appropriate to take advantage of natural experiments, of which there are a growing number, employing interrupted time series analysis, synthetic control designs and others. However, these are still few in number. A further constraint is that, in some cases, the WHO recommends population interventions which, at the time of writing, lack foundation in systematic reviews, such as educational interventions to increase physical inactivity. Although these question the selection of the interventions which our study drew upon to identify quick buys, it is beyond the scope of this analysis to revisit the methodology employed to create the best buys. It is important to note that our failure to find evidence using this hierarchical approach does not indicate a lack of evidence. The NCD best buys are, in themselves, limited, excluding important conditions like fatty liver disease and chronic renal disease.[68] We also lack evidence of the cumulative effect of interventions. Other research, for example on tobacco, shows that the addition of measures is non-linear, with the greatest benefits accruing from a comprehensive package.[69] Another challenge is that costs of some interventions can change substantially, for example when patents expire on innovative medicines.[70]

More generally it is important to note that several effective interventions were not included for evaluation (e.g., surveillance, monitoring, governance, joint interventions). Some best buys, such as those on unhealthy diets, were not well specified. It is possible that they might have an effect on salt, but not fat consumption, and the policy would still qualify as a quick buy. Other best buys require certain prerequisites, such as the existence of infrastructure to deliver a model of care, which may not always be a realistic assumption.

As in most public health interventions, the "precautionary principle" applies. For example, even if there is no randomised controlled trial showing that restricting marketing of unhealthy products to children can reduce obesity levels in children, this should not preclude action. This is particularly important given how the manufacturers of these products exploit any uncertainty about evidence to undermine public health.[71] These findings should not be misinterpreted or misused to argue against implementation of the best buys, but rather to support their increased uptake.

Our approach also sought to identify the earliest possible detectable effect based on evidence from meta-analyses or estimates in systematic reviews of a biologically plausible effect on NCD-related endpoints. This highlights plausibility and a best-case scenario, but does not address either robustness or the magnitude of the effect size. This requires further research, informed by an understanding of the biological mechanisms involved to ensure that findings are scientifically and epidemiologically plausible. Importantly, the risk function associated with exposure to certain substances is heterogenous and asymmetrical. For example, the effect of smoking on cardiovascular illness, mediated largely through endothelial dysfunction, can be measured in days whereas that on lung cancer involves a lag of many years. It takes several years of heavy drinking to acquire cirrhosis but withdrawal can reduce death rates rapidly. A further complication is that even if the biological effects are rapid, the process of implementing policies may be prolonged.

We also sought to link timing to global targets, for policy coherence. Yet these targets themselves vary and are debated.[72] We have taken a technical approach to targets that are set as part of a political process. We hope this will help inform the next iteration of the global discussion on accountable targets: the 2025 Political Declaration of the forthcoming UN High Level Meeting on NCDs and Mental Health.

Search strategy and selection criteria

References for this Health Policy paper were identified through searches of Cochrane Reviews and PubMed from database inception through to November 1, 2024 for best buys using search terms based on keywords for each intervention taken from Appendix 3 of the WHO Global NCD Action Plan 2013–2030. For each candidate quick buy, we sought to ascertain the earliest possible detectable effect on population health defined as the identification of significant effect in either a meta-analysis or a study contained in a systematic review. Our search followed a search hierarchy, prioritising Cochrane Reviews, followed by systematic reviews and/or meta-analysis, narrative reviews and finally individual research articles. For more details, see the main text.

Conclusions and future directions

Notwithstanding these limitations, our attempt to demonstrate the potential for rapid impacts on health and progress toward UN targets marks an important advance and contribution to the global effort to tackle NCDs. Further, we note that within the WHO European Region, 10 countries (specifically, Belgium, Denmark, Estonia, Israel, Kazakhstan, Luxembourg, Netherlands, Norway, Sweden, and Switzerland) have already achieved the European Programme of Work target of a 25% reduction in premature mortality from NCDs ahead of schedule. They have implemented comprehensive policies, reducing multiple risk factors, reducing preventable and treatable mortality and CVD and cancer mortality.

We note that "quick buys" should not be conflated with "quick wins." This latter concept is commonly used to denote interventions that are easy to implement, so-called 'low-hanging fruit'. This set of quick buys may not be easy to implement. Yet they are cost-effective means of attaining rapid population benefit.

Future research should look to expand previous research on how countries achieved this success[73] as well as assess the impact of combinations of interventions. This study also draws attention to the need for more natural experiments. Future research could also consider a wider range of outcomes at different stages along the causal pathways of disease.

Contributors

GG, DS and AE conceived of the paper and design. DS implemented the search protocol and drafted the paper. MM contributed to interpreting the data. GG, DS, AE and MM contributed to developing the search protocol, inclusion criteria, and drafting and editing the manuscript. **AC, MC, JF, CF, DK, ML, MN, IR, ET, KW and JW contributed to review and editing of the manuscript.**

Declaration of interests

DS received support from the WHO to conduct the research. All other authors have no conflicts of interest to declare.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lanepe.2025.101281.

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