

ADVOCACY REPORT

DELIVERING ON HEALTH AND FINANCIAL PROTECTION FOR ALL

Financing benchmarks for essential NCD services and options for improving access to affordable NCD medicines



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Cover picture: Chikhulupiliro Stanley Jnr Ng'ombe (Member of NCDA Board of Directors) testing glucose levels at the Kigali Car Free Day tent, 16 February 2025. Photo: Gilberto Lontro/NCDA

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Executive Summary

Noncommunicable diseases (NCDs), including mental health and neurological conditions, are the leading cause of death and disability worldwide. They are a rapidly growing public health crisis, especially in low- and middle-income countries (LMICs) where health systems are unprepared for this increasing disease burden and resources are tightly stretched.

This report demonstrates the size of the current funding gap in essential NCD care. To achieve universal coverage and provide financial protection for a package of 13 essential NCD primary healthcare interventions, countries should aim to spend 1.1% to 1.7% of gross national income (GNI). Based on the limited available data on allocation of health budgets on NCDs, it finds that currently, most countries invest just 0.26% to 0.46% of GNI on the same package. **This report also identifies that variations in pricing across and within countries is having a significant effect on the value gained from these health budgets allocations.**

From a four-country case study, if all countries were able to obtain these medicines at the minimum prices observed, the benchmark estimates for necessary spending would be 20-50% lower at 0.91% to 0.89% of GNI. **Finally, the report highlights policies identified through a literature review that can effectively improve the affordability and availability of NCD medicines, bringing countries closer to achieving universal health coverage for their populations.**

At the first United Nations High-Level Meeting (HLM) on the prevention and control of NCDs in 2011, Member States committed to tackling NCDs, including by increasing financing for these conditions. Unfortunately, progress since then has been slow, with most countries off track to achieve their targets for 2030. The World Health Organization hosted two international dialogues to explore options for accelerating progress on NCD financing, in partnership with the Government of Denmark (in 2018) and the World Bank Group (in 2024). The latter dialogue was a critical input to the forthcoming Political Declaration of the fourth HLM on NCDs in September 2025.

Against this backdrop, this report presents a set of recommendations to support the implementation of the new commitments that Member States will make at the fourth HLM. It focuses on those commitments regarding increased NCD financing and access to affordable medicines for NCDs. The report builds on the 2024 financing dialogue by addressing two related policy issues. First, it seeks to establish spending “benchmarks” for essential primary healthcare-based services for NCDs. Second, it explores the role that essential medicines play in overall costs and financing requirements, and discusses policies that have a track record of lowering prices for NCD medicines or improving their availability.

The report finds that countries are underspending on NCDs relative to their populations’ health needs. It looks at a set of 13 essential primary healthcare-based interventions and the essential medicines required for their implementation. To achieve universal coverage and provide financial protection for these specific interventions, countries should aim to spend about 1.1% to 1.7% of national income through their primary healthcare

budgets, with 20% to 54% of this spending allocated to medicines budgets.

However, medicines prices are idiosyncratic and are often higher in lower-income settings. The report includes a four-country case study that identified minimum prices for various NCD medicines. If all low- and middle-income countries (LMICs) were able to obtain these medicines at the minimum prices observed in the case study, our benchmark estimates would be 20% to 50% lower, at 0.81% to 0.89% of national income, with 5.2% to 28% of total spending allocated to medicines.

The report also includes a literature review to identify policies that can effectively improve the affordability of NCD medicines (mostly by lowering prices) and improve availability. Increasing production of generic medicines, centralising and pooling procurement, and engaging the private sector to facilitate distribution, all appear to be effective in achieving these goals. The volume of NCD medicines purchased needs to increase several fold to achieve adequate population coverage, so purchasers need to work with suppliers to move towards a high-volume, low-margin model.

The findings of this report have implications for key stakeholders including ministries of health, ministries of finance, advocacy groups, civil society organisations, people with lived experience, suppliers of generic medicines, and regional and international organisations. These stakeholders can come together as multisectoral coalitions that work within and across countries to implement the recommendations of the report. Doing so would help Member States deliver on their renewed commitments to addressing NCDs.

Introduction

Noncommunicable diseases (NCDs), which include mental health and neurological conditions, are major public health concerns, accounting for about two-thirds of the disease burden in most countries.¹ These conditions are projected to increase in the coming years because of population growth and aging, as well as increases in several major risk factors.^{2,3} However, in many countries access to essential NCD services (for example, primary healthcare-based treatment of hypertension and depression) remains limited,^{4,5} and implementation of public health preventive measures has also been lacking.⁶

To deliver on their political commitments on NCDs, national governments, with support from the international community, need to increase spending on essential interventions.⁹ This includes spending on essential medicines, which are often needed for interventions that prevent, treat, or palliate various NCDs. Inadequate population access to medicines¹⁰ and out-of-pocket (OOP) spending on medicines¹¹ appear to deter individuals from seeking needed care and increase the chance of catastrophic health expenditure.¹² A variety of health system strengthening efforts are needed to improve chronic disease management, such as expansion of the health workforce, increased spending on essential diagnostics, and better information systems.

However, access to medicines is arguably the largest bottleneck to expanding access to NCD services and the key determinant of financial risk from NCDs.¹³

These access issues are due in part to two related financing issues.

First, governments appear to be under-spending on NCDs relative to the estimated resources required to meet population needs for essential services.⁷ Second, current resources are being used inefficiently; for example, stable chronic conditions are often being managed at hospitals instead of primary healthcare clinics, and the cost of medicines varies widely, suggesting that many countries are over-paying for these medicines.⁸

In September 2025 the United Nations General Assembly will convene its fourth High-Level Meeting on NCDs to assess progress and renew national commitments to tackling these conditions.⁹ Within the Political Declaration, Member States have committed to promote equitable, sustainable, and affordable access to medicines for all, including a target for the availability and affordability of essential medicines and a target for financial protection for individuals affected by NCDs.

This report produces new evidence and recommendations that address two related policy questions:

1. How much does it cost, i.e., what is the “benchmark” spending required, to provide essential primary healthcare-based services for NCDs? Of this cost, how much would be for essential medicines?
2. What options do policymakers have for improving the affordability (and to a lesser extent, the availability) of essential NCD medicines? If these policies could be implemented, could lower medicines prices result in significantly lower benchmark spending estimates?

As discussed below, the existing literature provides insufficient evidence to answer these questions, especially the first. This paper seeks to advance the evidence by costing out a package of essential NCD services, including (but not limited to) the cost of a demonstrative selection of essential medicines required for these services.

The estimates in this paper are intended to inform budget allocation and financial protection schemes for individuals living with NCDs, thereby contributing to the achievement of universal health coverage (UHC).

DATA SCOPING AND METHODOLOGY

Published NCD cost estimates

Several estimates have been published in recent years of the spending required to address NCDs, including some on mental health conditions. These estimates variably consider (I) the cost of continuing to provide services for the subset of individuals already receiving care (“current spending”) and (II) the cost of addressing unmet need by expanding services to individuals who lack currently access to care (“incremental cost”).

The sum of these two quantities is, roughly, the total amount the governments need to be spending on NCDs to deliver on their UHC commitments. **Table 1** summarises four studies of the annual per capita cost of care for the “big four” NCDs and three studies on mental health conditions. Each of these studies provides useful insights into the sorts of costs that might be required to address NCDs, but as **Table 1** underscores, the range of costs varies widely, mostly because of differences in the countries covered, the interventions included in the costs, and the assumptions around target population coverage.^a Additionally, the estimates from the Disease Control Priorities Project⁷ include interventions at

hospitals and specialty clinics as well as population-based and community-based interventions, whereas the WHO studies focus only on population-based and primary healthcare-based interventions. Hence the Disease Control Priorities cost estimates are substantially higher than the WHO estimates.

The following section describes the methods and findings of the present costing exercise, which aims to generate comparable cost estimates for NCDs including mental health and neurological conditions across LMICs, considering the range of essential interventions that could be deployed in primary healthcare settings.



Rwandan nurse Rachel Nirere with Emmanuel Habanabashaka (19 years old). He is a PEN-Plus patient living with type 1 diabetes. He comes to the Masaka Hospital (Kicukiro District) every two months for insulin pens and check-ups with nurses who have been trained and supported to manage NCDs.

^a In this report, we define “coverage” as the proportion of individuals needing a given intervention who are receiving the intervention. For example, if a country has 10 million persons living with hypertension, and 5 million are on treatment, the coverage of hypertension treatment is 50%.)

Table 1. Summary of published NCD costs

Health area	Author and year of estimate	Annual cost per capita	Location(s) considered	Assumed population coverage and year achieved	Scope of interventions costed
Cardiovascular disease, diabetes, cancer, and chronic respiratory disease	Watkins et al. (2020) ⁷	US\$ 17 and US\$ 32	LICs and LMICs (respectively)	80% in 2015	Expanded package of NCD interventions
	WHO (2021a) ¹⁴	US\$ 0.51 and US\$ 0.90	LICs and LMICs (respectively)	50% in 2030	NCD "Best Buys"
	NCD Countdown 2030 (2022) ¹⁵	US\$ 5.2 and US\$ 13	Sub-Saharan Africa and South Asia (respectively)**	Varies by country in 2030	24 intervention options to achieve the SDG 3.4 target
	WHO (2022) ¹⁶	Int\$ 8.5 and Int\$ 9.8	LICs and LMICs (respectively)	95% (year not specified)	"Appendix 3" interventions***
Mental health conditions	Chisholm et al. (2016) ¹⁷	US\$ 0.13 and US\$ 0.50	LICs and LMICs (respectively)	Varies by country and service in 2030	Depression and anxiety care
	Watkins et al. (2020) ⁷	US\$ 2.7 and US\$ 6.8	LICs and LMICs (respectively)	80% in 2015	Expanded package of mental health interventions
	WHO (2021b) ¹⁸	Int\$ 4.8	LICs and LMICs combined	80% (year not specified)	"mhGAP" interventions

Notes: LICs = low-income countries, LMICs = lower-middle-income countries; NCD = noncommunicable disease. *The Best Buys are mostly comprised of intersectoral policies that are inexpensive to implement; the only clinical interventions that are included are cardiovascular disease preventive therapies and cervical cancer prevention and treatment; see the referenced study for more details. **This study produced estimates for various world regions; sub-Saharan Africa and South Asia are indicative of the range of costs across low- and lower-middle-income countries. ***The Appendix 3 interventions include the Best Buys but go beyond them to consider additional clinical interventions, which is why the costs are higher than the previous WHO study; see the referenced study for more details. Estimates are presented as average annual costs per capita by the year of full implementation, usually understood to be the end year of the analysis when the "target" population coverage of the modeled interventions is achieved.

Methods for estimating a new benchmark for NCD spending

Identifying spending benchmarks is conceptually challenging for several reasons. For one, country health systems operate with **differing levels of efficiency**, even at similar levels of income. An inefficient country could require an equal or greater amount than another to reach a given coverage target, even if it has significantly higher current NCD spending. Efficiency differences could be the result of differences in the types of facilities (e.g., hospitals vs. clinics) or health workers (e.g., physicians vs. nurses) engaged in service delivery; they could **also be due to differences in commodities prices across countries, with some countries paying significantly more for the same medicines than other countries at similar income levels.**⁸

Second, disease epidemiology varies, so spending on the same services will vary accordingly, even across countries that have the same “unit” costs. Third, the mix of technologies and clinical guidelines and standards of care vary, with some countries adopting more resource-intensive models of delivering the same services (sometimes with better quality, though not always). Fourth, the mix of services that countries might choose to offer under the broad categories of “NCDs” will inevitably vary by country, based on implicit or explicit priority setting, availability, and differences in health benefit packages.

Finally, **prices are dynamic, and products tend to get cheaper over time (e.g., as patents expire)**, so the cost of a set of services today might be higher than in the future. On the other hand, workforce costs tend to increase over time with economic growth, and pressures to adopt newer, costlier medicines are substantial. In sum, there will inevitably be differences in the cost of NCD services across countries, and any normative costing exercises must be critically reviewed before applying them in each country context.

The limitations above informed the standardised set of interventions and medicines included in our analysis and the assumptions therein. The cost estimates produced in this report are based on 13 interventions listed in **Table 2**. These interventions were drawn from recommendations by the Disease Control Priorities Project¹⁹ and WHO.^{16,18} Both sets of recommendations were informed by **cost-effectiveness evidence and experts’ assessments of the feasibility of their implementation in lower-resource settings**. **Annex A** provides a detailed list of the interventions, including a selection of the most widely used medicines (as per WHO’s model list) from each drug class that is indicated for these interventions. We argue that these interventions can be considered “essential” for any primary healthcare system.

Importantly, the interventions in **Table 2** can **all be delivered in primary healthcare settings**, although some interventions require trained physicians or clinical officers, whereas others can be delivered by nurses. We did not consider acute care interventions or interventions that can only be delivered at hospitals or referral facilities, although we acknowledge that some countries are already spending a significant share of their budgets on these interventions.²⁰ The rationale for this exclusion is threefold: (I) complex, specialised interventions require a level of health system capacity that does not exist in many lower-resource settings, (II) these interventions tend to be less cost-effective than primary healthcare-based interventions, and (III) **the health systems strengthening and UHC agendas, which inform the NCD agenda, are heavily focused on primary healthcare**. Hence this analysis focuses solely on the primary healthcare system response to NCDs.^b



A nurse checking the health of an old man living with hypertension.

^b Our focus on primary healthcare notably excludes cancer treatment. Making progress on cancer will entail greater spending on specialised hospitals, workforce, radiotherapy, and cancer drugs. Cancer systems fit within the broader health system but are distinct from primary healthcare: they take much longer to develop and start from the “top down”, with national cancer hospitals which then give rise to regional hospitals as local capacity expands. Investment in cancer systems is therefore conceptually very different from the primary healthcare-based NCD agenda, which is mostly focused on prevention and early treatment. The forthcoming Lancet Commission on Cancer and Health Systems aims to address these issues.

Table 2. Interventions used in this analysis to estimate required NCD spending.

Health area	Can usually be delivered by primary care nurses	Usually need to be delivered by physicians or clinical officers
Cardiovascular disease	Primary prevention of cardiovascular disease	Secondary prevention of ischemic heart disease
		Secondary prevention of stroke
		Management of chronic heart failure
Diabetes	Management of diabetes	
Chronic respiratory diseases	Management of chronic respiratory diseases	
Cancer	HPV immunization among adolescent girls	
	HBV immunization among infants (birth dose) and high-risk populations	
	Palliative care and pain control for all persons with cancer	
Mental health and neurological conditions	Management of depression	Management of Parkinson's disease
	Management of psychoses	Management of seizure disorders

Notes: Costs are presented in 2023 US dollars. Interventions are derived from recommendations from the 3rd Edition of Disease Control Priorities and NCD-related “packages” produced by WHO; i.e., Global Action Plan for the Prevention and Control of Noncommunicable Diseases (including the Package of Essential Noncommunicable [PEN] Disease Interventions, Mental Health Gap Action Program, and the Intersectoral Global Action Plan on Epilepsy and Other Neurological Disorders. [Annex A](#) lists the medicines used for collecting drug prices and estimating alternative intervention costs in this analysis; all medicines are included on the WHO Model Essential Medicines List. HPV = human papillomavirus; HBV = hepatitis B virus.

For this analysis, we used the same general costing approach as was used by Watkins et al. in their study of the cost of scaling up interventions for UHC benefit packages.⁷

The appendix to that report provides extensive documentation of methods, data sources, and assumptions. We summarise these issues here and note where our approach is updated or differs. As outlined in the previous costing study by Watkins et al.,⁷ the annual cost of each intervention is computed as the product of three quantities: (I) unit cost, (II) number of persons eligible for the intervention, and (III) percentage of eligible persons receiving the intervention (i.e., “coverage”). [Annex B](#) provides the costing input data and assumptions for these three quantities for all 13 interventions.

Unit costs

Estimates of the cost of each intervention per beneficiary per year were derived from published costing studies. Costs were inflated to 2023 and converted to US dollars using procedures recommended by the Global Health Costing Consortium.²¹ The costs were extrapolated from the study country (e.g., Tanzania) to all other countries by first dividing the cost into traded and nontraded components. The traded components (e.g., medicines and diagnostics) were assumed to be constant across countries. The nontraded components (e.g., health worker salaries, building costs) were assumed to vary in proportion to the ratio of gross national income per capita across countries. A few of the intervention unit cost estimates were updated based on newer costing studies than those used by Watkins et al (see Annex B). We also used updated markups for health systems costs, including both facility-level ancillary services (e.g., utilities, pathology) and “above-facility” costs (e.g., administration, supply chain and logistics) as described in the appendix to the NCD Countdown 2030 report.¹⁵

Number of persons eligible for the intervention

Watkins et al. used data from the Global Burden of Disease (GBD) 2016 study and the WHO's Global Health Observatory for the year 2015 to estimate the "population in need" of each intervention. For this study, we updated the intervention-specific epidemiological inputs using GBD 2021 estimates.¹ Further adjustments were made to these quantities in most cases based on other literature, clinical guidelines, or expert opinion. For example, if it was assumed that 80% of persons with type 2 diabetes would require medications, the number of persons eligible for type 2 diabetes medicines was computed as the prevalence of type 2 diabetes (from GBD) multiplied by 0.80. See [Annex B](#) for a full list of assumptions.

Percentage of eligible persons receiving the intervention

Watkins et al. used several literature sources and expert opinions as inputs to estimate current intervention coverage in the aggregate across low-income and lower-middle-income countries.

For this study, we updated the intervention-specific inputs using country-specific coverage estimates for "tracer" conditions available in the WHO's Global Health Observatory.²² Of note, these values only apply to the "current spending" estimates reported in [Table 2](#); the "required spending" estimates assume an 80% population coverage that is achieved through an instantaneous scale-up.

While this degree of scale-up is not achievable in the real world, it avoids the need to employ numerous assumptions around population dynamics, prices, feasible scale-up rates, and other factors to produce year-over-year projections. In this sense, we mimic a "comparative statics" approach.

Comparative statics does not assume any impact on other types of spending, e.g., it does account for potential savings on curative interventions from increased coverage of preventive interventions. (In lower-resource countries it is not clear that these savings would materialise since access to specialised treatments is low.) Our required spending estimates are therefore conservative.

Out-of-pocket costs

In a modification of the methods used by Watkins et al., we explicitly consider the role of OOP spending. Currently, a substantial amount and proportion of NCD care worldwide is paid OOP. Because this is not consistent with the principles of UHC, benchmark spending estimates must account for the need to reduce OOP costs to very low levels. **To simplify our analysis, we assume that the "required spending" to achieve 80% population coverage of the 13 interventions covers the full cost of service delivery and that there are no OOP payments for direct medical costs.** However, we do not assume that governments cover direct non-medical costs (e.g., transportation to and from healthcare visits) or compensate indirect losses (e.g., income forgone by seeking care), since these costs are not included in the global indicators used for tracking financial protection.²³

Additionally, we compare "current spending" to "required spending" to show the magnitude of the increase in spending needed to achieve universal coverage of the interventions. When we report current spending, we adjust intervention-specific costs downwards based on the share of NCD spending that is currently borne OOP (as per National Health Accounts data). Put another way, current government spending for a given coverage level is too low, because some costs are being shifted to households.

Achieving universal coverage would not only require increasing spending to expanding access to reach a target of 80% of the population; it would also require additional spending to eliminate OOP payments for those currently receiving care. The latter is included in our benchmark cost estimates.

The benchmark spending estimates presented in this report are the sum of the costs of the selected 13 essential primary healthcare-based NCD interventions listed in [Table 2](#). Annual costs were calculated for the current year (2025) by assuming that the 80% coverage target had been achieved for all 13 interventions in 2025.

Total costs were calculated for each of the 114 low- and middle-income countries with complete data, then they were aggregated by World Bank income group using the 2024 World Development Indicators data.

We present two metrics: (I) cost per capita, which is the aggregate cost of the interventions divided by the total population, and (II) cost as a share of current gross national income, which is the aggregate cost of the interventions divided by aggregate gross national income. When presenting results by income group, we simply summed the population sizes and gross national income estimates for the countries in each income group.

FINDINGS FROM THE COSTING EXERCISE

Required spending assuming current medicines prices

Our principal findings are provided in [Table 3](#). We estimate that LMIC national governments are currently spending between 0.26% and 0.46% of gross national income on NCDs.^c This varies considerably across country income groups, with low-income countries spending considerably less in both absolute and relative terms, especially because most of the NCD spending is OOP and is intentionally not included in these estimates.

Required spending to reach 80% coverage of the 13 listed interventions would be between 1.1% and 1.7% of gross national income in total.

Spending in the five major NCD areas (i.e., cardiovascular disease, cancer, diabetes, chronic respiratory diseases, and mental health and neurological conditions) is included in [Annex C](#). Of this required spending, the percentage spent on medicines would be 54% in low-income countries, 44% in lower-middle-income countries, and 20% in upper-middle-income countries.^d The remainder of spending would be for all the other components of care, including diagnostics and other equipment, workforce, facility costs, and other health system costs.

The values in [Table 3](#) are population-weighted averages for each country income group. [Figure 1](#) shows the country-level variation in required spending within each income group, which is considerable. [Annex C](#) shows the country variation in required spending for each of the disease categories. Most of the costs would be for chronic respiratory diseases and diabetes, driven by the high prices of metered-dose inhalers and insulin reported in the literature.

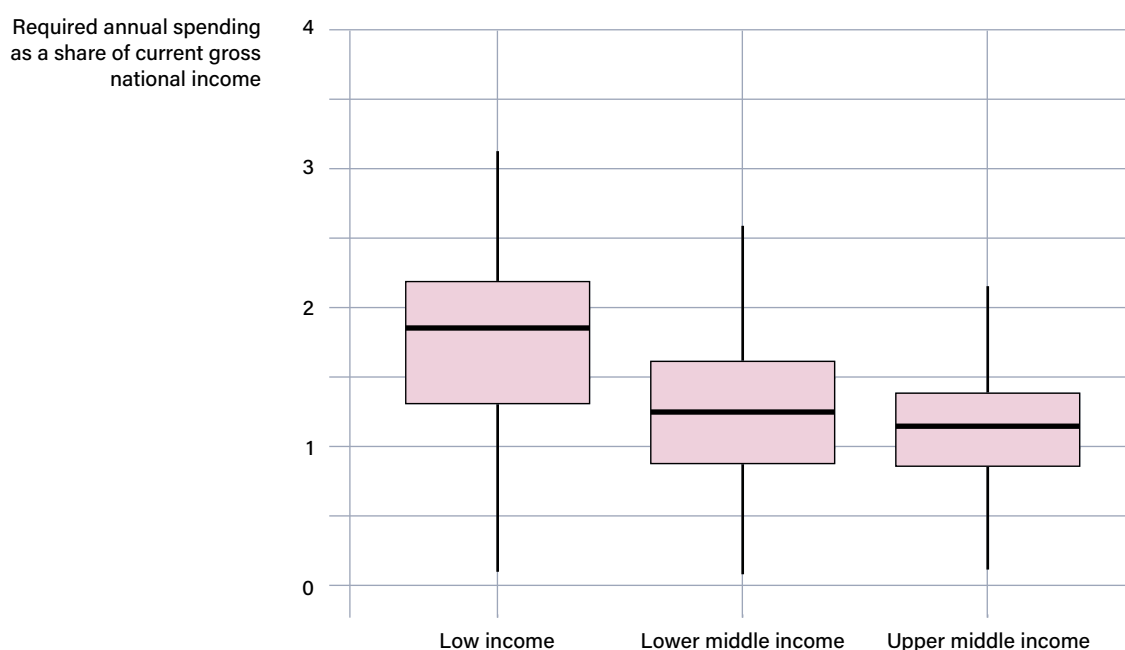
Table 3. Current and required spending on NCDs

	Low-income countries	Lower-middle-income countries	Upper-middle-income countries
Current spending			
Per capita (US\$)	1.9	6.9	50
Relative to GNI	0.26%	0.28%	0.46%
Required spending			
Per capita (US\$)	13	35	120
Relative to GNI	1.7%	1.4%	1.1%

Notes: Costs are presented in 2023 US dollars. Current spending is estimated based on the current coverage of the interventions, which varies considerably across countries and only includes the share of total spending that is from general government health expenditures from domestic sources; it does not include OOP costs, which are substantial. Required spending is estimated assuming a target of 80% coverage and no out-of-pocket direct medical costs for all interventions, consistent with universal health coverage. GNI = gross national income.

- c The estimates of current spending are generated by our model via the parameters outlined above: unit cost (extrapolated from the literature), population in need (including necessary assumptions), current intervention coverage, and the share of overall NCD spending that is OOP as per national health accounts. These estimates are meant to be illustrative of the level of spending on these NCD interventions across low- and middle-income countries, rather than definitive estimates for each country. We did not collect primary data on NCD spending in these countries. Validating our estimates of current spending (e.g., by adjusting our model inputs using local health worker salaries, drug prices, etc.) was beyond the scope of this analysis.
- d Our model assumed that medicines are traded goods and should have similar prices across countries, so the percentage of spending on medicines is inversely proportional to country income per capita, because the nontraded costs (e.g., health worker salaries, facility maintenance, etc) are assumed to be proportional to country income per capita. So, the lowest-income countries will have the highest percentage of spending on these medicines, and the highest-income countries will have the lowest percentage of spending. This finding applies only to the medicines included in this analysis, which are generic drugs that are very cheap, and more so in higher-income countries. It is generally true that a significant percentage of healthcare spending in higher-income countries is on medicines, but this is because these countries can afford a broader basket of medicines far beyond the medicines included here.

Figure 1. Variations in required annual spending on NCDs by country income

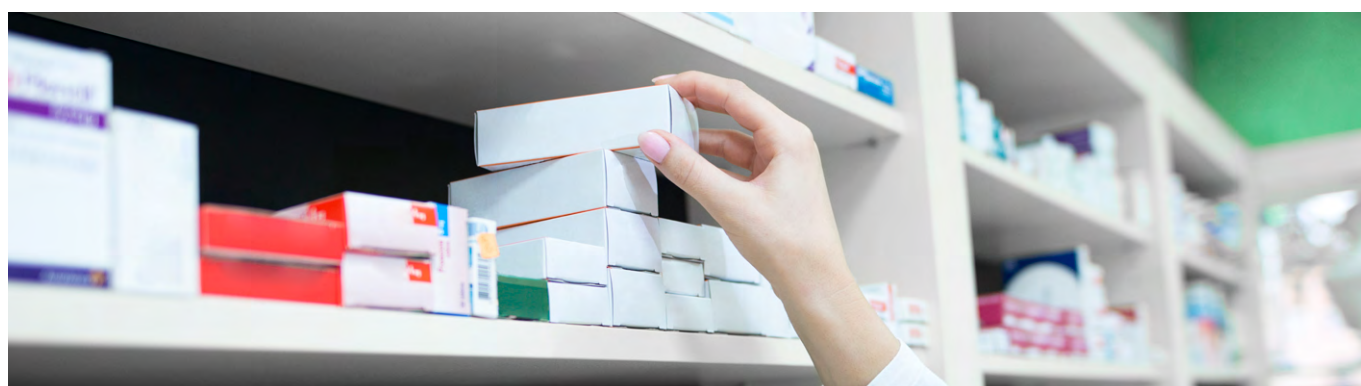


Notes: The figure contains boxplots that show the country-level distribution of required spending within each income group. The horizontal line within each box is the mean, with the box showing the interquartile range and the bars showing the 2.5th and 97.5th percentile values. Spending assumes 80% population coverage of essential interventions and no OOP spending on these interventions, as outlined in [Table 3](#). Estimates are presented as a share of gross national income.

Heterogeneity in medicine prices as a driver of costs

The cost estimates presented above assume that all countries would face roughly equivalent prices for the medicines included in the intervention list ([Annex A](#)) and that those prices are the same as what is reported in the literature. In practice, this is a flawed assumption; most countries are currently facing medicines prices that deviate significantly from the literature, with some higher and some potentially lower than published.

To illustrate the importance of heterogeneity in medicines prices and the need to determine appropriate prices, we did an analysis of the price per patient-year of the medicines used for each intervention. We obtained data on negotiated medicines prices from government officials in four countries ([Table 4](#)). Country A is a lower-middle-income country in sub-Saharan Africa. Country B is a lower-middle-income country in South Asia. Country C is an upper-middle-income country in Latin America. Country D is a high-income country in Europe. (The names of the countries are not disclosed in this report because of data confidentiality.)^e



^e The price data we obtained did not include markups along the supply chain, which can be considerable in many countries.

Table 4. Unit cost of the essential medicines required for each intervention included in this analysis

	Country A	Country B	Country C	Country D
Primary prevention of cardiovascular disease	50 (120%)	84 (210%)	12 (30%)	16 (40%)
Secondary prevention of ischemic heart disease	130 (80%)	420 (260%)	40 (25%)	61 (37%)
Secondary prevention of stroke	33 (89%)	83 (220%)	16 (43%)	17 (46%)
Management of chronic heart failure	50 (210%)	17 (70%)	16 (66%)	14 (58%)
Management of type 2 diabetes (oral medications only)	13 (130%)	16 (160%)	9.9 (97%)	1.8 (18%)
Management of type 2 diabetes (includes insulin)	10 (63%)	33 (210%)	16 (100%)	4.2 (27%)
Management of type 1 diabetes	50 (41%)	340 (280%)	78 (64%)	17 (14%)
Management of chronic asthma	9.0 (68%)	8.3 (62%)	12 (90%)	24 (180%)
Management of chronic COPD	21 (22%)	19 (20%)	30 (32%)	310 (330%)
Palliative care and pain control for all persons with cancer	260 (330%)	9.7 (12%)	22 (28%)	23 (29%)
Management of depression	350 (340%)	17 (17%)	10 (10%)	30 (29%)
Management of psychoses	44 (70%)	8.8 (14%)	6.9 (11%)	190 (300%)
Management of Parkinson's disease	340 (330%)	43 (41%)	21 (20%)	15 (14%)
Management of seizure disorders	180 (46%)	23 (5.9%)	46 (12%)	1300 (340%)

Notes: Costs are presented in 2023 US dollars. The values above can be interpreted as the cost of the basket of medicines required to provide the intervention for the typical beneficiary for one year. Prices of hepatitis B and human papillomavirus vaccines were not available, so these interventions are not included in this table. The values in parentheses are the percentages of each country's medicine basket price relative to the average basket price across the four countries. COPD = chronic obstructive pulmonary disease.

Table 4 underscores that countries can end up paying vastly different prices for the same basket of medicines, with significant disparities between lower- and higher-income countries in many cases.

Lower-middle-income countries paid the highest price for 71% of studied essential medicines for NCDs.

The literature suggests that generic market share, the presence of discounts, local tendering policies, public purchasing arrangements, and pricing regulation policies are the major determinants of differences in price across countries.²⁴ Logistics costs can also be considerable, especially in landlocked countries and those with significant transportation infrastructure challenges. For the medicines and interventions assessed in Table 4, all of which are generics and used in clinical practice for decades, there is no clear trend towards higher prices in higher-income settings; indeed country A or country B paid the highest price in 10 out of 14 cases. Interestingly, country C never paid the highest price, but it only paid the lowest price in five out of 14 cases.

Required spending assuming lowest reported medicines prices

How much would the spending benchmarks in **Table 3** change if countries could obtain NCD medicines at the lowest reported prices? We re-estimated the required NCD spending using the lowest negotiated medicine prices for each intervention as reported in **Table 4**.

The findings are shown in **Table 5**. We find that the spending benchmarks would be 52% lower in low-income countries, 42% lower in lower-middle-income countries, and 19% lower in upper-middle-income countries. In this scenario, medicines would comprise 28%, 18%, and 5.7% of required spending (respectively), significantly lower than the percentages in the primary analysis.

Lastly, in countries without centralised procurement, medicine prices can vary substantially, but the magnitude of this variation differs across medicines. Country C provides an instructive example. **Figure 2** shows the variation in prices across the five major suppliers of these medicines, normalised to the mean price for each medicine. While prices of tablets and capsules were generally consistent across suppliers, they varied widely for aerosolised medicines and especially for insulin.

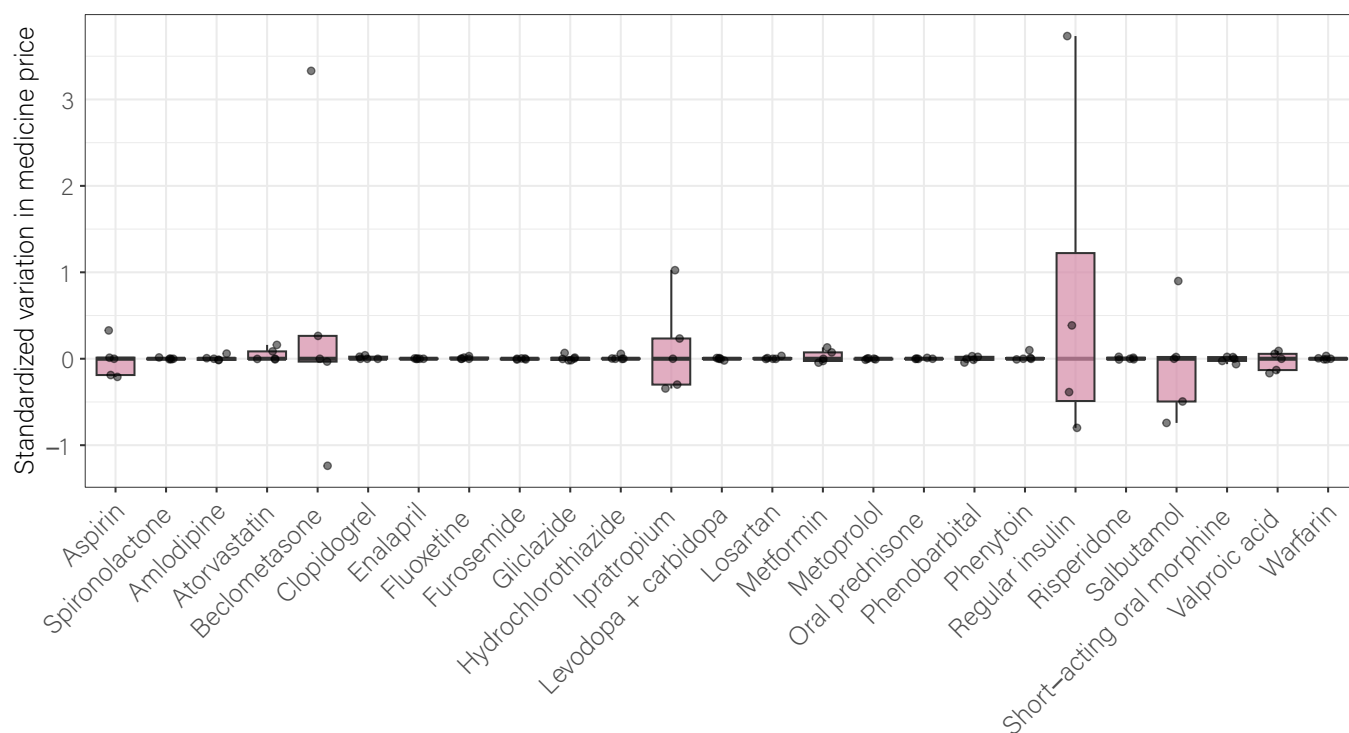
If countries could obtain NCD medicines at the lowest reported prices spending would be 52% lower in low-income countries.

Table 5. Alternative estimates of required spending on NCDs at lowest medicine prices

	Low-income countries	Lower-middle-income countries	Upper-middle-income countries
Required spending per capita	6.1	20	98
Required spending relative to GNI	0.83%	0.81%	0.89%

Notes: This table is analogous to **Table 3**, but it uses the lowest observed prices from **Table 4** instead of the estimates of medicines costs from the literature, and therefore the required spending on NCDs is lower because of these alternative price assumptions. Costs are presented in 2023 US dollars. As in **Table 3**, required spending is estimated assuming a target of 80% coverage and no out-of-pocket costs for all interventions in all countries.

Figure 2. Within-country variation in medicine prices in Country C across five suppliers.



Notes: Y-axis values are the variance-to-mean ratio for medicine prices.

Evidence-based policies to address NCD medicines availability and affordability

Medicines are a key component of all the essential interventions analysed in this report. In many countries, these medicines—all of which are featured on WHO’s model essential medicines list and can therefore be considered “essential”—are not available to all who need them, especially in public-sector facilities where most individuals receive care. It is critical to develop and implement policies that can improve the availability of medicines within the country, reduce the prices paid for these medicines, or both.

There is an entire body of literature on improving access to medicines in general. What is less clear is which policies are especially effective for medicines used for NCD interventions, which are needed in very high volumes for a significant share of the population over many years of their lives. To address this question, we did an umbrella review (i.e., a review of reviews) to identify narrative reviews, scoping reviews, and systematic reviews on policy-level interventions to improve access to essential NCD and mental health medicines, with particular attention to affordability, availability, and price reduction mechanisms.

Our review had several objectives:

1. Synthesise findings from existing reviews on global policies that improve access to and affordability of NCD medicines, including reduced prices
2. Differentiate between general essential medicine policies and those with evidence specifically for NCDs
3. Appraise each policy in terms of reported outcomes related to access (coverage) and price (affordability)
4. Organise policies along the pharmaceutical value chain to identify potential overlaps and complementarities.

We searched PubMed, Scopus, the WHO Institutional Repository for Information Sharing, and websites published by the World Bank, looking for reports published between 2010 and 2025 in English. We used three seed articles to optimise the final PubMed search string:

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( "essential medicine"[tiab] OR "essential medicines"[tiab] OR "pooled procurement"[tiab] OR "joint procurement"[tiab] OR "drug pricing"[tiab] OR "price transparency"[tiab] OR "Medicines Patent Pool"[tiab] OR "medicine affordability"[tiab] OR "access to medicines"[tiab] OR "universal health coverage"[tiab] ) AND ( policy[tiab] OR "health policy"[MeSH] OR "pharmaceutical policy"[tiab] OR intervention*[tiab] OR strategy[tiab] OR "health system"[tiab] OR governance[tiab] ) AND ( review[pt] OR "systematic review"[tiab] OR "scoping review"[tiab] OR "narrative review"[tiab] ) AND ( "2010/01/01"[Date - Publication] : "2025/12/31"[Date - Publication] ) NOT ( HIV[tiab] OR tuberculosis[tiab] OR malaria[tiab] OR "clinical trial"[pt] )
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We then used the PubMed review filters "systematic review"[tiab] OR "scoping review"[tiab] OR "narrative review"[tiab] OR review[pt] and the following topic filters: "essential medicine", "pooled procurement", "drug pricing", "universal health coverage", and "pharmaceutical

policy" to identify candidate articles. A single reviewer screened titles and abstracts and extracted the data.

Our search identified 1825 titles, about half of which came from PubMed. After exclusion of irrelevant titles and abstracts, we identified 81 unique reports. Of these, 21 were specific to NCDs, and the remainder were generic but with applications to these conditions. Counts of reports across the value chain were as follows: 10 on R&D and innovation, six on production, 17 on regulatory approval, 27 on purchasing, 13 on delivery and eight crosscutting. About half of the reports discussed policies that had proven effectiveness, and the other half discussed policies with potential effectiveness.

Table 6 synthesises the findings of this review, focusing on policies that have (I) been shown to be effective, and (II) have been applied to NCDs.^f The table presents 23 good-practice policies across the value chain. It notes the policies that address medicine availability, medicine price (broadly defined to include out-of-pocket costs, when consistent with the policy intent), or both. Other considerations, when relevant, are included in the final column of the table.



Health workers and volunteers from the Rwanda NCD Alliance offer free screenings for weight, height, blood pressure, eyesight, and dental health on the first and third Sundays of every month in the streets of Kigali, Rwanda.

^f Our focus on policies that have evidence for impact on NCD medicines should not be interpreted as evidence against other policies, including those in WHO's pharmaceutical pricing policy guidelines. It is possible that other policies are also effective on NCD medicines but that there is not yet sufficient evidence in the literature to confirm their effectiveness. The items included in **Table 6** are not meant to supersede best-practice policies for medicines in general, but rather to highlight the policies that governments focused on NCDs could prioritise amongst the broader list of policy options.

Table 6. Policies to improve availability and reduce prices of medicines for NCDs.

Stage of value chain	Specific policy action	Impact on availability	Impact on prices	Comments
Production	Use of compulsory licensing and TRIPS flexibilities	Yes	Yes	Permits market entry; impact on innovation is unclear
	Establishment of regional generic manufacturing hubs	Yes	Yes	
Regulatory approval	Regional regulatory harmonization and cooperation	Yes	No	Improves efficiency of regulatory process
	Establishment of health technology assessment programs and regional networks	Yes	Yes	Also improves rational use, reduces unnecessary spending
	Medicines regulatory system strengthening	Yes	No	Also increases quality and trust
Procurement	Pooled procurement	Yes	Yes	50-90% reductions in prices in some studies
	Supplier incentives and market competition policies	Yes	Yes	
	External reference pricing	No	Yes	
	National essential medicines list / reimbursement list alignment	Yes	Yes	
	Price ceiling/regulation	Yes	Yes	May not improve availability in rural areas
	Mark-up regulation	No	Yes	
Financing	Essential medicines financing policy	Yes	Yes	
	Government-initiated access programs	Yes	Yes	
	Targeted Public Subsidies (e.g., Revolving Drug Funds, Free Medicine Programs)	Maybe	Yes	
Delivery	Strengthening warehousing, distribution, and inventory management systems	Yes	No	
	Public-private partnerships for pharmacy contracting	Yes	Yes	Improves affordability of medicines in the private sector
	Emergency procurement support	Yes	No	
	Lending agreements	Yes	No	
Uptake	Generic medicines policies	Yes	Yes	Most effective when including mandatory substitution
	Rational use/stewardship programs	No	Yes	Also improves rational use, reduces unnecessary spending
Cross-cutting actions	National medicines policy frameworks and comprehensive pricing policies	Maybe	Maybe	Effectiveness depends greatly on implementation capacity
	Cross-country collaborations across the value chain	Maybe	Maybe	Can also improve supply chain security
	Information-sharing and mutual learning	Maybe	Maybe	Enabling policy for others

Notes: TRIPS = Agreement on Trade-Related Aspects of Intellectual Property Rights

As **Table 6** illustrates, countries have a range of policy options for addressing the problem of limited availability and affordability of NCD medicines. The learnings from the studies featured in this table generally align with WHO guidance on pharmaceutical pricing policies, which is applicable to all medicines, not just NCD medicines.²⁵ Additionally, progress on ensuring availability and affordability is most likely when multiple policies are developed and implemented together to foster synergies and align incentives.²⁵

The next step will be to determine priority policy interventions to improve access and reduce prices of the medicines featured in this study. The priority policy interventions may vary between countries and for different medicines. While streamlining regulatory approval and using health technology assessment are valuable in general, we did not focus on these, because most of these medicines are generics that have been used worldwide for many years. Hence policies that incentivise greater production, reduce procurement costs, and strengthen delivery systems are likely to have the greatest impact for the medicines featured in this analysis.

In principle, these medicines should be quite inexpensive. However, the budget for NCD medicines is currently insufficient in many countries because of low demand for NCD services (due to low awareness) and low quality of chronic disease care.¹³ For example, in 2019 only one in five people living with hypertension had their blood pressure under control, and most people living with hypertension were not even aware they had condition.⁴

These sobering statistics imply that the quantity of medicines manufactured and procured worldwide would need to increase by several-fold to reach an 80% coverage target; in the hypertension example above, it would be a factor of about four. Hence one of the pricing models used by suppliers on “low-volume, high-margin” would need to shift to “high-volume, low-margin” to ensure lower prices. Pooled procurement policies could be a critical part of

this shift: these policies have led to massive reductions in prices for cardiovascular medicines in the Americas²⁶ and for cancer chemotherapeutics in India, for example.²⁷ Additionally, **Table 4** underscores the importance of price transparency and establishment of regional and global reference prices to ensure that individual procurement agencies, especially in lower-income countries, are not paying excessively for medicines that can be obtained much cheaper in countries with mature markets and strong procurement systems.

Among the policies in **Table 6**, three of them could readily work together to help countries shift to the high-volume, low-margin model described above. These include (I) increased (global and regional) production of generic medicines, (II) greater use of pooled procurement, and (III) engagement of private-sector suppliers and providers (dispensaries). How might these policies work together in practice? The Lancet Commission on Investing in Health, in its 2024 report, “Global Health 2050: the path to halving premature death by mid-century,” proposed an integrated approach that the authors called the “Arrow Mechanism.”²⁸

Named after the late Nobel laureate economist Kenneth Arrow, this mechanism was originally tested for antimalarials and shown to be effective at improving availability and reducing OOP costs paid, especially at private retail pharmacies where most individuals obtained their antimalarials.²⁹ It involves four key components, which are redirection of general budget transfers to ministries of health to line-item budget transfers for specific priority drugs; pooled purchasing, assurance of adequate supplies, and a long-term commitment to manufacturers to ensure a steady supply of medications; procurement in sufficient quantities to ensure availability; and use and strengthening of existing supply chains, both public and private. The Lancet Commission report included a reflection on how the Arrow Mechanism could be applied to medicines for NCDs.²⁸



International journalists reporting on the Global NCD Alliance Forum held in February 2025 visited a PEN+ Clinic project based at Masaka Hospital in Kigali. PEN+ is a regional strategy to address NCDs such as T1 Diabetes and sickle cell disease at first-level referral health facilities.

SUMMARY AND RECOMMENDATIONS

Governments have committed to tackling NCDs, but increased financing and improved implementation of evidence-based practices have fallen short of expectations since the first UN HLM on NCDs in 2011. The fourth UN HLM on NCDs provides an opportunity to renew national commitments and take concrete actions to follow through on them. Along with increasing domestic financing, improving access to affordable, high-quality medicines is arguably one of the most urgent and high-priority issue for the NCD agenda.

To this end, this report sought to answer two questions. The first question was: what level of spending is typically required to ensure universal access to essential NCD services? How much of this spending would need to be on essential medicines? Our best estimate is that countries should aim to spend about 1.1% to 1.7% of national income on these interventions through their primary healthcare budgets, with 20% to 54% of this spending allocated to medicine budgets. We also point out the idiosyncratic nature of medicine price variability within and across countries. We looked at an alternative scenario where countries were able to procure the medicines included in this report at the lowest prices we observed across four diverse countries. We found that this would reduce the benchmark estimates by 20-50%, to a target of 0.81% to 0.89% of national income, with 5.2% to 28% of spending allocated to medicines in an optimistic scenario.

The second question was: what options do policymakers have for improving access to affordable essential NCD medicines? We found strong evidence in our umbrella review that increased production of generic medicines, centralised and pooled procurement, and engagement of the private sector (to facilitate distribution) could be highly effective at improving availability and reducing prices. By subsidising essential medicines distributed through the private sector, governments can also address a major source of OOP spending on NCDs and provide additional financial protection. Depending on the country context and the interventions in question, a range of policies should be assessed to tackle specific barriers a country is experiencing.

Our findings have implications for different stakeholder groups:

Ministries of health are the primary adopters and implementers of these recommendations. We urge ministries to **prioritise NCDs in their strategic planning and policy processes** and to advocate for increased allocation to the health budget to support the scale-up of the interventions listed here, in alignment with their primary healthcare strategies. Ministries can also develop and implement policies in line with the Arrow Mechanism that align with their local realities.

Ministries of finance can support ministries of health by **maintaining (or better, increasing) budgetary allocations to health**, with an emphasis on improving delivery of a set of highly cost-effective NCD interventions. The Arrow Mechanism entails a redesign of the health budget to ensure that essential medicines are adequately financed. Additionally, ministries of finance could play a supporting role in fostering better public financial management within the health sector, which would improve efficiency within the budget execution process and make the best use of available resources for NCDs.

Advocacy groups, civil society organisations, and people with lived experience can raise awareness of the need to tackle NCDs and **hold governments accountable for their commitments**. They can partner with government agencies in the design and implementation of prevention and control programs and support patients.

Engagement of **suppliers of generic medicines** throughout this process is essential. New **partnerships between governments (or groups of governments) and suppliers** are needed. Suppliers require sufficient incentives to increase production of generic medicines, which might take the form of larger, multi-year commitments by governments that are backed up by increased financing. Purchasing medicines in much greater volumes, with guarantees for demand over time, can facilitate a shift from a low-volume, high-margin model to a high-volume, low-margin model.

Finally, **regional and international organisations** can **facilitate collective action on NCDs**. In addition to providing technical support to national actors, they play an important role in ensuring access to affordable medicines. For example, regional regulatory harmonisation and pooled procurement across countries can speed up approvals, lead to more predictable medicine supplies, and reduce prices for all participating countries.

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ANNEX A

Interventions and medicines used in this analysis

Interventions that can be delivered in lower-capacity clinics by PHC nurses

Intervention 1: primary prevention of cardiovascular disease

- Amlodipine (fraction of hypertension)
- Hydrochlorothiazide (fraction of hypertension)
- Lisinopril (fraction of hypertension)
 - Losartan (for lisinopril-intolerant individuals)
- Atorvastatin (hyperlipidemia with high absolute 10-year CVD risk)

Intervention 2: management of diabetes

- Metformin (type 2 only)
- Gliclazide (type 2 only)
- Regular insulin (both types; fraction of type 2)
- Isophane insulin (both types; fraction of type 2)

Intervention 3: management of chronic respiratory diseases (asthma and COPD)

- Salbutamol
- Beclometasone (moderate/severe fraction of both)
- Ipratropium (moderate/severe COPD)
- Oral prednisone (acute exacerbations; chronic treatment of severe cases of both)

Intervention 4: management of depression

- Amitriptyline (fraction of depression)
- Fluoxetine (fraction of depression)

Intervention 5: management of psychoses

- Haloperidol (fraction of psychotic disorders)
- Risperidone (fraction of psychotic disorders)
- Valproic acid (manic episode in bipolar disorder)

Intervention 6: HPV immunization among adolescent girls

- HPV vaccine

Intervention 7: HBV among infants (birth dose) and high-risk populations

- HBV vaccine

Intervention 8: Palliative care and pain control for all persons with cancer

- Short-acting oral morphine

Interventions that can be delivered in higher-capacity clinics and hospital OPDs by physicians and clinical officers

Intervention 9: secondary prevention of ischemic heart disease

- Aspirin
- Atorvastatin
- Metoprolol
- Lisinopril (LV dysfunction and/or hypertension)
 - Losartan for lisinopril-intolerant individuals
- Clopidogrel (post-PCI)

Intervention 10: secondary prevention of stroke

- Aspirin (non-cardioembolic)
- Clopidogrel (non-cardioembolic)
- Warfarin (cardioembolic)
- Lisinopril (hypertension)
 - Losartan for lisinopril-intolerant individuals
- Atorvastatin (hyperlipidemia)

Intervention 11: management of chronic heart failure

- Lisinopril (reduced ejection fraction)
 - Losartan for lisinopril-intolerant individuals
- Metoprolol (reduced ejection fraction)
- Spironolactone
- Furosemide

Intervention 12: management of Parkinson's disease

- Levodopa + carbidopa

Intervention 13: management of seizure disorders

- Phenobarbital (focal-onset)
- Phenytoin (focal-onset)
- Valproic acid

ANNEX B

Costing input data and assumptions used in this analysis

Health area	Intervention	Sub-component	Sub-subcomponent	Unit Cost	Curr.	Loc, yr	DOI	Population in need (condition, sexes, age range, treated proportion)	Coverage proxy
CVD	Primary prevention of cardiovascular disease	Primary prevention with absolute CVD risk	CVD targeted screening	1.85	USD	TZA, 2016	https://doi.org/10.1017/bca.2023.25	all, Both, 30 to 95, 0.2	Hypertension treatment coverage (NCD-RisC)
		Primary prevention with absolute CVD risk	Primary CVD prevention (antihypertensives, statins)	28.98	USD	TZA, 2013	https://doi.org/10.1186/s12913-016-1409-3	all, Both, 30 to 95, 0.06	Hypertension treatment coverage (NCD-RisC)
	Secondary prevention of ischemic heart disease	Secondary prevention of ischemic heart disease	Case finding and diagnosis at the first-level hospital level	36.74	USD	TZA, 2012	https://doi.org/10.1111/ijis.12322	incidence, Ischemic heart disease, Both, 0 to 95, 0.52	Hypertension treatment coverage (NCD-RisC)
		Secondary prevention of ischemic heart disease	Treatment cost for IHD patients	47.12	USD	BRA, 2014	https://doi.org/10.1371/journal.pone.0210502	prevalence, Ischemic heart disease, Both, 0 to 95, 1	Hypertension treatment coverage (NCD-RisC)
		Secondary prevention of ischemic heart disease	Lab tests and follow-up visits for stroke patients	60.77	USD	TZA, 2016	https://doi.org/10.1186/s12913-016-1409-3	prevalence, Ischemic heart disease, Both, 0 to 95, 1	Hypertension treatment coverage (NCD-RisC)
	Secondary prevention of stroke	Secondary prevention of stroke	Case finding and diagnosis at the first-level hospital level	386.33	LCU	BRA, 2007	https://doi.org/10.1159/000184747	incidence, Ischemic stroke, Both, 30 to 95, 0.52	Hypertension treatment coverage (NCD-RisC)
		Secondary prevention of stroke	Treatment cost for stroke patients	60.77	USD	TZA, 2016	https://doi.org/10.1111/ijis.12322	prevalence, Ischemic stroke, Both, 30 to 95, 0.5	Hypertension treatment coverage (NCD-RisC)
		Secondary prevention of stroke	Lab tests and follow-up visits for stroke patients	36.74	USD	TZA, 2012	https://doi.org/10.1186/s12913-016-1409-3	prevalence, Ischemic stroke, Both, 30 to 95, 0.5	Hypertension treatment coverage (NCD-RisC)
		Secondary prevention of stroke	Case finding and diagnosis at the first-level hospital level	386.33	USD	TZA, 2007	https://doi.org/10.1159/000184747	incidence, Intracerebral haemorrhage, Both, 30 to 95, 0.52	Hypertension treatment coverage (NCD-RisC)
		Secondary prevention of stroke	Treatment cost for stroke patients	60.77	USD	TZA, 2016	https://doi.org/10.1111/ijis.12322	prevalence, Intracerebral haemorrhage, Both, 30 to 95, 0.5	Hypertension treatment coverage (NCD-RisC)
		Secondary prevention of stroke	Lab tests and follow-up visits for stroke patients	36.74	USD	TZA, 2012	https://doi.org/10.1186/s12913-016-1409-3	prevalence, Intracerebral haemorrhage, Both, 30 to 95, 0.5	Hypertension treatment coverage (NCD-RisC)

Health area	Intervention	Sub-component	Sub-subcomponent	Unit Cost	Curr.	Loc, yr	DOI	Population in need (condition, sexes, age range, treated proportion)	Coverage proxy
CVD	Management of chronic heart failure	Longitudinal management of chronic heart failure	Treatment of heart failure for HHD patients	55.45	USD	TZA, 2012	https://doi.org/10.1371/journal.pone.0210502	prevalence, Hypertensive heart disease_2, Both, 30 to 95, 1	Hypertension treatment coverage (NCD-RisC)
		Longitudinal management of chronic heart failure	1 cardiac echo per year for IHD patients	6.6	USD	BRA, 2017	https://doi.org/10.5334/gh.529	prevalence, Ischemic heart disease_2, Both, 30 to 95, 0.2	Hypertension treatment coverage (NCD-RisC)
		Longitudinal management of chronic heart failure	1 cardiac echo per year for CMP patients	6.6	USD	BRA, 2017	https://doi.org/10.5334/gh.529	prevalence, Cardiomyopathy and myocarditis, Both, 0 to 95, 1	Hypertension treatment coverage (NCD-RisC)
		Longitudinal management of chronic heart failure	Treatment of heart failure for CMP patients	55.45	USD	TZA, 2012	https://doi.org/10.1371/journal.pone.0210502	prevalence, Cardiomyopathy and myocarditis, Both, 0 to 95, 1	Hypertension treatment coverage (NCD-RisC)
		Longitudinal management of chronic heart failure	1 cardiac echo per year for HHD patients	6.6	USD	BRA, 2017	https://doi.org/10.5334/gh.529	prevalence, Hypertensive heart disease_2, Both, 30 to 95, 1	Hypertension treatment coverage (NCD-RisC)
		Longitudinal management of chronic heart failure	Lab tests and follow-up visits for CMP patients	36.74	USD	TZA, 2012	https://doi.org/10.1186/s12913-016-1522-3	prevalence, Cardiomyopathy and myocarditis, Both, 0 to 95, 1	Hypertension treatment coverage (NCD-RisC)
		Longitudinal management of chronic heart failure	Lab tests and follow-up visits for HHD patients	36.74	USD	TZA, 2012	https://doi.org/10.1186/s12913-016-1522-3	prevalence, Hypertensive heart disease_2, Both, 30 to 95, 1	Hypertension treatment coverage (NCD-RisC)
		Longitudinal management of chronic heart failure	Treatment of heart failure for IHD patients	14.83	USD	TZA, 2016	https://doi.org/10.1111/ijvs.12322	prevalence, Ischemic heart disease_2, Both, 30 to 95, 0.2	Hypertension treatment coverage (NCD-RisC)

Health area	Intervention	Sub-component	Sub-subcomponent	Unit Cost	Curr.	Loc, yr	DOI	Population in need (condition, sexes, age range, treated proportion)	Coverage proxy
Diabetes	Management of diabetes	Longitudinal management of diabetes mellitus type 1	Diabetes opportunistic screening	72	LCU	CHN, 2016	https://doi.org/10.1186/s12882-017-0538-1	prevalence, Diabetes mellitus type 1, Both, 0 to 95, 1	Diabetes treatment coverage (NCD-RisC)
		Longitudinal management of diabetes mellitus type 1	Insulin	151	USD	RWA, 2014	https://doi.org/10.1136/bmjgh-2019-001449	prevalence, Diabetes mellitus type 1, Both, 0 to 95, 1	Diabetes treatment coverage (NCD-RisC)
		Longitudinal management of diabetes mellitus type 2	Diabetes opportunistic screening	39.97	LCU	IND, 2016	10.1016/S2468-2667(21)00199-7	all, Both, 30 to 95, 0.2	Diabetes treatment coverage (NCD-RisC)
		Longitudinal management of diabetes mellitus type 2	Diabetes management, non insulin dependent	337.8	USD	BGD, 2019	10.1186/s12913-019-4440-3	prevalence, Diabetes mellitus type 2, Both, 30 to 95, 0.6	Diabetes treatment coverage (NCD-RisC)
		Longitudinal management of diabetes mellitus type 2	Diabetes management, insulin dependent	701.96	USD	BGD, 2019	10.1186/s12913-019-4440-3	prevalence, Diabetes mellitus type 2, Both, 30 to 95, 0.2	Diabetes treatment coverage (NCD-RisC)

Health area	Intervention	Sub-component	Sub-subcomponent	Unit Cost	Curr.	Loc, yr	DOI	Population in need (condition, sexes, age range, treated proportion)	Coverage proxy
CRD	Management of chronic respiratory diseases (asthma)	Longitudinal management of asthma	Inhalers steroids theophylline	24.7	USD	TZA, 2016	http://apps.who.int/medicinedocs/documents/s21982en/s21982en.pdf Serje J. 2015. "Estimates of Health Sector Salaries across Four Occupational Levels for UN Member States." Unpublished. WHO.	prevalence, Asthma, Both, 0 to 95, 0.638	General health service coverage (WHO UHC index)
		Treatment of acute exacerbation of asthma	Steroids inhalers antibiotics oxygen	195	USD	VNM, 2005	https://doi.org/10.1136/tobaccocontrol-2014-051821	prevalence, Asthma, Both, 0 to 95, 0.135	General health service coverage (WHO UHC index)
	Management of chronic respiratory diseases (COPD)	Longitudinal management of COPD	Inhalers steroids theophylline	24.7	USD	TZA, 2016	http://apps.who.int/medicinedocs/documents/s21982en/s21982en.pdf Serje J. 2015. "Estimates of Health Sector Salaries across Four Occupational Levels for UN Member States." Unpublished. WHO.	prevalence, Chronic obstructive pulmonary disease, Both, 0 to 95, 0.647	General health service coverage (WHO UHC index)
		Treatment of acute exacerbation of COPD	Steroids inhalators antibiotics oxygen	195	USD	VNM, 2005	https://doi.org/10.1136/tobaccocontrol-2014-051821	prevalence, Chronic obstructive pulmonary disease, Both, 0 to 95, 0.0855	General health service coverage (WHO UHC index)

Health area	Intervention	Sub-component	Sub-subcomponent	Unit Cost	Curr.	Loc, yr	DOI	Population in need (condition, sexes, age range, treated proportion)	Coverage proxy
Cancer	HPV immunisation among adolescent girls	Human Papilloma virus (HPV) immunisation	Human Papilloma virus (HPV) immunization	9.14	USD	TZA, 2016	https://hdl.handle.net/10986/28876	all, Female, 12 to 12 , 1	HPV immunization coverage (WHO)
	HBV among infants (birth dose) and high-risk populations	HBV among infants (birth dose) and high-risk populations	HBV among infants (birth dose) and high-risk populations	2.2	USD	TZA, 2021	HepB-vaccine-prices-07052025.pdf	Birth, Both, 0 to 0, 1	DPT3 coverage (WHO)
		HBV among infants (birth dose) and high-risk populations	HBV among infants (birth dose) and high-risk populations	2.25	USD	TZA, 2021	HepB-vaccine-prices-07052025.pdf	all, Both, 30 to 95, 0.05	DPT3 coverage (WHO)
	Palliative care and pain control for all persons with cancer	Palliative care and pain control for all persons with cancer	Palliative care and pain control for all persons with cancer	64.36	USD	TZA, 2013	https://hdl.handle.net/10986/28877	deaths, Palliative care, 0 to 95, 2	General health service coverage (WHO UHC index)

Health area	Intervention	Sub-component	Sub-subcomponent	Unit Cost	Curr.	Loc, yr	DOI	Population in need (condition, sexes, age range, treated proportion)	Coverage proxy
Mental and neuro disorders	Management of depression	Management of depression	Psychosocial care for severe peri-natal depression	6.71	USD	ZAF, 2008	https://doi.org/10.1016/S2215-0366(16)30024-4	Birth, to 0.087143	Psychiatrist density in the population (WHO)
		Management of depression	Psychotherapy and anti-depressant medication for moderate depression	71.37	USD	ZAF, 2008	https://doi.org/10.1016/S2215-0366(16)30024-4	prevalence, Major depressive disorder, Both, 0 to 95, 0.2	Psychiatrist density in the population (WHO)
		Management of depression	Intensive psychotherapy and anti-depressant medication for severe depression	87.26	USD	ZAF, 2008	https://doi.org/10.1016/S2215-0366(16)30024-4	prevalence, Major depressive disorder, Both, 0 to 95, 0.11	Psychiatrist density in the population (WHO)
		Management of depression	Basic psychosocial treatment for mild depression	15.45	USD	ZAF, 2008	https://doi.org/10.1016/S2215-0366(16)30024-4	prevalence, Major depressive disorder, Both, 0 to 95, 0.69	Psychiatrist density in the population (WHO)
	Management of psychoses	Management of psychotic disorders	Basic psychosocial support and anti-psychotic medication	38.91	USD	UGA, 2008	https://doi.org/10.1016/S2215-0366(16)30024-4	prevalence, Schizophrenia, Both, 10 to 95, 1	Psychiatrist density in the population (WHO)
	Management of Parkinson's disease	Basic management of Parkinson's disease	Drugs for Parkinson's disease (levodopa)	357.267	USD	TZA, 2021	https://gh.bmj.com/content/7/Suppl_2/A18.1	prevalence, Parkinson's disease, Both, 0 to 95, 1	Psychiatrist density in the population (WHO)
	Management of seizure disorders	Basic management of epilepsy	Basic management of epilepsy	63.01	USD	TZA, 2021	https://gh.bmj.com/content/7/Suppl_2/A18.1	prevalence, Idiopathic epilepsy, Both, 0 to 95, 1	Psychiatrist density in the population (WHO)

ANNEX C

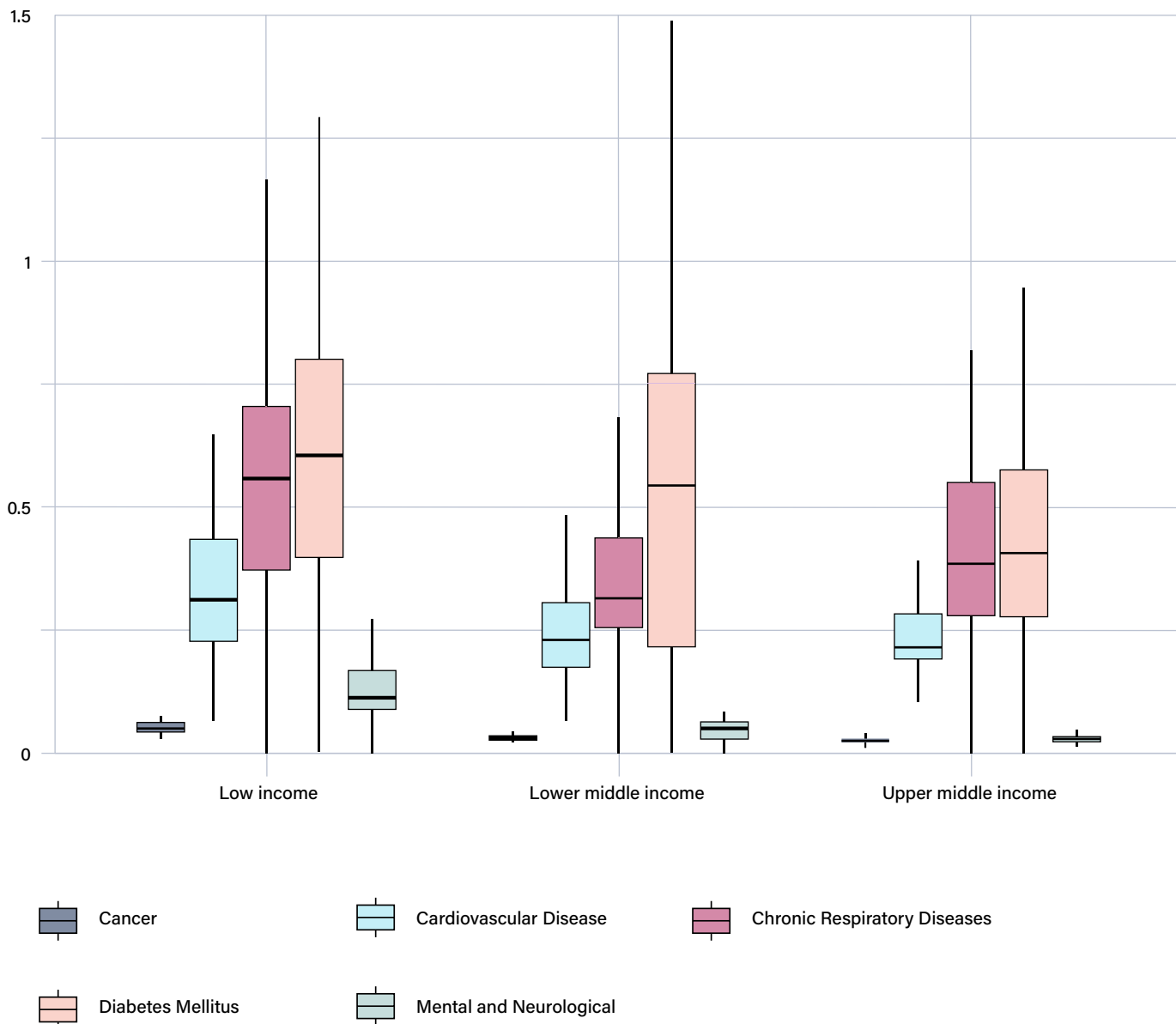
Additional results

Table A1. Findings presented in [Table 3](#), disaggregated by disease area.

	Low-income countries	Lower-middle-income countries	Upper-middle-income countries
Cardiovascular disease			
Current spending			
Per capita (US\$)	0.31	1.4	11
Relative to GNI	0.043%	0.057%	0.10%
Required spending			
Per capita (US\$)	2.2	7.3	32
Relative to GNI	0.30%	0.29%	0.29%
Diabetes			
Current spending			
Per capita (US\$)	0.92	3.0	16
Relative to GNI	0.13%	0.057%	0.14%
Required spending			
Per capita (US\$)	5.9	17	41
Relative to GNI	0.81%	0.67%	0.38%
Chronic respiratory diseases			
Current spending			
Per capita (US\$)	0.52	2.2	21
Relative to GNI	0.071%	0.089%	0.19%
Required spending			
Per capita (US\$)	3.4	9.1	44
Relative to GNI	0.46%	0.37%	0.40%
Cancer			
Current spending			
Per capita (US\$)	0.11	0.20	1.6
Relative to GNI	0.016%	0.0081%	0.015%
Required spending			
Per capita (US\$)	0.36	0.71	3.2
Relative to GNI	0.049%	0.029%	0.029%
Mental health and neurological conditions			
Current spending			
Per capita (US\$)	0.0068	0.033	0.63
Relative to GNI	0.00093%	0.0013%	0.0013%
Required spending			
Per capita (US\$)	0.74	1.1	2.0
Relative to GNI	0.10%	0.044%	0.018%

Figure A1. Country variation in spending benchmarks by disease group and country income.

Required annual spending as a share of current gross national income





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