

Universal Health Coverage and Intersectoral Action for Health: Findings from *Disease Control Priorities*, 3rd Edition

by

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Abstract

The World Bank is publishing the nine volumes of *Disease Control Priorities, 3rd edition (DCP3)* over the period 2015-18. Volume 9, *Improving Health and Reducing Poverty*, summarizes the main messages from all the volumes and reports a number of cross-cutting analyses. This paper draws on volume 9 to convey conclusions.

DCP3 built its analysis around 21 essential packages that were developed in the nine volumes. Each essential package addresses the concerns of a major professional community and contains a mix of intersectoral policies and health sector interventions. In total 79 intersectoral policies were identified, with 30 of them priorities for early introduction. Interventions within the health sector were grouped onto 5 platforms – population-based, community level, health center, first level hospital and referral hospital. *DCP3* defines a ‘model’ concept of essential UHC (EUHC) with 244 interventions that provides a starting point for country-specific analysis of priorities. Of these interventions a total of 104 constitute a model highest priority package (HPP).

In steady state implementation by 2030, EUHC would cost about \$69 billion per year above current spending levels in low-income countries and result in an estimated 2.6 million fewer premature (below age 70) deaths per year. For lower-middle income countries, additional costs are estimated at \$180 billion per year with a reduction in premature deaths of about 5 million. Financing provision of lifelong intervention against chronic conditions accounts for about half of estimated incremental costs. Higher priority subpackages for LICs and LMICs were also identified and costed. For LMICs the mortality reduction from implementing the EUHC can only reach about half the mortality reduction in NCDs that the Sustainable Development Goals call for. Full achievement will require greater investment or sustained intersectoral action, of which actions by the finance ministries to tax smoking and polluting emissions and to reduce or eliminate (often large) subsidies on fossil fuels appear of central importance.

In addition to assessing mortality impacts *DCP3* looked at outcomes of EUHC not encompassed by the disability adjusted life-year metric and related cost-effectiveness analyses. The other objectives included: financial protection (often best provided upstream by keeping people out of the hospital rather than downstream by paying their hospital bills for them); stillbirths averted; palliative care; contraception; and child growth and development. (The first 1000 days after conception are highly important for child development, but the next 7000 days are likewise important and frequently neglected.)

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Universal Health Coverage and Intersectoral Action for Health: Findings from *Disease Control Priorities*, 3rd Edition

1. Introducing Disease Control Priorities, 3rd Edition

In 1993 the World Bank published *Disease Control Priorities in Developing Countries (DCP1)*, an attempt to systematically assess value for money (cost-effectiveness) of interventions that would address the major sources of disease burden in low- and middle-income countries (World Bank 1993). A major motivation for *DCP1* was to identify reasonable responses -- in highly resource constrained environments -- to the growing burden of noncommunicable disease (NCD) and of HIV/AIDS in low- and middle-income countries. The World Bank had highlighted the already substantial NCD problem in country studies for Malaysia (Harlan, Harlan, and Oii 1984), for China (Jamison, Evans and others 1984) and in a *New England Journal of Medicine* Stattuck Lecture (Evans, Lashman Hall, and Warford 1981). Mexican scholars (Bobadilla and others 1993; Frenk and others 1989) pointed to the rapid growth of NCDs in Mexico and introduced the concept of a protracted epidemiological transition involving a dual burden of NCDs combined with significant lingering problems of infectious disease. The 'dual burden' paradigm remains valid to this day. The World Bank's first (and so far only) World Development Report dealing with health drew heavily on findings from *DCP1* to conclude that a number of specific interventions against NCDs (including tobacco control and multi-drug secondary prevention of vascular disease) were attractive even in environments where substantial burdens of infection and insufficient dietary intake remained policy priorities (World Bank 1993).

DCP2, published in 2006, updated and extended *DCP1* most notably by explicit consideration of implications for health systems of expanded coverage of high priority interventions (Jamison, Breman, Measham and others 2006). One important linkage to health systems was through examination of

selected *platforms* for delivering logistically related interventions that might be addressing quite heterogeneous sets of problems. Platforms examined included the district hospital as a whole, the surgical and emergency room platforms within the district hospital and school-based platforms for delivering a range of services. Platforms often provide a more natural unit for investment – and for estimating costs – than do individual interventions. Analysis of the costs of providing platforms – and of health improvements they can generate in a given epidemiological environment – can thus help guide health system investments and development. Both *DCP3* and WHO’s major investment case for health (Stenberg and others 2017) continue to utilize across platforms and their costs as important organizing concepts.

This paper conveys the main findings of *Disease Control Priorities*, 3rd edition (*DCP3*), and in particular its conclusions concerning intersectoral policy priorities and essential universal health coverage. Like its two predecessors, *DCP3*’s broad aim is to assist decision makers in allocating often tightly constrained budgets so that health system objectives are maximally achieved. Beyond informing policy discourse the granularity of analysis reported in *DCP3*’s nine volumes is intended to serve officials within ministries at the implementation level. Beginning with *DCP3* volume 1, on *Essential Surgery*, *DCP3*’s first 8 volumes (and related overviews of six of them in *The Lancet*) appeared between 2015 and 2017. The final volume, with cross-cutting and synthesizing chapters, is being published early in 2018. Panel 1 lists *DCP3*’s 9 volumes and their editors.

DCP3 differs importantly from *DCP1* and *DCP2* in terms of its multi-volume format, in terms of extending and consolidating the concept of platforms, and in terms of explicit consideration of a broad range of intersectoral and fiscal policies for health. Figure 1 illustrates the division of *DCP3*’s analyses between intersectoral policies and health sector policies and shows examples of the risk factors and conditions that the policies address. Importantly the *DCP3* structure views the role of intersectoral action to be reduction of behavioral and environmental risks, which themselves affect the level of

physiological risks and health outcomes directly. The health sector's role in reducing behavioral and environmental risk is viewed as modest – rather the health sector's main role is in reducing (some of) the physiological risk factors, and reducing the duration and severity of health conditions and their sequelae. Appropriate health sector policies also offer the potential for reducing health-related financial risks in a population.

DPC3 has four major objectives that go beyond previous editions. One is to address explicitly the financial risk protection and poverty reduction objective of health systems, as well as other objectives such as provision of contraception, reduction in stillbirths and palliative care or enhancement of the physical and cognitive development of children. Standard health metrics such as the QALY and DALY fail to encompass these other objectives of health systems and *DPC3* has endeavored to be explicit about them and their importance. The second extension lies in systematic attention to the intersectoral determinants of health. The third major way that *DPC3* goes beyond previous editions lies in organizing interventions into 21 *essential packages* reflecting professional communities. Table 1 lists *DPC3*'s 21 packages and shows how each package is divided into four types of intersectoral policy and five platforms for health system interventions. Entries in the table show the number of policies or interventions in each category. Third, *DPC3* defines a concept of *essential universal health coverage (EUHC)* in terms of the health systems components of the essential 21 packages. Fourth, *DPC3* identifies a subset of EUHC (the 'highest priority' package or HPP), the subset that can potentially be afforded by low-income countries (LICs) and that offers the most potential achievement (given limited resources) of health, financial protection and other objectives. For both EUHC and HPP *DPC3* provides estimates – for low- and for lower-middle income countries – of their incremental and total costs in 2030 and of the magnitude of their impact on mortality. In addition to these new elements, *DPC3* updates the efforts of *DPC1* and *DPC2* to assemble and interpret the literature on economic evaluation of health interventions.

This paper introduces the substantive topics addressed by *DCP3* and relays our main conclusions. Before turning to that we briefly describe the context in which *DCP3*'s analyses have been undertaken.

2. Context

Four considerations set the context for *DCP3* – the 20th century revolution in human health, the scientific underpinnings of that revolution, the high estimated returns to (carefully chosen) health investments and the increasing implementation of universal health coverage (UHC) as a practical goal for health systems. Skolnik (2016) provides further discussion of these issues.

Chile exemplifies the two key elements of the 20th century revolution in human health. One is the sheer magnitude of improvement. As recently as 1910 Chilean life expectancy fell below 32 years. By 2010, life expectancy exceeded 78 years. Second, time has narrowed cross-country differences. In 1910 world leaders (like Australia and New Zealand) achieved life expectancies almost 30 years greater than Chile, but by 2010 that gap had narrowed to around 4 years. The magnitude of Chile's success has been unusual but the broad story it conveys is not. That said, sub-Saharan African now lags 20 years behind global life expectancy of 72 years and countries in other regions (and regions within large countries) remain similarly disadvantaged. *DCP3*'s main purpose is to provide information to help close those gaps.

Income growth in the past century and past decades has contributed to increased life expectancy as has, to a somewhat greater extent, improvements in education levels (Pradhan and others 2017). Most improvements, however, have resulted from an ever-expanding menu of drugs, diagnostics, vaccines and knowledge (Jamison, Jha, and others 2013). Nurturing continuation of the scientific investment therefore remains a policy priority, as was extensively discussed in *DCP2* (Bloom and others 2006; Mahmoud and others 2006; Meltzer 2006; Weatherall and others 2006). *DCP3* has

devoted less attention to R&D than did *DCP2* – in part because of the coverage there. Nonetheless R&D is discussed in many places (e.g. Bundy and others 2017; Trimble and others 2015), but a careful mining of *DCP3* for its implications for R&D remains to be done.

Valuation of mortality decline (or health change more generally) is excluded from the global system of national income and product accounts. Economists have nonetheless expended substantial effort tracing the impact of health improvements on household and national income and in assessing the value of the small reductions in mortality risk that have occurred year by year. *Global Health 2035* (GH2035), the report of *The Lancet* Commission on Investing in Health (Jamison, Summers, and others 2013), reviewed and extended the literature on the value of health improvements. That literature points to high returns indeed. The Copenhagen Consensus, a project that comparatively assesses returns across all major development sectors, has likewise found high returns: their 2012 assessment found that 9 of the 15 highest return investments were health-related including all of the top five (Kydland, Mundell, Schelling and others 2013).

As national incomes rise countries typically increase the percentage of national income devoted to health. Equally significantly they increase the proportion of health expenditures that are prepaid, usually through public or publicly mandated finance. The World Health Organization's leadership in advancing a global UHC agenda has accelerated this underlying direction of political systems toward UHC. Dr. Tedros Ghebreyesus, WHO's new Director-General, has reaffirmed the WHO commitment to UHC and to the use of evidence and data in support of achieving that goal (Ghebreyesus 2017). *GH2035* advocated variants on a pathway toward UHC, 'progressive universalism', that emphasized two initial priorities for action: universal coverage of publicly financed interventions and reductions of user payments at the point of service to very low levels. With inevitable constraints on public budgets these two priorities point to the need for *initial* selectivity in the range of interventions to be publicly financed, the so-called benefits package. Many considerations will influence national choices of how benefits

packages will evolve over time and on the appropriate pathways to universalism. Hence the importance of maintaining focus on the highest priority health investments as *DCP3* is intended to facilitate.

3. Packages, platforms, and policies

DCP3 defines *packages* of interventions as conceptually related interventions, e.g. those dealing with cardiovascular disease or reproductive health or surgery. An objective of each *DCP3* volume was to define one or more essential packages and the interventions in that package that might be acquired at an early stage on the pathway to universal health coverage (UHC). The essential packages comprise interventions that provide value for money, are implementable and address substantial needs.

Platforms are defined as logistically related delivery channels. Table 1 shows how *DCP3* groups EUHC interventions within packages that can be carried on different types of platforms. The temporal character of interventions matters critically for health system development. Patients requiring non-urgent but substantial intervention – repair of cleft lips and palates is an example in the table – can be accumulated over space and time enabling the efficiencies of high volume in service delivery. Urgent interventions, which include a large fraction of essential surgical interventions, are ideally available 24/7 close to where patients live – with important implications for dispersal of relevant platforms and integration of different services. Non-urgent but continuing interventions to address chronic conditions (for example secondary prevention of vascular disease or antiretroviral therapy for HIV+ individuals) provide a major and quite distinct challenge. One new product of *DCP3* has been to explicitly categorize all essential interventions into one of these three temporal categories and to draw relevant lessons, including concerning cost, for health systems.

Table 1 also has columns to indicate the intersectoral policies (fiscal, regulatory, infrastructural, and informational) relevant for each package. In total 79 distinct intersectoral policies for reducing

behavioral and environmental risk were identified, and 30 of these were identified as candidates for early implementation. In addition to intersectoral policies *DCP3* reviews policies that affect the uptake of health sector interventions (e.g. conditional cash transfers) and the quality with which they are delivered (Peabody and others 2018).

4. Methods

DCP3's authors have thoroughly updated findings from *DCP2* on costs, effectiveness and cost-effectiveness. The literature provides much of specific interest, but formulation of policy, when informed by evidence at all, requires expert judgment to fill extensive gaps in the literature. The first subsection of this section discusses *DCP3*'s approach to utilizing evidence. The second and third subsections discuss methods of economic evaluation and *DCP3*'s extension of standard methods to include analysis of the financial protection objectives of health systems. The final subsection discusses the process of formulation of *DCP3*'s packages.

4.1 Utilization of Evidence

Utilizing research (or other) evidence to guide policy is most simply done when randomized controlled trials of the relevant intervention (mix) have been undertaken on the population of interest in the appropriate ecological setting. Even in high-income countries such strong evidence is rarely available. In lower income environments the evidence quality problem is compounded. As always evidence must be used to help decision makers (i) avoid adopting interventions that don't work in a given context and (ii) to avoid rejecting those that do. Panel 2 discusses the DCP thinking on this issue.

4.2 Economic Evaluation

The methods and findings of *DCP3*'s approaches to economic evaluation appear in 3 separate chapters of *DCP3*'s concluding volume – one on cost-effectiveness analysis (CEA), one on benefit cost

analysis (BCA) and one on extended cost-effectiveness analysis (ECEA). Table 2 provides a high-level overview. Several of the entries in that table – covering value for money, dashboards and ECEA – point to the desirability of multi-criteria decision analysis of the sort explored by Youngkong (2012) and others.

The bottom row of Table 2 takes the multi-outcome ECEA approach one step further, to presentation and illustration of the ‘dashboard’ *DCP3* uses to help inform and structure the priority setting process. This health dashboard concept is a natural extension of the dashboard approach that Stiglitz, Sen and Fitoussi (2010) propose to go beyond GDP as a macroeconomic indicator. The health dashboard is likewise a natural step beyond use of cost-effectiveness league tables in constructing health benefit packages, an approach consistent with that of Glassman, Giedion and Smith (2017).

4.3 Protecting against financial risk

In populations lacking access to health insurance or prepaid care, medical expenses that are high relative to income can be impoverishing (figure 2 illustrates mechanisms). Where incomes are low, seemingly inexpensive medical procedures can be catastrophic. WHO’s *World Health Report 2010* (WHO (World Health Organization) 2010) documented the (very substantial) magnitude of medical impoverishment globally and pointed to the value of universal health coverage for addressing both the health and financial protection needs of populations. Most of the literature on medical impoverishment fails to identify the medical conditions responsible. Essue and colleagues (2018) point to where specific causes of medical impoverishment information are known, an obviously central point for construction of benefits packages. Although multiple studies document the overall magnitude of medical impoverishment most economic evaluations of health interventions and their finance (including those in *DCP1* and *DCP2*) failed to address the important question of *efficiency* in the purchase of financial protection. In work undertaken for *DCP3*, Verguet, Laxminarayan and Jamison (2015) developed an

approach – extended cost-effectiveness analysis or ECEA – to explicitly include financial protection in economic evaluation of health interventions. Peter Smith has developed an approach that addresses the same concern from a different perspective (Smith 2013). ECEA is the approach that *DCP3* used to address issues of both reduction in financial risk and the distribution across income groups of financial as well as health outcomes resulting from policies (e.g. public finance) to increase intervention uptake. ECEA has been used to evaluate tobacco taxation and regulatory policies (Verguet and Jamison, in this volume). An important implication of the ECEA evaluations of tobacco taxation in China and in Lebanon was that such taxation, when the full range of consequences is considered, is unlikely to be regressive (Salti, Brouwer, and Verguet 2016; Verguet and others 2015). A 13-country ECEA of tobacco taxation found results similar to those from China and Lebanon (Jha and others 2017).

The tobacco ECEAs suggest a more general point about government policies to provide populations with protection against financial risk. Policy can operate either upstream or downstream. Upstream provision of FRP attenuates the need for financial protection. Upstream measures include prevention, early treatment, and investment in improved medical technologies (see Lakdawalla, Malani, and Reif 2017). Most health systems emphasize downstream measures through payment for expensive procedures in the hospital. Downstream measures will always be needed. That said, resource constraints will sharply limit public finance of downstream financial protection, provision only of downstream measures perverts incentives in the obvious way and in many (but not all) cases upstream measures more efficiently purchase FRP given budget constraints.

4.4 Construction of packages

Editors of *DCP3*'s first eight volumes and authors of specific chapters in volume 9 – on rehabilitation (Mills and others 2018), on pathology (Fleming and others 2018), on palliative care (Krakauer and others 2018) and pandemic preparedness (Madhav and others 2018) – constructed the 21

‘essential packages’ listed in Table 1. The series editors and authors of this paper then consolidated those policies and formats into a common level of aggregation and a common structure (e.g. screening was not considered an intervention by itself but only in conjunction with the indicated response). This generated a set of harmonized essential packages. (The originals appear as appendices to chapter 1 of DCP3 (Jamison and others 2018) and chapters 2 and 3 provide a full discussion of methods). Several interventions appear in more than one package, but the final lists of 79 intersectoral policies and 244 EUHC interventions remove this duplication. A consequence is that the cost of EUHC is less than the sum of the costs of the packages within it.

5. Intersectoral policies for health

Fifteen out of *DCP3*’s 21 packages contained a total of 79 intersectoral policies. These policies fall into 4 broad categories: taxes and subsidies (18 out of 79); regulations and related enforcement mechanisms (35 of 79); built environment (15 of 79); and informational (11 of 79). These policies are designed to reduce the population level of behavioral and environmental risk factors – tobacco and alcohol use, air pollution, micronutrient deficiencies in the diet, unsafe sexual behavior, excessive sugar consumption and others (figure 1). Watkins, Nugent et al (2018) provide a thorough overview of *DCP3*’s findings on intersectoral policy. Here we highlight several broad conclusions:

First, at initially low levels of income the levels of many risk factors rise with income thereby creating headwinds against which health sector policy must proceed. These rises are at least potentially countered by sound policy. We identify 30 out of 79 intersectoral policies to be well worth considering for early adoption.

Second, for important categories of risk, such as pollution and transport risks, there are multiple sources for the risk each of which is addressed through different modalities. Rather than a clear set of

‘first priorities’ there are multiple country or site specific actions to be taken. Perhaps the single most important point to note is that the success of many high income countries in reducing these risks to very low levels points to the great potential that these multiple policies can have for dealing, in particular, with air pollution and road traffic injuries.

A third point of importance is that fiscal policies – finance ministry policies – are likely of key significance. Discussion of these policies has most prominently involved taxes on tobacco, alcohol and sugar sweetened beverages. But the possibilities for taxation are broader: sugar production and imports, fossil fuels (or carbon) and industrial or vehicle emissions. Also of importance is reducing expensive subsidies that now exist on fossil fuels and, often, on unhealthy food production or unhealthy child dietary supplements. While health improvement may be only one of several objectives for lowering subsidies, it is an important one. The literature on the health potential for removing subsidies remains limited. But the sheer magnitude of some of these subsidies, as the International Monetary Fund has stressed, points to the value of careful further analysis. In all likelihood the finance ministry is the most important ministry (after health) for improving population health. And many – not all – of the measures it can take are public sector revenue enhancing.

6. Essential UHC

The heart of *DCP3* consisted of reviewing available evidence on health sector interventions’ costs, effectiveness, implementability and capacity to deliver significant outcomes. *DCP3*’s nine volumes provide granular overviews of this evidence, overviews directed to the implementation community as well as the policy community. Chapter 3 of volume 9 provides an integrative overview (Watkins, Jamison, and others 2018).

Figure 3 provides a schema of how *DCP3* defines EUHC. Beyond EUHC is the full range of available, efficacious health sector interventions or UHC. While no country publicly finances all interventions, many high-income countries come close and can reasonably be described as having achieved UHC. Short of EUHC is what *DCP3* labels a highest priority package or HPP. Individual countries' highest priorities will differ from our model list for multiple reasons. That said, the HPP is intended to provide a useful starting point for national or subnational assessments. As with EUHC *DCP3* provides estimates for the cost and impact of EUHC. *Global Health 2035* pointed to the possibility of a 'grand convergence,' across most countries, in our lifetimes, in levels of under-5 mortality and major infections. Figure 3 illustrates grand convergence within the *DCP3* structure. The two following subsections provide our estimates of the costs and mortality-reducing consequences of EUHC.

6.1 Costs

We generated two estimates of costs for the health system component of each of *DCP3*'s 21 packages. The first was an estimate of how much additional funding it would take — in the 2015 cost and demographic environment -- to implement each package to the extent judged feasible. The packages were designed so that for most cases 'full' implementation, i.e. 80% effective coverage, was judged feasible by 2030. The second estimate of cost was of total cost for the package defined as incremental cost plus the amount already (in 2015) being spent on the intervention. These costs were estimated both for LICs and for lower middle-income countries (LMICs). Some interventions were included in several packages which was a natural outcome of a package formulation process that delineated packages as areas of concern to specific professional communities, such as surgeons or reproductive health specialists. Eliminating this duplication resulted in 244 distinct EUHC interventions. This implies that the sum of the package costs will exceed the cost of providing all packages. The subset of UHC that was judged — by explicit criteria — to be highest priority (the highest priority package or HPP) was costed in the same way as for EUHC. All these costs are the estimated costs associated with expanding

coverage in the 2015 environment, an environment for which we have substantial if incomplete information without making assumptions about the evolution of costs and epidemiology over time. Costs should be interpreted as long-term steady state costs, i.e. costs that include training of staff to replace retirements and investment to counter depreciation of equipment and facilities.

Table 3 reports the calculated expenditure increases required above baseline and expresses those numbers as a % of GNI. (Chapter 3 of volume 9 of *DCP3* reports costs by package.) We feel it reasonable to think of the costs in 2030 of EUHC and the HPP in these percentage terms (as well as numbers of dollars). Only a small fraction of reasonably anticipated economic growth in most countries would cover the incremental costs of EUHC, although achieving the increased % of GNI required would require substantial reallocation of public sector priorities (*GH2035*). In principle projections could be made of changes in both the tradeable and nontradeable components of cost, of the responsiveness of costs to demography and in particular to fertility decline, and on whether improved transport and other infrastructure might reduce our estimates of the cost of expanding coverage to ever more difficult to reach parts of the population. In a country specific context this might well be worthwhile. But for purposes of reasonable overall cost estimates we judge adding these layers of assumption would add little or nothing to the information content of table 3.

Table 4 presents our cost assessments divided along two other relevant dimensions. Panel A provides estimates of the costs associated with each platform. About half of our calculated costs occur at the health center level. For EUHC another 20% each of incremental expenditures would go to the first level hospital and to the community level. Panel B reports intervention cost estimates by degree of urgency. The health systems implications for increasing intervention coverage differ markedly by urgency. Life-long interventions require appropriate community capacity for delivery. Examples include ART or anti-hypertensive therapy. *A full half of estimated incremental costs are needed to finance lifetime or very long term intervention.* Urgent interventions – e.g. for trauma or obstructed labor –

require that first level hospitals be accessible quickly (Reynolds and others 2018). About one third of incremental costs are required to provide this capacity. Time bound but non urgent interventions (e.g. cataract extraction) allow patients to be accumulated over space and time with concomitant potential for efficiency and quality resulting from high volume.

6.2 Mortality reduction from essential UHC

Norheim et al (2015) developed a structure — 40x30 — for thinking about mortality reduction goals for the SDG period. Their starting point was the UNPD's projected age distribution of population in 2030 and an age and cause distribution of deaths generated from that age distribution of population and mortality rates from 2010. The overall 40x30 goal was, then, to reduce the calculated number of premature deaths by 40%, where 'premature' is defined as under age 70. Subgoals were to reduce under-5 and major infectious disease deaths by 2/3 and NCD and injury deaths by 1/3. Our approach in *DCP3* followed the Norheim et al approach in broad terms but utilizes updated parameters. We start with a baseline age distribution of deaths by age and (broad) cause generated from the UNPD's projected 2030 age distribution of population and age combined with cause-specific death rates from 2015 (Mathers and others 2018). We then estimate the impact of EUHC (and HPP) on mortality by assuming that the underlying intervention packages are implemented over the 15 years from 2015 to 2030. (The packages were designed to make this assumption reasonable.) The age- and cause-specific mortality rates from counterfactual 2015 were then applied to the UNPD 2030 age distributions to give age the distributions of death by cause estimated to result from implementation of EUHC.

These calculations enable comparison of the EUHC mortality profile to an explicit counterfactual baseline. Table 5 shows these comparisons for EUHC and for the HPP. What we can see from this comparison is that full implementation of the HPP in LICs comes close to meeting 40x30 goals. (The estimated reduction in deaths is 2.3 million out of the 40 x 30 target 2.5 million.) Full implementation of

EUHC in lower middle-income countries is estimated to slightly more than achieve the 40x30 target for 2.4 million deaths averted under age-5. The results for age group 5-69 fall short of the 40x30 target of 5.2 million. Tuberculosis, cancer, cardiovascular disease and injuries each fall about half a million averted deaths short of target. Estimated deaths averted by EUHC (5 million) is about 2/3 of the 40 x 30 target of 7.6 million. If we were to assume that both tools and implementation capacity improve over the period to 2030 — *Global Health 2035* (Jamison, Summers, and others 2013) made an assumption of a 2% rate of ‘technical progress’ in one of their scenarios — then the reduction in deaths from EUHC could be more substantial than shown in these tables. Likewise there could be more than anticipated reduction in behavioral and environmental risk. Such progress is certainly possible, but may be unlikely. Our model estimates what is technically and economically feasible given today’s tools. The results are indeed substantial — and are viable options for decision makers. But required resources are substantial and for LMICs the goals incompletely met. The actual decision to commit resources remains, of course, in the hands of national authorities.

7. Conclusion

DCP3 has been a large scale enterprise involving multiple authors, editors and institutions. The first volume appeared in 2015 and the last of its 9 volumes is being published at the beginning of 2018. The volumes appear as serious discussion continues about quantifying and achieving sustainable development goals (SDGs), including SDG-3 for health.

DCP3’s analyses complement those of *Global Health 2035* and WHO’s recent assessments of the cost of attaining SDG-3 (Stenberg and others 2017). Each of these analyses addresses somewhat different questions (Table 6), but the broad results they convey are mutually supportive.

DCP3 reached six broad conclusions:

1. *DCP3* has found it useful to organize interventions into 21 packages that group the interventions relevant to particular professional communities. Each *package* can contain both intersectoral interventions and health system interventions. Specific findings from packages point to the attractiveness of widely available surgical capacity, the value of meeting unmet demand for contraception, the potential of a multipronged approach to air pollution and the importance of maintaining investment in child health and development far beyond the first ‘1000 days’.
2. Interventions were selected for packages by a systematic process using criteria of value-for-money, burden addressed and implementation feasibility. Collectively they are defined to constitute ‘essential’ universal health coverage or EUHC. A subset of 104 of these interventions, selected using more stringent criteria, are suggested as a ‘highest priority package’, or HPP, constituting an important first step on the path to EUHC. Five platforms – from population-based through the referral hospital – provide the delivery base for 244 health sector interventions. The specific interventions selected for the HPP and for EUHC, and the definitions of platforms and packages are necessarily quite generic. Every country’s definitions and selections will differ from these and from each other’s. Nonetheless we view *DCP3*’s selections as a potentially useful starting point for what are appropriately country-specific assessments.
3. The costs estimated for the HPP and EUHC are substantial. The HPP is, however, affordable by low-income countries prepared to commit to health and the EUHC is affordable by lower middle-income countries. Many upper middle-income countries have yet to achieve EUHC and they, too, might find that the EUHC interventions are a useful starting point for discussion.
4. The goal of a 40 percent reduction in premature mortality by 2030 (Norheim and others 2015), i.e. 40x30, represents a quantitative goal for mortality reduction closely mirroring the content of SDG-3. Our calculations suggest that low-income countries implementing HPP by 2030 will achieve 40x30 but that lower-middle income countries that implement EUHC are likely to fall

short (unless there is unexpectedly substantial intersectoral action to reduce behavioral and environmental risk factors for NCDs).

5. DCP3 has shown that it is possible to identify the main sources of health related financial risk and impoverishment, to estimate the value of risk reduction and to utilize extended cost-effectiveness analysis (ECEA) to help achieve efficiency in purchase of risk reduction. While DCP3 has made a beginning in applying these methods, much remains to be done.
6. In addition to the aggregate conclusions of *DCP3* just summarized, each volume provides rich detail on policy options and priorities. This granularity in the volumes makes them of use to the implementation level of ministries as well as the policy level.

Conflict of Interest

The authors declare no conflict of interest.

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Panel 1: DCP3's nine volumes

The World Bank is publishing *DCP3* over the period 2015-2018. In contrast to the single (very large) volume formats of *DCP1* and *DCP2*, *DCP3* appears in 9 smaller, topical volumes, each with its own set of editors. Coordination across volumes has been provided by seven series editors -- Dean T. Jamison, Rachel Nugent, Hellen Gelband, Susan Horton, Prabhat Jha, Ramanan Laxminarayan and Charles N. Mock. The topics and editors of the individual volumes are listed below:

2015

Volume 1: Essential surgery (edited by: Haile Debas, Charles Mock, Atul Gawande, Dean T. Jamison, Margaret Kruk and Peter Donkor, with a foreword by Paul Farmer)

Volume 3: Cancer (edited by: Hellen Gelband, Prabhat Jha, Rengaswamy Sankaranarayanan and Susan Horton, with a foreword by Amartya Sen)

2016

Volume 2: Reproductive, maternal, newborn and child health (edited by: Robert Black, Ramanan Laxminarayan, Marleen Temmerman and Neff Walker, with a foreword by Flavia Bustreo)

Volume 4: Mental, neurological, and substance use disorders (edited by: Vikram Patel, Dan Chisholm, Tarun Dua, Ramanan Laxminarayan and Maria Elena Medina-Mora, with a foreword by Agnes Binagwaho)

2017

Volume 5: Cardiovascular, respiratory, and related conditions (edited by: Dorairaj Prabhakaran, Tom Gaziano, Jean Claude Mbanya, Rachel Nugent and Yangfeng Wu, with a foreword by Srinath Reddy)

Volume 6: Major infectious diseases (edited by: King Holmes, Stefano Bertozzi, Barry Bloom and Prabhat Jha, with a foreword by Peter Piot)

Volume 7: Injury prevention and environmental health (edited by: Charles Mock, Olive Kobusingye, Rachel Nugent and Kirk Smith, with a foreword by Ala Alwan)

Volume 8: Child and adolescent health and development (edited by: Don Bundy, Nilanthi de Silva, Susan Horton, Dean T. Jamison and George Patton, with a foreword by Gordon Brown)

2018

Volume 9: Disease control priorities: improving health and reducing poverty (edited by: Dean T. Jamison, Hellen Gelband, Susan Horton, Prabhat Jha, Ramanan Laxminarayan, Charles N. Mock and Rachel Nugent, with a foreword by Bill and Melinda Gates and an introduction by Lawrence H. Summers)

Panel 2: Evidence for policy: from research findings to policy parameters

Analysis in *DCP3* proceeds by attempting to make the best use of the evidence available for informing important decisions rather than exclusively using what ideally generated evidence has to say (Jamison 2015). The distinction is important. An example illustrates. Quite good evidence is available on the impact of vector control on malaria mortality in specific environments. Likewise there is strong evidence concerning treatment efficacy. Very little evidence, however, exists on how different mixes of vector control and treatment affect mortality, but this is the important question for policy.

Inevitably imperfectly, our task in the Disease Control Priorities series, beginning with the 1st edition, has been to combine the (sometimes) good science about unidimensional intervention in very specific locales with informed judgment to reach reasonable conclusions about the impact of intervention mixes in diverse environments. To put this slightly differently: the parameters required for assessing policy differ, often substantially, from what has been addressed (so far) in the research literature. The transition from research findings to policy parameters requires judgment to complement the research and, often, a consideration of underlying mechanisms (e.g. use of incentives) that might suggest generalizability (Bates and Glennerster 2017).

In particular, four types of judgments were often needed in the course of *DCP3* to make the transition from research findings to evidence for policy. Examples illustrate:

- (i) *Similar interventions*. Assume we have evidence that intervention A is effective and we believe intervention B is quite similar. (Think of two lipid lowering agents.) We use judgment to infer that intervention B is (or perhaps is not) also effective.
- (ii) *Combined interventions*. As in the malaria example above, assume that evidence shows interventions A and B are both effective. What about A + B? Is the combination's effect the sum of the separate effects? Or are the two substitutes? Hard evidence on combinations is far more rare than evidence on individual interventions.
- (iii) *Changed settings*. Assume we have strong evidence that intervention A works in environment Y – for example that antimalarial bednets reduce all cause child mortality when mosquitos bite indoors at night, at moderate intensity. Good evidence concludes that bednets were effective where evaluated but other, biological considerations suggest that that evidence be rejected in an environment with very high biting intensity. Economists have discussed this point in the context of 'external validity'. Ozler (2013) provides a clear overview.
- (iv) *Trait-treatment interactions*. Finally, patient characteristics may differ. Measles immunization in healthy child populations may have been shown to have no effect on mortality rates. Generalizing that finding to a population with different traits (e.g. undernourished or sickly children) might and in this case would generate an unfortunate false negative.

Evidence can be weak. Or, as in the examples above, evidence can be strong but only partially relevant. Often weak evidence for effectiveness, or partially relevant evidence for effectiveness, is likewise weak evidence concerning lack of effectiveness. Interpreting weak evidence as grounds for rejecting an intervention could generate false negatives that cost lives. The attempt in *DCP3* has been to unashamedly combine evidence with informed judgment in order to judiciously balance false positives and false negatives.

Panel word count: 527

Table 1: DCP3: essential packages, intersectoral policies and essential universal health coverage (EUHC)^a

Essential package (DCP3 volume number)	Intersectoral policies ^b (chapter 2)					Essential UHC interventions by platform ^{c, d} (chapter 3)					
	Taxes and subsidies	Regulations	Built environment	Information	Intersectoral Total	Population- based	Community	Health center	First-level hospital	Referral and specialty hospital	EUHC Total
<u>Age-related</u>											
1. Maternal and newborn health (2)	0	0	0	0	0	0	11	14	7	2	34
2. Child health (2)	0	0	0	0	0	0	12	4	2	0	18
3. School-age health and development (8)	2	0	0	0	2	0	7	0	0	0	7
4. Adolescent health and development (8)	0	0	0	0	0	3	3	1	0	0	7
5. Reproductive health and contraception (1,2,8)	0	0	0	0	0	3	7	5	2	0	17
<u>Infectious diseases</u>											
6. HIV and STIs (6) ^e	1	2	0	0	3	4	9	13	2	0	28
7. Tuberculosis (6)	0	0	0	0	0	1	3	4	1	1	10
8. Malaria and adult febrile illness (2,6,8) ^f	0	0	0	0	0	2	14	4	2	1	23
9. Neglected tropical diseases (6)	0	2	0	0	2	1	4	0	2	0	7
10. Pandemic and emergency preparedness (9)	0	2	0	0	2	6	2	2	0	0	10
<u>Noncommunicable disease and injury</u>											
11. Cardiovascular, respiratory and related disorders (5)	2	3	1	0	6	4	5	13	5	4	31
12. Cancer (3)	1	2	0	0	3	1	2	4	1	4	12
13. Mental, neurological, and substance use disorders (4)	0	2	0	0	2	0	2	8	0	0	10
14. Musculoskeletal disorders (9)	0	0	0	0	0	2	1	2	3	2	10
15. Congenital and genetic disorders (9)	0	2	0	0	2	0	2	6	1	2	11

Table 1 (continued)

Essential package (DCP3 volume number)	Intersectoral policies ^b (chapter 2)					Essential UHC interventions by platform ^{c, d} (chapter 3)					
	Taxes and subsidies	Regulations	Built environment	Information	Intersectoral Total	Population- based	Community	Health center	First-level hospital	Referral and specialty hospital	EUHC Total
16. Injury prevention (7)	3	10	7	9	29	0	2	0	0	0	2
17. Environmental improvement (7) ^e	10	15	8	2	35	1	2	0	0	0	3
Health services											
18. Surgery (1)	0	0	0	0	0	0	0	9	28	7	44
19. Rehabilitation (9)	0	0	0	0	0	0	7	2	6	0	15
20. Palliative care and pain control (9)	1	0	0	0	1	0	1	3	1	0	5
21. Pathology (9)	0	0	0	0	0	0	1	1	1	1	4
Totals - consolidated^h	18	35	15	11	79	17	71	76	59	21	244

^aThe table shows the number of interventions in each package grouped by type of intersectoral policy or platform of delivery of intervention.

^bIntersectoral policies affect the level of behavioral and environmental risk factors.

^cCountries categorize delivery platforms in different ways, and the typical capacity of a facility of a given type in a country will evolve over time. We assign an intervention to the lowest platform where it would typically be delivered, fully recognizing that in a country-specific analysis a more precise and relevant categorization will be possible.

^dFor many interventions there is a continuum of care across platforms. We assign the intervention to the lower platform on that continuum and discuss in the text, where important, the role of higher level platforms.

^eMost forms of hepatitis are in part sexually transmitted and hence control of hepatitis is included in this package.

^fDengue is included among adult febrile illnesses.

^gEnvironmental improvements affect the incidence of risk factors both for infectious and for noncommunicable disease. We include under NCDs because the more significant consequences lie there.

^hThe same policy or intervention may appear in more than one package. The 'consolidated' total is the total after eliminating duplication.

Table 2: Economic evaluation methods

	Costs	Consequences
<p>1.1 Cost-effectiveness analysis (CEA)</p> <p>Horton (this volume; 2018) overviews <i>DCP3</i>'s findings on CEA. Wilkinson, Sculpher et al. (2016) and Sanders, Neumann et al (2016) provide recent guidelines for health CEA. Jamison (2009) provided earlier guidelines that pointed to inclusion of financial protection outcomes and nonfinancial constraints in CEA.</p>	<ul style="list-style-type: none"> • Social costs^a 	<ul style="list-style-type: none"> • Changes in specific outcomes (child deaths, new HIV infections) • Changes in aggregated measures (YLL, QALY, DALY)
<p>1.2 Value-for-money assessment</p> <p>Value-for-money assessment of health sector interventions includes CEA but acknowledge the CEA is irrelevant for some health sector outcomes.</p>	<ul style="list-style-type: none"> • Social costs^a 	<p>Important outcomes of health sector intervention not measurable in mortality or DALY terms (and therefore excluded from CEA) include:</p> <ul style="list-style-type: none"> • contraception provided • stillbirths averted • palliative care • IQ or stature enhanced
<p>1.3. Extended cost-effectiveness analysis (ECEA)</p> <p>Verguet and Jamison (this volume; 2018) overview <i>DCP3</i>'s findings on ECEA.</p>	<ul style="list-style-type: none"> • Costs are separately viewed from perspectives of provider, patient, and society 	<ul style="list-style-type: none"> • Consequences are reported from a distributional perspective (e.g. by gender, income or membership in a disadvantaged group. See, for example, Asaria, Griffin, Cookson and others (2015). • Valuation of financial risk protection included.
<p>1.4. Benefit-cost analysis (BCA)</p> <p>Chang, et al (this volume; 2018) overview <i>DCP3</i>'s findings on BCA.</p>	<ul style="list-style-type: none"> • Social costs^a 	<ul style="list-style-type: none"> • Changes in income or GDP • Changes in income plus the monetary value of change in mortality (or health)
<p>1.5. Economic dashboard</p> <p><i>DCP3</i>'s judgments about interventions to include in ECEA and in the HPP involved combining multiple strands of evidence. While intervention cost-effectiveness was typically most important, in the end judgments involved considering a dashboard of information including disease burden, value for money assessment, ECEA and BCA. Stiglitz, Sen and Fitoussi (2010) propose making this dashboard explicit and the primary guide to decision-making in the macroeconomic context.</p>	<ul style="list-style-type: none"> • As with ECEA 	<ul style="list-style-type: none"> • Poverty reduction consequences or insurance value explicitly considered • Distribution of costs and consequences across income quintiles explicitly considered • Dashboard contains a fuller and more disaggregated list of consequences than ECEA, which is itself much more comprehensive than CEA

^a'Social costs' refer to the value of real resources used to implement an intervention. For example if a health ministry needs to pay import taxes on pharmaceuticals the social cost is the pre-tax cost not the post-tax cost as the tax simply represents a transfer (from the health to the finance ministry). Taxation itself is often considered by economists to involve a real cost (the so-called 'deadweight' loss from taxation) arising from distortion of prices and hence decisions of actors in the economy. *DCP3* follows standard practice in health-related CEA in not considering deadweight losses from taxation. Inclusion of deadweight losses as currently assessed would typically increase the cost per unit of outcome by 50-70%.

**Table 3: Total and incremental annual costs of essential UHC and the highest priority package, 2015
(in 2012 US\$)**

	Low-income countries ^a		Lower middle-income countries ^a	
	HPP	EUHC	HPP	EUHC
1. Incremental annual cost (in billions of 2012\$)	US\$ 26 (19 to 34)	US\$ 59 (43 to 78)	US\$ 94 (70 to 120)	US\$ 180 (140 to 230)
2. Incremental annual cost per person^b	US\$ 34 (25 to 45)	US\$ 78 (57 to 103)	US\$ 36 (27 to 45)	US\$ 70 (54 to 88)
3. Total annual cost	US\$ 37 (28 to 47)	US\$ 72 (55 to 91)	US\$ 180 (130 to 210)	US\$ 310 (230 to 390)
4. Total annual cost per person^c	US\$ 49 (37 to 62)	US\$ 95 (73 to 120)	US\$ 67 (50 to 82)	US\$ 120 (90 to 150)
5. Incremental annual cost as a share of current GNI per person^b	4.2% (3.0 to 5.5)	9.5% (7.0 to 13)	1.7% (1.3 to 2.1)	3.3% (2.6 to 4.2)
6. Total annual cost (as % of GNI per person)^d	6.0% (4.6 to 7.5)	12% (8.9 to 15)	3.2% (2.4 to 3.9)	5.9% (4.4 to 7.3)

^aThis paper uses the World Bank's 2014 income classification of countries (World Bank, World Development Indicators, 2014). As a country's income changes its classification can also change; for example, both Bangladesh and Kenya moved from low- to lower-middle income after 2014.

^b*Incremental* annual cost is the estimated cost of going from current to full (80%) coverage of the EUHC and HPP interventions. The *total* annual cost is the incremental cost plus the cost of the current level of coverage assuming the same cost structure for current as for incremental coverage. Estimated costs are inclusive of estimates for (large) health system strengthening cost and are steady state (or long term average) costs in that investments to achieve higher levels of coverage and to cover depreciation are included.

^cThe 2015 population of low-income countries was 0.76 billion. For lower-middle income countries, it was 2.6 billion.

^dThe 2015 GNI of low-income countries was \$0.63 trillion and for lower-middle income countries it was \$5.4 trillion.

Table 4: Incremental costs of the HPP and EUHC by Platform and by Intervention Urgency (%)

Panel A: Incremental costs by platform (% of total)				
	Low-income countries		Lower middle-income countries	
	HPP	EUHC	HPP	EUHC
Population-based	1%	1%	1%	1%
Community	22%	21%	20%	23%
Health center	60%	53%	55%	50%
First-level hospital	13%	21%	13%	20%
Referral and specialty hospitals	4%	4%	11%	6%
	100%	100%	100%	100%

Panel B: Incremental costs by intervention urgency (% of total)				
	Low-income countries		Lower middle-income countries	
	HPP	EUHC	HPP	EUHC
Urgent	35%	32%	27%	32%
Chronic	47%	49%	52%	47%
Time-bound (non-urgent)	18%	19%	21%	21%
	100%	100%	100%	100%

Source: Watkins, Jamison et al (2018).

**Table 5: IMPLEMENTATION OF DCP3'S ESSENTIAL PACKAGES:
ESTIMATED REDUCTION IN PREMATURE DEATHS IN 2030^a**
(in millions)

Age-group or condition	Low-income countries ^b				Lower middle-income countries ^b			
	Projected number of premature deaths, 2030	40x30 reduction target ^c	Expected reduction in premature deaths from		Projected number of premature deaths, 2030	40x30 reduction target ^c	Expected reduction in premature deaths from	
			HPP	EUHC			HPP	EUHC
<u>By age group</u>								
0 - 4	2.2	1.5	1.7	1.9	3.6	2.4	2.8	3.0
5 - 69	4.2	1.1	0.65	0.72	16	5.2	1.7	2.0
0 - 69	6.4	2.5	2.3	2.6	19	7.6	4.5	5.0
<u>By cause (Age 5+)^d</u>								
I. Group I	1.8	0.63	0.39	0.41	3.5	1.6	0.52	0.55
Tuberculosis	0.23	0.15	0.03	0.04	1.0	0.67	0.16	0.17
HIV/AIDS	0.43	0.29	0.12	0.13	0.52	0.35	0.15	0.16
Malaria	0.08	0.06	0.03	0.03	0.06	0.04	0.01	0.01
Maternal conditions	0.17	0.11	0.04	0.05	0.21	0.14	0.04	0.05
Other diseases	0.84	0.02	0.16	0.16	1.7	0.42	0.15	0.15
II. Group II	1.7	0.37	0.22	0.27	9.9	3.0	1.1	1.3
Neoplasms	0.45	0.15	0.01	0.02	2.0	0.68	0.12	0.15
Cardiovascular diseases	0.62	0.21	0.16	0.19	4.3	1.44	0.86	1.0
Other diseases	0.67	0.01	0.06	0.06	3.5	0.87	0.15	0.15
III. Group III	0.68	0.08	0.03	0.04	2.1	0.58	0.10	0.12
Road injuries	0.22	0.07	0.03	0.03	0.62	0.21	0.07	0.08
Other injuries	0.46	0.01	0.01	0.01	1.5	0.38	0.03	0.04

Source: Watkins, Norheim et al. (2017); Watkins, Qi et al. (2017); Watkins, Jamison et al. (2018)

Note: All estimates are in millions of deaths. The 40x30 reduction target includes a 40% reduction in deaths 0-69 overall, a two-thirds reduction in under-five deaths and adult deaths from tuberculosis, HIV/AIDS, malaria, and maternal conditions, and a one-third reduction in deaths from major noncommunicable diseases. The quantitative targets above reflect these goals; however, targets for the residual categories ("other diseases" and "other injuries") have been calculated in light of the targets for specific causes of death so that the total number of target deaths 5-69 is sufficient to meet the 40x30 target.

^aA death under the age of 70 is defined as premature.

^bThis paper uses the World Bank's income classification of countries (World Bank, 2014).

^cA reduction target of 40x30 is defined as a 40% reduction in premature deaths by 2030, relative to the number that would have occurred had 2015 death rates persisted to 2030. The *UN Population Prospects* (UN, 2017) median population projection for 2030 was used to provide the population totals for calculating deaths by age and sex.

^dWHO's Global Health Estimates (Mathers et al., 2017) provided the 2015 cause distributions of deaths for these calculations.

Table 6: Comparison of *Global Health 2035*, *DCP3* and WHO 2017 resource estimates for costs and consequences of large scale investment in health systems

	Global Health 2035	DCP3	WHO 2017
1. Subject of estimates	Low- and lower-middle income countries. Separate estimates for the low- and lower middle-income countries groups are provided.	Low- and lower-middle income countries. Separate estimates for the low- and lower middle-income countries groups are provided.	67 low-, lower-middle and upper-middle income countries individually estimated then aggregated. Reported results are for all included countries combined.
2. Key definitions / intervention range covered	"Grand convergence" (GC) interventions defined as ones leading to very substantial cross-country convergence in under-5, maternal, tuberculosis, malaria and HIV/AIDS mortality and in the prevalence of neglected tropical diseases (NTDs).	<ul style="list-style-type: none"> • 21 packages of care (Table 1) identified in terms that include intersectoral and health sector interventions • Extended Universal Health Coverage (EUHC) defined as health sector interventions in the packages (covered in national health accounts and potentially included in benefits packages). • A highest priority subset of EUHC (HPP). The HPP includes GH2035 but goes beyond it including a limited range of intervention against NCD and injury. • Intersectoral interventions - typically managed and financed outside the health sector. 	<ul style="list-style-type: none"> • UHC - <i>progress scenario</i> (coverage limited by capacity constraints.) • UHC - <i>ambitious scenario</i> (in which most countries achieve SDG targets). • WHO 2017 scenarios include some finance of intersectoral interventions.
3. Intervention coverage	Full coverage defined as 85%.	Full coverage defined as 80%. The HPP differs from EUHC not in coverage rate but in interventions included.	Full coverage defined as 95% in the ambitious scenario. The progress scenario includes the same interventions but at lower coverage rates.
4. Estimated additional costs (including requisite investment in health system capacity)	<p>For low-income countries in 2035: \$30 billion per year.</p> <p>For lower-middle income countries in 2035: \$61 billion per year.</p>	<p>Low-income countries, 2030: HPP - \$30 billion/year EUHC - \$69 billion/year</p> <p>Lower middle-income countries, 2030: HPP - \$94 billion/year EUHC - \$180 billion/year</p>	<p><i>Progress scenario</i> : \$274 billion/year</p> <p><i>Ambitious scenario</i> : \$371 billion/year</p>
5. Estimated deaths averted ^{a, b, c}	<p>For low-income countries in 2035: 4.5 million per year</p> <p>For lower middle-income countries: 5.8 million per year</p>	<p>Low-income countries: 2.6 million/year</p> <p>Lower middle-income countries: 5 million per year</p>	<p><i>Progress scenario</i>: 71 million deaths averted over 15 years; annual average = 4.3 million</p> <p><i>Ambitious scenario</i>: 97 million deaths averted over 15 years; annual average = 6.5 million</p>

Sources: Global Health 2035 - Jamison, Summers et al (2013); Boyle et al (2015). *DCP3* - Watkins, Qi et al (2017); Watkins, Norheim et al (2017). WHO2017 - Stenberg et al (2017).

^a*DCP3* reports the number of *premature* deaths averted, i.e. deaths under age 70.

^bAverted deaths included stillbirths averted in *GH2035* and WHO2017, but not in *DCP3*.

^cFor *GH2035* and *DCP3* the reported deaths averted included only deaths averted among children actually born. Contraception averts unwanted pregnancies and hence potential deaths of children from those pregnancies who were never born. The difference is major. For LICs a GH2035 sensitivity analysis estimated that the more comprehensive figure was 7.5 million deaths averted rather than the 4.5 million shown in the table.

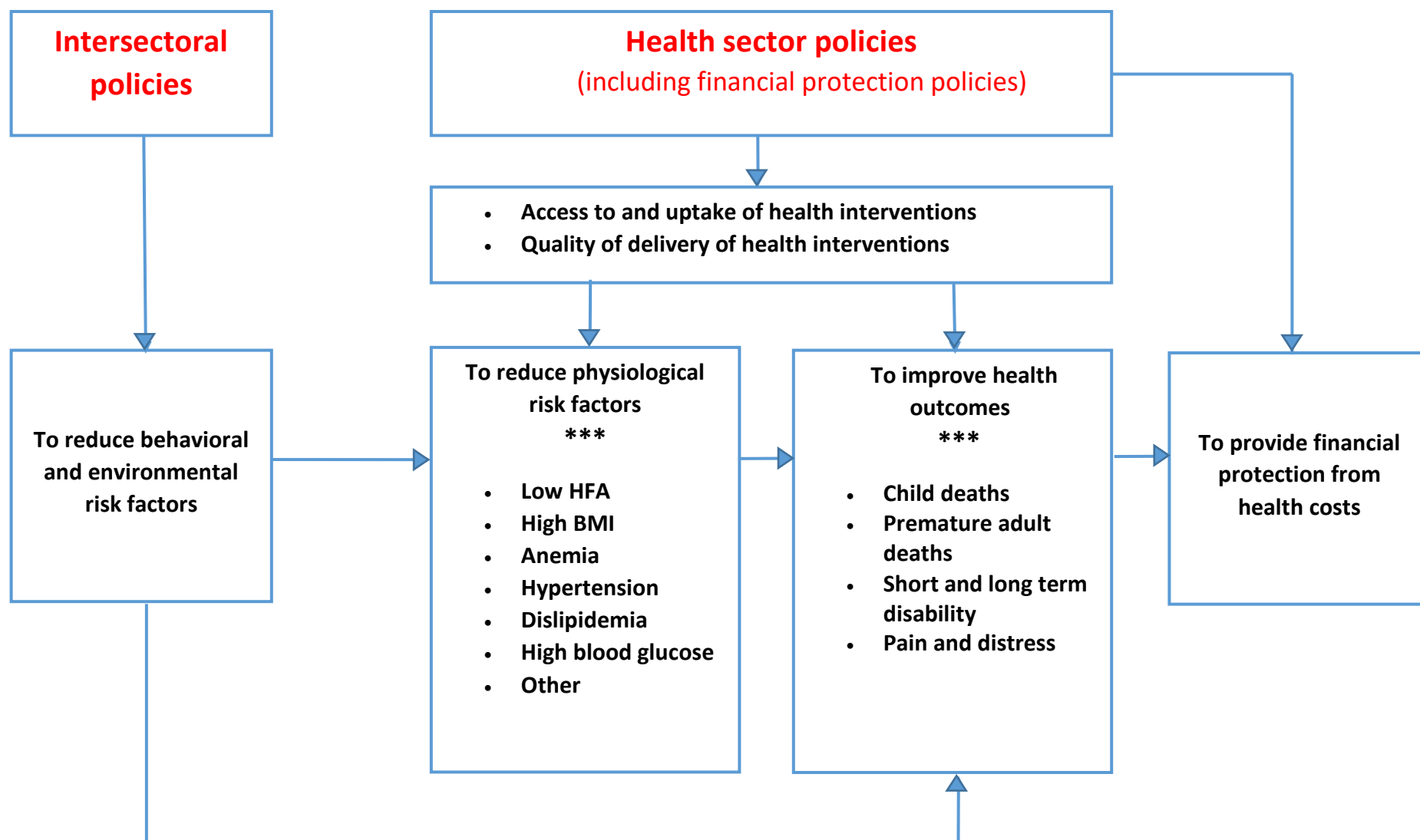


Figure 1: Policies for health

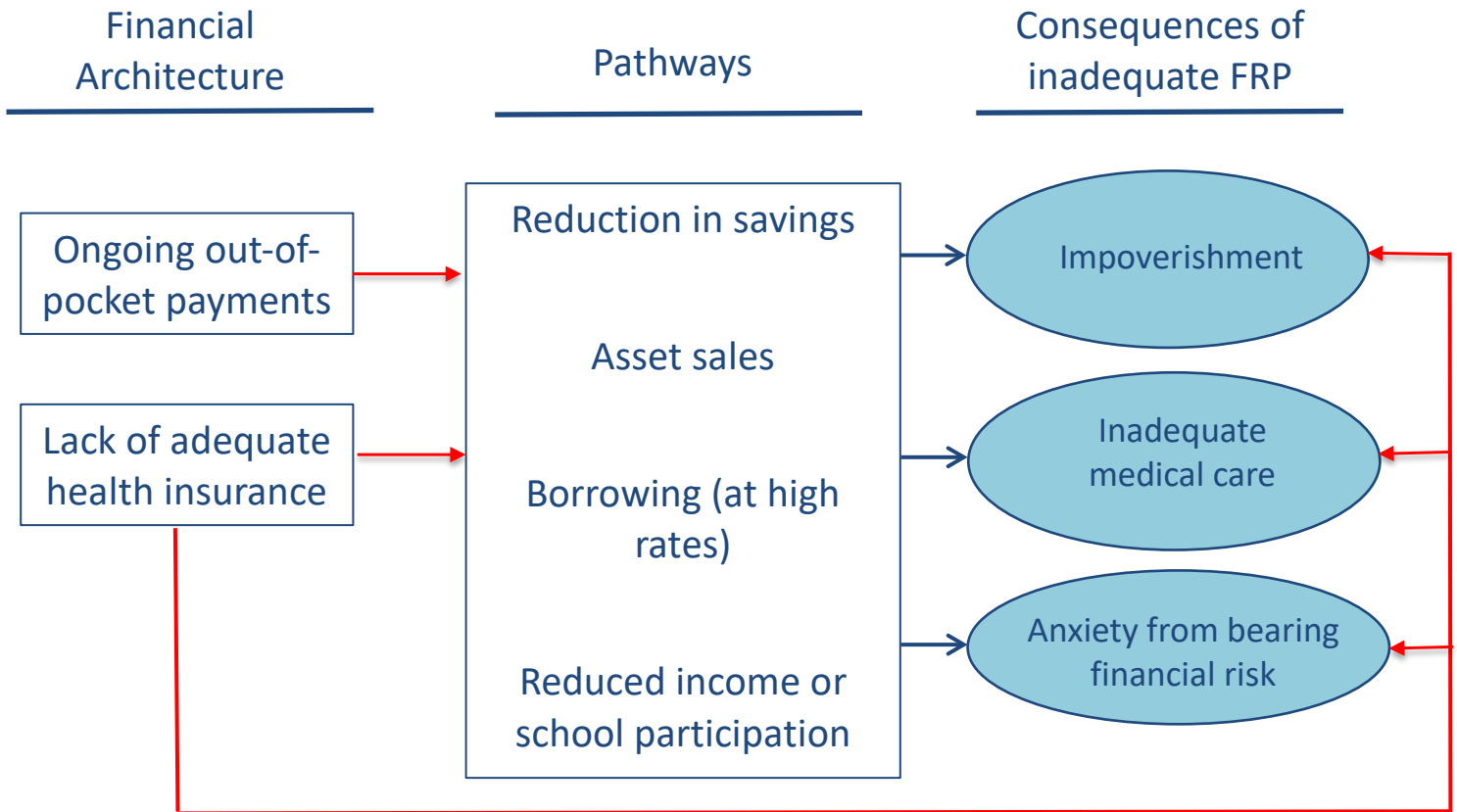
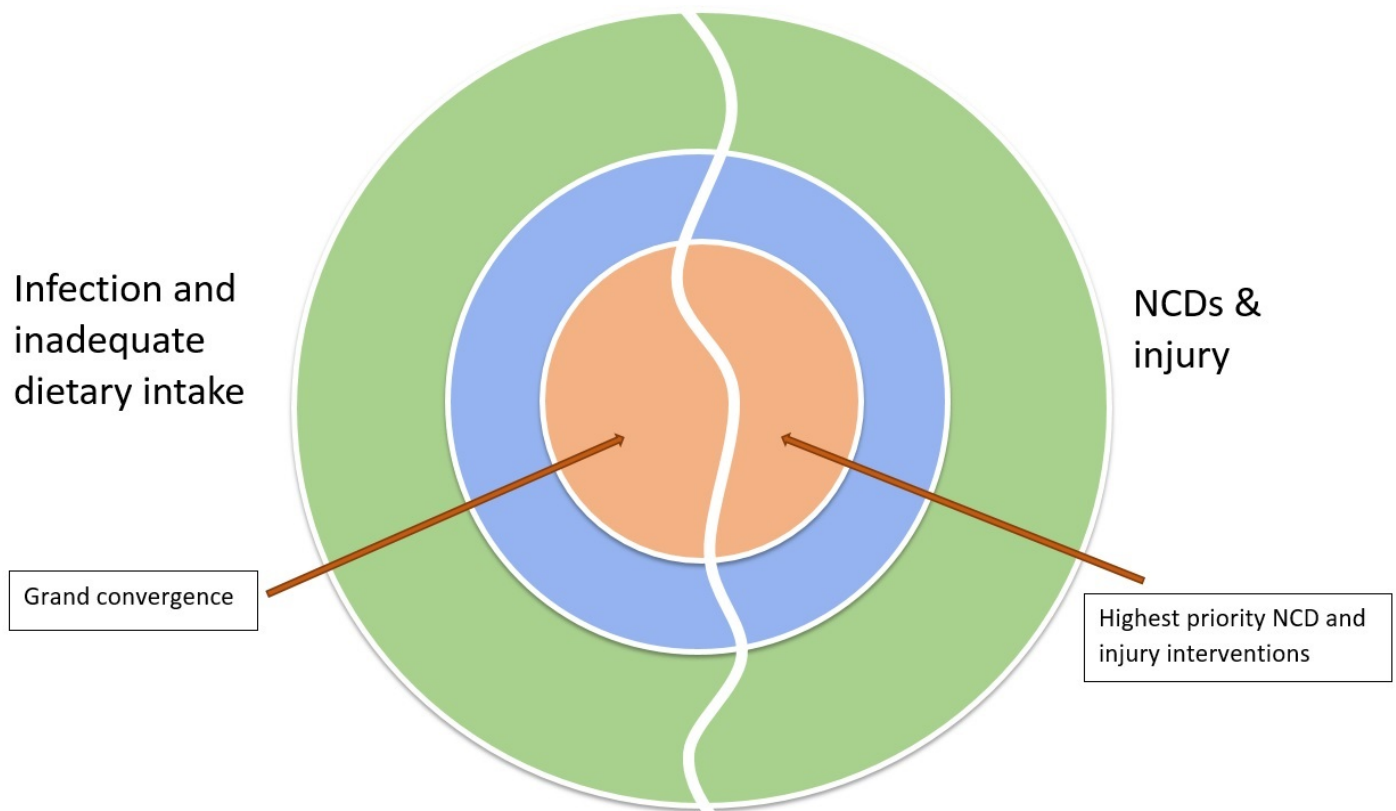


Figure 2: Financial risk protection (FRP)



Note: The 'grand convergence' (GC) agenda for reducing child and infectious disease mortality was advanced by *The Lancet* Commission on Investing in Health (Jamison, Summers, et al. 2013).

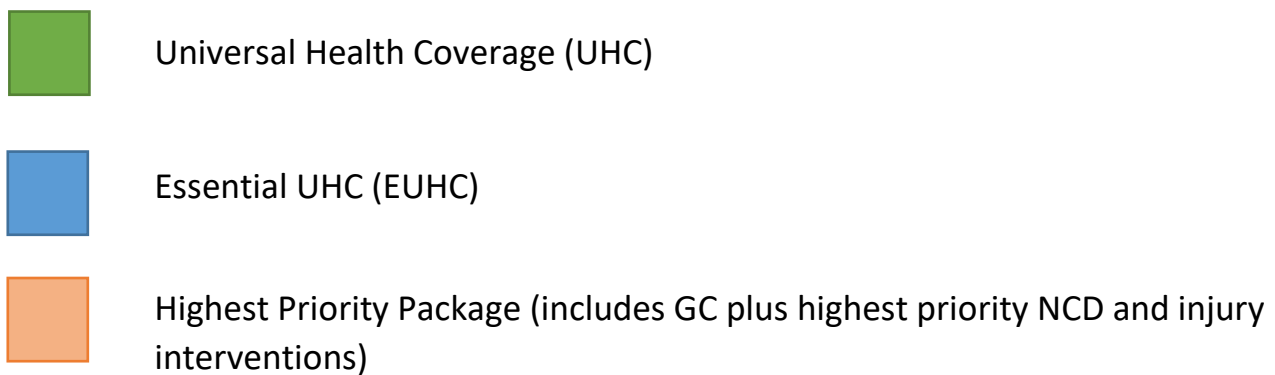


Figure 3: Essential UHC and the Highest Priority Package