22

Lessons Learned from the Use of Disease Control Priorities Recommendations to Address Noncommunicable Diseases in Low- and Middle-Income Countries

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ABSTRACT

Noncommunicable diseases (NCDs) are a rapidly growing challenge worldwide, and priority setting is essential for making progress on NCDs in limited-resource settings. This chapter reviews the evolution of NCDs within the Disease Control Priorities (DCP) project over the years. It then presents two recent case studies where DCP recommendations were used in priority-setting processes. The chapter concludes with suggestions for expanding and improving the analyses and recommendations that will come from the fourth edition of DCP and related projects.

INTRODUCTION

The term "noncommunicable diseases" (NCDs) largely comes from the nosology of global health measurement, starting with the 1990 Global Burden of Disease study that accompanied the first edition of the *Disease Control Priorities* (DCP) series and the 1993 *World Development Report* (Jamison et al. 1993; World Bank 1993). Practically, NCDs capture every health condition that is not part of the "unfinished agenda" of communicable, maternal, perinatal, and nutritional diseases and cannot be classified as an injury. Although NCDs account for most premature deaths in

low- and middle-income countries (LMICs), actions at the global and national levels to implement NCD interventions and packages have encountered numerous political, financial, and logistical challenges (Nishtar et al. 2018).

In the 2000s, efforts to raise awareness on NCDs focused on a subset of four groups of NCDs (cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes) that were emerging in LMICs as a by-product of economic development and increased exposure to a small set of common risk factors (tobacco use, harmful use of alcohol, unhealthy diets, and insufficient physical activity). Those NCDs had the additional characteristics of chronicity and complexity of disease management. That conceptualization culminated in the "4 × 4" framing of the NCD problem reflected in the first United Nations high-level meeting on NCDs in 2011 (Schwartz, Shaffer, and Bukhman 2021) and persists to this day in the form of Sustainable Development Goal (SDG) target 3.4.[1] In 2021, the World Health Organization (WHO) developed a road map for countries to get back on track for SDG target 3.4, with a renewed focus on high-priority interventions (WHO 2021). The United Nations community plans to meet again in 2025 to review progress on that target and the NCD agenda, and to begin looking beyond 2030 and the SDGs (NCD Countdown 2030 Collaborators 2022). The COVID-19 pandemic, and its impact on health care systems and on progress on NCDs, will inevitably serve as the backdrop for that assessment.

Still, the 4 × 4 framing—four major diseases and four major risk factors—can be critiqued as an oversimplification that fails to address important NCDs in very resource-constrained environments (Schwartz, Shaffer, and Bukhman 2021). In 2015, the Lancet Commission on Noncommunicable Diseases and Injuries in the Poorest Billion (hereafter, "Lancet NCDI Poverty Commission") was launched as an attempt to broaden the NCD agenda beyond the top four diseases to endemic conditions like sickle cell anemia and rheumatic fever, and to link NCDs to injuries because they have similar implications for health care systems and have been neglected in the global health agenda (Bukhman et al. 2020). The Lancet NCDI Poverty Commission launched a series of national commissions to provide context for the global report and begin to take action to implement interventions (box 22.1).

This chapter reviews the contribution of the DCP enterprise to the global NCD agenda over the past 30 years, especially the influence of DCP recommendations for priority interventions. It presents two case studies on the use of DCP evidence in practice: (1) the Lancet NCDI Poverty Commission and (2) the NCD Countdown 2030 Collaborators and related efforts on WHO's road map for NCDs in the post-COVID-19 era. The chapter aims to critically review the strengths and limitations of existing recommendations, particularly from DCP3, to inform work on NCDs in subsequent volumes in this series.

Box 22.1

National- and State-Level NCDI Poverty Commissions

The Lancet Commission on Noncommunicable Diseases and Injuries in the Poorest Billion (the "Lancet NCDI Poverty Commission") developed a two-step analytic framework to support national and subnational NCDI poverty commissions in defining local NCDI epidemiology, determining an expanded set of priority NCDI conditions, and recommending cost-effective, equitable health sector interventions (Bukhman et al. 2020). National NCDI poverty commissions were established in 22 countries with country-level commissions and one state-level commission in India that have more than 25 percent prevalence of extreme poverty in at least one subnational region (determined by a modified multidimensional poverty index). The commissions were established from 2016 to 2022 following application and approval by respective ministry of health officials in collaboration with in-country implementers.[a]

As of October 2024, 17 commissions had completed the NCDI priority-setting exercise using recommendations from the third edition of *Disease Control Priorities*, and 21 have published reports (Gupta et al. 2021). The first six published reports had an average of 25 prioritized noncommunicable disease (NCD) and injury conditions based on prevalence, severity, disability, and equity metrics. All commissions selected the following 15 conditions: asthma, breast cancer, cervical cancer, diabetes mellitus (types 1 and 2), epilepsy, hypertensive heart disease, intracerebral hemorrhage, ischemic heart disease, ischemic stroke, major depressive disorder, motor vehicle road injuries, rheumatic heart disease, sickle cell disorders, and subarachnoid hemorrhage. On average, the commissions prioritized 35 health sector interventions on the basis of cost-effectiveness, financial risk protection, and equity-enhancing characteristics. The prioritized interventions were estimated to cost an additional US$4.7 to US$14.0 per capita, or approximately 9.7 percent to 36.0 percent of current total health expenditure (0.6 percent to 4.0 percent of current gross domestic product), depending on the country.

Participants have reported positive outcomes of the commissions in informing national planning and implementation of NCD and injury interventions, improving governance and coordination for those conditions, and advocating for an expanded NCD agenda. In Ethiopia, Kenya, and Nepal, commission recommendations were incorporated into the development of national universal health coverage policies and benefits packages and formed the basis for primary research in the delivery of integrated NCDI interventions from the third edition of *Disease Control Priorities* (Memirie et al. 2022; Mwangi et al. 2021). In Liberia and Malawi, commission findings formed the basis for a National Operational Plan for addressing severe NCDs, and 13 commissions have overseen the implementation of the integrated package of health services for severe NCDs at the primary referral hospital level ("PEN-Plus"), endorsed by the World Health Organization Africa Region (Boudreaux et al. 2022).

In 2020, the commissions formed the NCDI Poverty Network, hosted by co-secretariats at the Center for Integration Science at Brigham & Women's Hospital and the Universidade Eduardo Mondlane (Bukhman et al. 2021). That network, governed by a steering committee of 10 commission leaders, provides an active platform for collective policy, research, and advocacy to improve health sector interventions and financing for NCDIs in low- and lower-middle-income countries within national and regional commitments for universal health coverage.

a. For a full list of countries and partners, refer to the NCDI Poverty Network home page, www.ncdipoverty.org.

THE EVOLUTION OF NCD RECOMMENDATIONS OVER DCP1–DCP3

Broadly speaking, the DCP enterprise has been integral to the NCD agenda and to recent efforts to accelerate progress. The 1990 Global Burden of Disease study, the first *Disease Control Priorities (DCP1)* volume, and the 1993 *World Development Report* (all produced around the same time) were the first international publications to emphasize the growing burden of NCDs in LMICs and their relationship, at the population level, to trends in risk factors like tobacco use (Bobadilla et al. 1993). In fact, although the development community at the time focused almost exclusively on eradicating communicable childhood diseases, 9 out of 25 of DCP1's disease-specific chapters addressed NCDs or injuries. Table 22.1 presents a summary of NCD interventions recommended in DCP1.

Table 22.1 Recommended NCD interventions in DCP1

Disease group	Specific interventions
Cancers	• Screening (Pap smear) and treatment of cervical cancer • Screening (clinical exam) and treatment of breast cancer • Treatment of early-stage oral and rectal cancers • Palliative care and pain relief for all cancer cases • Smoking cessation classes • Tobacco taxes
Cardiovascular diseases	• Screening and counseling regarding individual risk, plus medical management of hypertension and hypercholesterolemia • Medical management of stable angina • Low-cost management of unstable angina and acute myocardial infarction at district hospitals • Secondary prevention medications post myocardial infarction or stroke • Secondary prevention of rheumatic heart disease • Where resources allow, angioplasty or bypass graft surgery • Where resources allow, surgery for rheumatic heart disease
Chronic respiratory diseases	• Treatment of exacerbations including mechanical ventilation, steroids, and fluids • Tobacco control measures (refer to "cancers" in the first row)
Diabetes	• Health education regarding diet and exercise to prevent diabetes • Screening of high-risk groups (pregnant, obese) and treatment of diabetes (both type 1 and type 2)
Mental disorders	• Antipsychotic therapy for schizophrenia • Lithium therapy for bipolar disorder
Other NCDs	• Cataract repair • Plaque and calculus removal, fissure sealants, and topical fluoride • Extraction of teeth with advanced caries

Source: Jamison et al. 1993.

Note: DCP1 = *Disease Control Priorities*, first edition; NCD = noncommunicable disease.

NCDs also featured prominently in DCP2 (Jamison et al. 2006), with updates to the cost-effectiveness estimates provided in DCP1. Still, DCP2 had very similar main messages around value for money and featured many of the interventions in table 22.1 in its chapters. Cross-fertilization of DCP2 with the WHO Choosing Interventions that are Cost-Effective (WHO-CHOICE) project also shaped a package of "Best Buy" interventions that accompanied WHO's Global Action Plan on NCDs (WHO 2013).[2] One important distinction between the DCP2 approach and WHO's Best Buys was a greater focus on clinical interventions in DCP2, a distinction that persisted through DCP3 (Jamison et al. 2018).

The initiation of DCP3 (2010–17) provided an opportunity to do a more in-depth treatment on specific NCDs (defined broadly) and intervention areas. Three entire volumes (3, 4, and 5) and substantial portions of other volumes (1, 7, 8, and 9) were devoted to NCD topics; out of 21 intervention packages, 6 focused exclusively on NCDs, with another 4 in the "health services cluster" (surgery, rehabilitation, palliative care, and pathology) having major implications for NCDs. DCP3 volumes included systematic reviews of cost and cost-effectiveness analyses that informed the essential intervention packages. Online annex 22A UR (https://dcp4.w.uib.no/volumes/volume-1-country-led-priority-setting-for-health) provides a list of the interventions found throughout DCP3 that addressed NCDs.

Generally speaking, DCP recommendations and WHO recommendations for NCDs have had a high degree of concordance over the years. Both sets of recommendations have placed a strong emphasis on cross-cutting preventive interventions like tobacco control and on clinical interventions to address cardiovascular disease, for which cost-effectiveness evidence is easiest to find. DCP has tended to go further on clinical care (for example, recommending pharmacological treatment of chronic and acute heart failure in DCP3) whereas WHO has tended to emphasize promotion and behavior change interventions (for example, mass media campaigns on physical activity and diet). However, many of the apparent differences appear at the surface level and relate to differences in naming and aggregation of activities and technologies into unique interventions rather than reflecting substantive differences.

Although DCP3 was not resourced to do original cost and cost-effectiveness analyses, two working papers for volume 9 included estimates of the overall cost and mortality impact of the interventions included in the volumes. Across all low- and lower-middle-income countries, the packages of NCD interventions will cost an estimated US$140 billion annually by 2030 but would prevent about 2.6 million premature deaths annually (that is, about US$54,000 per death averted).

Cost-effectiveness is not the only relevant criterion for priority setting for universal health coverage (UHC). Health systems also seek to improve the distribution of health in the population (that is, equity) and, through public financing of health services, to provide financial protection from the risks of seeking health care (WHO 2014). DCP3 included new attempts to consider equity and financial

protection alongside cost-effectiveness in a new methodological approach called "extended cost-effectiveness analysis" (Watkins, Nugent, and Verguet 2017). Five country-level extended cost-effectiveness analyses were done on NCD interventions in DCP3. Despite the data challenges inherent in conducting them, those studies have come to be seen as helpful additions to the cost-effectiveness literature, with 60 publications indexed in PubMed as of June 26, 2024.

One concrete example of the usefulness of extended cost-effectiveness analysis, a study of the equity impact of tobacco taxes in China, provides compelling evidence to counter the tobacco industry's long-standing argument that taxes are regressive (Verguet, Gauvreau, et al. 2015). Another study shows that NCD interventions were relatively more favorable in financial protection terms than in cost-effectiveness terms. It follows that a UHC benefits package that seeks both to improve health and provide financial protection would invest relatively more in NCD interventions than a package focused solely on health gains (Verguet, Olson, et al. 2015).

USE IN THE LANCET NCDI POVERTY COMMISSION

During 2016–17, substantial cross-fertilization occurred between the DCP3 enterprise and the Lancet NCDI Poverty Commission. DCP3 collaborators developed a priority-setting framework for NCDI national commissions that balanced disease burden data, cost-effectiveness, equity, and financial protection. The collaborators provided draft lists of interventions and packages, with semiquantitative assessments of cost-effectiveness, equity, and financial protection as well as cost estimates. Those data were prepared as a series of Excel spreadsheets used in commission priority-setting exercises (refer to online annex 22B for a sample spreadsheet from the Uganda commission, https://dcp4.w.uib.no/volumes/volume-1-country-led-priority-setting-for-health/). Additionally, the official report of the global commission, published in 2020, features updates to the DCP3 estimates of intervention cost and impact mentioned previously (Bukhman et al. 2020).

The global and national commissions also influenced the direction of DCP3, especially the synthesis chapters in volume 9. Commissioners pointed out some areas that DCP3 initially missed, such as congenital and genetic disorders, which prompted new evidence reviews and revision of chapter content (Watkins et al. 2017). They also served as an informal network for validating quantitative estimates (for example, intervention costs) and the final lists of interventions.

The general feedback from commissioners was that DCP3 provided a useful starting point and a structured process for deliberating on NCD priorities. Messages regarding priority interventions contained in the commission reports were frequently used for advocacy within countries and especially to ministries of health (Gupta et al. 2021). Strong collaborations between the NCDI poverty network and the DCP team also unlocked new resources from the Norwegian Agency for Development Cooperation to work on priority setting and capacity building in several countries and with the Africa Centres for Disease Control and Prevention.

The commissions did, however, identify several challenges and limitations. First, some disease areas were not well represented by DCP3 evidence because of the structure of the volumes. For example, DCP3 did not deal comprehensively with management of digestive disorders. Some relevant interventions were interspersed throughout the volumes—such as surgery for perforated ulcers in volume 1, childhood hepatitis B immunization in volume 2, and care for alcohol and opioid use disorders in volume 4—but basic clinical questions (such as medical management of decompensated cirrhosis) were not addressed at all.

Second, and related, the DCP3 packages were largely constructed around cost-effectiveness studies, which did not always account for the continuum of care for certain conditions. For example, the congenital and genetic disorders package contained an intervention around sickle cell disease screening and infection prophylaxis in under-five children, based on evidence for the cost-effectiveness of the approach in highly endemic settings (Kuznik et al. 2016). At the time of DCP3 writing, however, later-life management of sickle cell anemia had not been addressed in any economic evaluations in low- or middle-income countries, so potentially beneficial interventions (for example, hydroxyurea or basic management of acute crises) were not even assessed. A more systematic approach to sickle cell disease interventions—including original cost-effectiveness analyses for areas with evidence gaps—and with a life course perspective could address those limitations.

Third, despite the helpfulness of the spreadsheets of intervention lists and properties in facilitating dialogue, commissioners found them cumbersome and not very user-friendly. Relatedly, because of data gaps, many interventions did not have an assessment of equity or financial risk protection properties, making it difficult to systematically weigh the pros and cons of alternative intervention options.

Additionally, commissioners found that the definition of an "intervention" was inconsistent in terms of aggregation. On one end of the spectrum was "aspirin for suspected cases of acute coronary syndrome," a clear statement on use of a specific medicine for a specific indication. On the other end of the spectrum was a "basic package of palliative care," a recommendation based on aggregating numerous medications and tasks for various serious diseases into one intervention. Surgical procedures emerged as another challenging area, with some commissioners expecting detailed information on the cost-effectiveness of specific procedures and others advancing the idea of an integrated approach to surgery (for example, "basic district hospital services that can be performed by a nonspecialist physician or clinical officer").

From an analytic standpoint, one of the biggest challenges—and not unique to DCP—was identifying data on the current (or baseline) coverage level of various interventions. An intervention's baseline coverage, and the target coverage level that policy makers set, is a major driver of incremental costs and benefits, yet very few indicators for NCD service coverage are available. Hypertension is a notable

exception, with numerous population-based surveys (STEPwise Approach to NCD Risk Factor Surveillance, sometimes Demographic and Health Surveys, and so on) capturing hypertension awareness, treatment, and control (NCD Risk Factor Collaboration 2021). Future efforts to measure NCD service coverage and quality need to address that critical evidence gap.

Finally, and also not unique to DCP3, the commissions reported challenges incorporating their work into routine ministry of health policy processes. Feedback from policy makers indicated a desire to conduct sector-wide priority setting, for example, through national strategic plans and health benefits package revisions rather than siloed priority setting just for NCDs. At the same time, DCP3 recommendations were very useful for advocacy efforts, including the global surgery movement (refer to chapter 21, this volume). There are several plausible ways to balance disease-specific content and cross-cutting/synthetic approaches, and forthcoming volumes of *Disease Control Priorities,* fourth edition (*DCP4*), will need to consider the range of readership and structure their content accordingly.

CONTRIBUTION OF DCP IN UPDATING WHO'S GLOBAL AND REGIONAL NCD ACTION PLANS

The NCD Countdown 2030 was launched in 2018 as a collaboration between *The Lancet*, WHO, the NCD Alliance, and Imperial College London to track progress on reducing NCD mortality to achieve SDG 3.4 (NCD Countdown Collaborators 2018). In 2019, the Countdown collaborators approached Bergen Center for Ethics and Priority Setting collaborators (and DCP3 alumni) to prepare a paper on NCD intervention priorities for the SDG period (NCD Countdown 2030 Collaborators 2022). The onset of the COVID-19 pandemic led to a reframing of the paper to focus on how countries could get back on track to achieving SDG 3.4 in the face of pandemic-related disruptions to health systems.

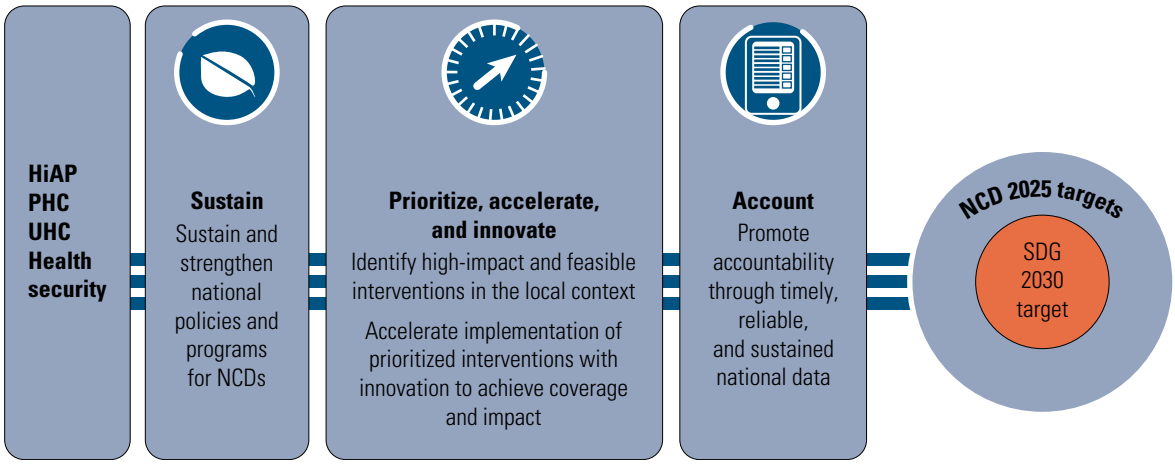
The foundation of that paper was a list of 15 clinical interventions (for example, treatment of hypertension and hypercholesterolemia to prevent cardiovascular disease) and six intersectoral policies (for example, tobacco excise taxes) taken from the DCP3 essential packages related to NCDs. Importantly, the interventions represented a subset of the scores of interventions for NCDs in DCP3. The paper focused on interventions that (1) addressed the four most common NCDs among adults and (2) could substantially reduce mortality by 2030. The analysis did not include numerous high-value NCD interventions that did not meet those criteria (for example, HPV immunization, treatment of childhood cancers, palliative care, and rehabilitation).

The paper's authors estimated that, under realistic implementation conditions, scaling up that package of interventions across 123 LMICs could allow 55 percent of countries to achieve SDG target 3.4, preventing 39 million deaths between 2023 and 2030 at a cost of about US$140 billion (or about US$2.6 per person per year) (NCD Countdown 2030 Collaborators 2022). If innovations in delivery science occur to allow NCD interventions to be scaled up as fast as HIV treatment and childhood immunization programs have been, then about 85 percent of countries could achieve the target. Intersectoral policies to reduce behavioral risk factors would be responsible for about two-thirds of the package's health gains and would reduce the need for more costly clinical services.

Around the same time that the Countdown paper was being prepared and under peer review, WHO initiated an effort to update its Global Action Plan for NCDs and provide a road map for countries to get back on track for SDG target 3.4 (WHO 2021). During much of 2021, the WHO NCDs department collaborated closely with the Bergen Center team and representatives from other Countdown partners. The Countdown report, published in *The Lancet* in March 2022, helped inform WHO's overall strategy and especially the road map document. Part of the context for the Countdown report was the observation that the pandemic disproportionately affected persons living with NCDs, who had higher rates of severe disease and case fatality. The Countdown report emphasized the links between NCDs, pandemic preparedness, and health security, and the need for advocacy efforts to acknowledge those links (NCD Countdown 2030 Collaborators 2022). Framing NCD prevention and management as a health systems resilience issue might also be helpful in the argument for additional investment.

After launch of the Countdown report, WHO commissioned a team from the University of Washington to develop two web-based tools to help countries implement the recommendations from the report. The first simulation tool provided estimates of intervention impact in 123 LMICs, under different implementation scenarios (Pickersgill et al. 2022).[3] The second impact simulation tool, commissioned by the WHO South-East Asia Regional Office, was tailored to the 11 countries in the region and incorporated estimates of intervention cost and cost-effectiveness.[4] The second tool was a key component of the WHO Regional Office's implementation road map for NCDs in South-East Asia, endorsed at the Regional Committee Meeting in 2022 in Paro, Bhutan (WHO 2022). The road map sought to help countries assess their status, sustain their good work, prioritize interventions, accelerate the most effective and feasible approaches, and promote accountability (figure 22.1). During late 2022 and early 2023, WHO disseminated its tool for South-East Asia to its country offices and to ministries of health in the region, which used the tool for national strategic planning on NCDs (figure 22.2).

Figure 22.1 Scope of the NCD Road Map Developed by WHO for Countries in Its South-East Asia Region



Source: Adapted from the World Health Organization Regional Office for South-East Asia, "WHO South-East Asia Regional NCD Roadmap," https://apps.searo.who.int/whoroad/.

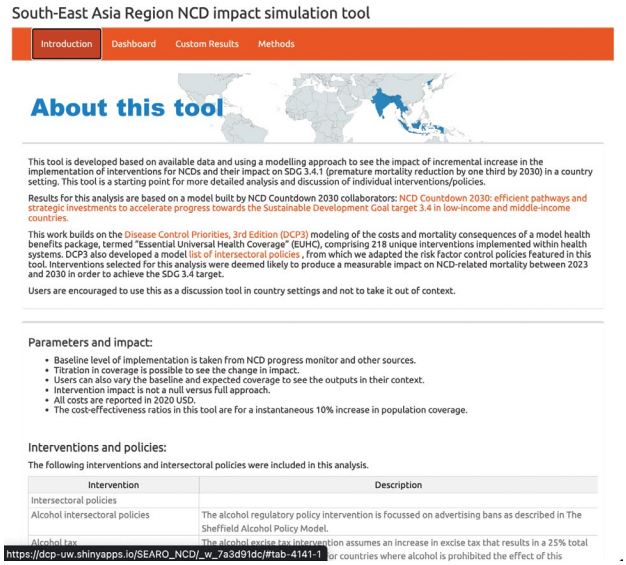
Note: The World Health Organization's South-East Asia Region consists of the following countries: Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, and Timor-Leste. HiAP = Health in All Policies; NCD = noncommunicable disease; PHC = primary health care; SDG = Sustainable Development Goal; UHC = universal health coverage.

The tools developed for WHO generally received very positive feedback, though some stakeholders raised concerns about the alignment of the tools with WHO recommendations, including those from the latest Global Action Plan, updated the Best Buy recommendations. Others noted the potential for confusion at the country level about how to use the tools relative to the Spectrum toolkit, including the OneHealth Tool[5] and WHO-CHOICE generalized cost-effectiveness analysis. Most relevant, however, was that countries could use the tool to do their own exercises and arrive at context-specific priorities. Global tools, lists, and instruments can guide this process.

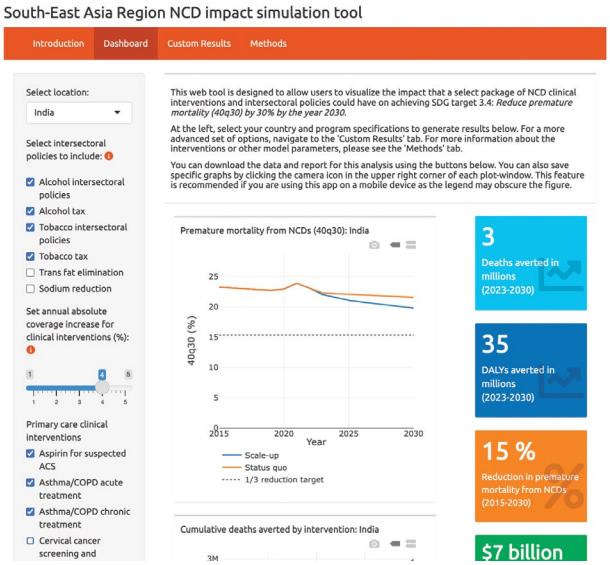
The analyses and tools developed for the NCD road map had an immediate impact by enabling scale-up of cardiovascular disease interventions through the SEAHEARTS program, an adaptation of the WHO HEARTS program for countries in WHO's South-East Asia region (Joshi et al. 2024). The SEAHEARTS initiative represents the world's largest expansion of NCDs in primary health care and includes a target of 100 million people with hypertension and diabetes on treatment by 2025. India has set its own target of 75 million by 2025 and had reached 30 million as of June 2024. Experience with WHO's South-East Asia modeling tool demonstrates that, in the right political and policy context, DCP evidence can have a rapid and major impact.

Figure 22.2 Screenshots from the NCD Prioritization Tool Developed for WHO Using DCP3 Evidence

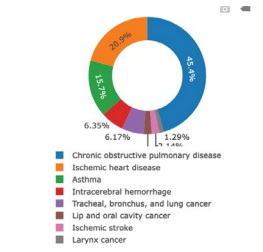
a. Introduction



b. Dashboard of health outcomes, India



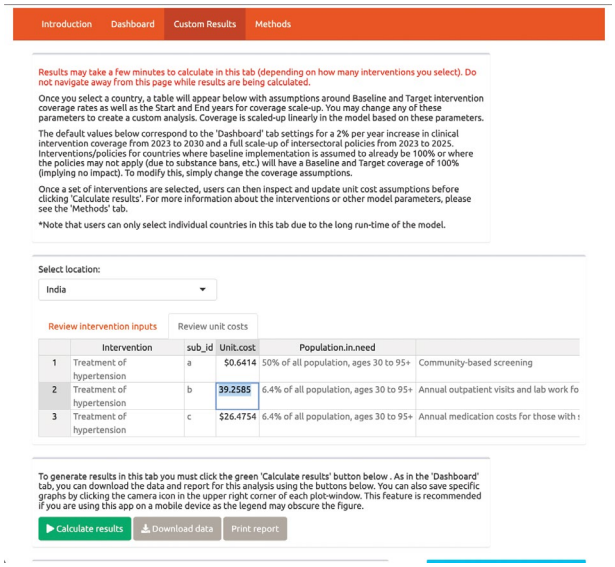
c. Cost-effectiveness and impacts of selected interventions, India



Cost effectiveness by intervention

Intervention	Cumulative DALYs averted	Cumulative incremental cost	Cost effectiveness ($/DALY averted)
Aspirin for suspected ACS	2M	120K	0.059
Tobacco tax	16M	7.8M	0.49
Alcohol policy	1.5M	11M	7.5
Tobacco policy	2.7M	22M	8.2
Alcohol tax	660K	7.8M	12
Asthma/COPD acute treatment	11M	5.5B	480
Asthma/COPD chronic treatment	670K	1.4B	2.1K

d. Custom results, selected interventions, India



Source: World Health Organization, South-East Asia Region NCD Impact Simulation Tool, https://apps.searo.who.int/whoroad/south-east-asia-region-ncd-impact-simulation-tool.

Note: Panel a shows the landing page for the simulation tool. Panel b shows the tool's dashboard, with India selected as the location and a given mix of interventions. Panel c, also for India, shows the cost-effectiveness of selected interventions and their impact on cause-specific deaths. Panel d shows the tool's ability to dynamically incorporate, for example, different hypertension treatment costs for India. WHO's South-East Asia Region consists of the following countries: Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, and Timor-Leste. DCP3 = *Disease Control Priorities*, third edition; NCD = noncommunicable disease; WHO = World Health Organization.

RECOMMENDATIONS FOR FUTURE DCP4 VOLUMES

Close collaboration with the NCDI Poverty Commission and WHO has provided the DCP/Bergen Center team with important opportunities for learning, with the following implications for the subsequent volumes of DCP4, even beyond NCDs.

First, efforts need to be made to ensure that DCP4's treatment of various health topics is as comprehensive as possible, indicating the need for a more systematic approach to identifying and appraising interventions. The WHO's UHC Compendium is intended to be a comprehensive repository of health interventions across the continuum of care for most diseases of public health relevance.[6] DCP4 analysts should consider engaging more broadly with disease experts in areas underrepresented in DCP3 (for example, hepatology and otolaryngology) to ensure that no important topics are neglected, and they should consider aligning their work with the structure of the UHC Compendium to ensure appraisal of a full range of interventions for each health issue. When available, resources should go toward original cost-effectiveness analysis of the interventions in different settings to allow for a more evenhanded treatment. At the same time, comprehensive lists of interventions might be overwhelming, with costs that are off-putting to financing and planning stakeholders. An alternative approach could be to create several "tiers" of investment that account for both differential cost-effectiveness and the interdependencies of interventions (for example, a set of interventions that can be efficiently delivered by the same cadre). Those tiers could be tied to different levels of incremental and total resources and different contexts—for example, what sorts of interventions are realistic to consider in a low-income country with US$5 per capita versus in a low-income country with US$10 per capita versus in a lower-middle-income country with US$20 per capita.

Second, it will be important to review the content of health benefits packages in a range of countries to help DCP contributors and analysts better understand what constitutes an "intervention" from a policy standpoint. Although something like a tobacco tax could reasonably be considered a standalone intervention, most interventions require the co-implementation of multiple clinical services and technologies, and cost-effectiveness evidence needs to adapt to that reality. For example, in the context of diabetes care, it is incoherent to assess the cost-effectiveness of glycemic control separately from the cost-effectiveness of blood pressure and lipid management in diabetes, because the drugs are co-deployed and form a coherent "package" of care for persons with diabetes. At the same time, health technology assessment (for example, for new, costly, branded diabetes drugs) clearly has a somewhat separate role from the more fundamental question of what constitutes the health system building blocks for a national NCD program in a low-income setting.

Third, and related to the issue of intervention aggregation, is the presentation of results for aggregations of countries. DCP4 analytics could be done at the country level but then flexibly grouped for presentation purposes into country typologies

with relevance for specific policy questions and to avoid the politically fraught issue of publishing country-level data without sufficient local engagement and review. For example, analysis of the cost-effectiveness of direct-acting antivirals for hepatitis C could take place by level of endemicity (such as high, medium, and low seroprevalence) rather than by World Bank income group or WHO region. Other cross-cutting groupings that might be useful include the small island developing states and fragile and conflict zones.

Fourth, the scientific and technical community is clearly moving more into the digital and online space with each passing year. Printed books and Excel spreadsheets have extremely limited use in the setting of rapid growth in research and evidence in LMICs. The DCP4 team should consider alternative ways of disseminating findings, potentially by focusing on producing continuously updated online content and open-access online analytical tools that can incorporate local data. The experience with WHO's South-East Asia prioritization tool provides a case in point: the tool has undergone several revisions since 2022 as new data have emerged and the modeling has improved.

Finally, DCP4 collaborators need to take countries along on the process and create champions within countries. DCP4 development itself should provide an opportunity for learning within national ministries of health. Ultimately, DCP4 could benefit from a "co-production" model whereby a network of academics and technical experts in selected ministries from around the world collaborates to continuously improve the outputs of the DCP enterprise. Because many of the specific actions on NCDs take place outside the health sector, it will also be important to engage other stakeholders within government (for example, legislatures that draft laws and appropriate funds to health and finance ministries that implement health taxes) as well as nongovernment stakeholders (for example, civil society organizations, persons with lived experience, and other advocates). Fostering durable multisectoral coalitions can help ensure that political commitment to NCDs translates into financial commitment, implementation, and impact.

NOTES

1. United Nations, "Goal 3: Ensure healthy lives and promote well-being for all at all ages," http://www.un.org/sustainabledevelopment/health/.
2. For more on WHO-CHOICE, refer to the WHO-CHOICE web page, https://www.who.int/news-room/questions-and-answers/item/who-choice-frequently-asked-questions.
3. For more on the tool, visit "Simulation tool for countries to assess the impact of interventions on the SDG target for NCDs," https://dcp-uw.shinyapps.io/NCDC/.
4. WHO, South-East Asia Region NCD impact simulation tool, https://dcp-uw.shinyapps.io/SEARO_NCD/. WHO's South-East Asia Region consists of the following countries: Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Indonesia, Maldives, Myanmar, Nepal, Sri Lanka, Thailand, and Timor-Leste.
5. WHO, OneHealth Tool, https://www.who.int/tools/onehealth.
6. WHO, UHC Compendium, https://www.who.int/universal-health-coverage/compendium.

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