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On What Diseases and Health Conditions Should New Economic Research on Health and Development Focus?

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Abstract

Given the public goods nature of research, economic research on health in developing countries is likely to have the highest returns by focusing, *inter alia*, on diseases and health conditions that are relatively widespread and costly and that are relatively rapidly growing. This article first summarizes the time patterns in economic research on diseases and health in developing countries for 1990–2005. It then compares those time patterns with the distribution of DALYS for diseases and health conditions in developing countries estimated for 2005 and for 2030. These comparisons suggest relatively overemphasis on HIV/AIDS and underemphasis on noncommunicable diseases. This opens the possibility for individuals or organizations initiating, re-evaluating or increasing their economic research on health and development to make a significant contribution by focusing particularly on the analysis of behaviour and policy choices related to non-communicable diseases. Careful consideration must, of course, be given to other demands, but on the basis of these two criteria, potential contributions are likely to be greatest from research with such a focus.

Keywords

rate of return to research; non-communicable diseases; HIV/AIDS; DALYS; economic development

INTRODUCTION

Health is of considerable interest because of its intrinsic value, with improved health adding directly to people's welfare. Improved health may also have considerable instrumental importance if better health saves resources for other uses that would otherwise have been used to deal with morbidity and if better health increases productivity. Recent estimates suggest that the benefit/cost ratios for at least some investments in better health and nutrition may be considerable. A panel of eight prominent economists, including four Nobel Prize recipients, for example, ranked investments in health and nutrition very high among alternatives in the 2004 Copenhagen Consensus (Lomborg, 2004). The goal of the Copenhagen Consensus project was to set priorities among a series of proposals for confronting ten great global challenges. These challenges, selected from a wider set of issues identified by the United Nations, were: civil conflicts; climate change; communicable diseases; education; financial stability; governance; hunger and malnutrition; migration; trade reform; and water and sanitation. Up to five opportunities were to be identified for each challenge by experts, primarily on the basis of benefit/cost ratios. These were ranked, and in the resulting consensus the opportunities

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related to health and nutrition were evaluated very highly, with four of the first five opportunities and eight of the first 13 prioritized (see the bold items in Table 1).

But health-related deprivation and inequality in developing countries potentially cover an enormous range of health/disease conditions. Given the impossibility of adequately covering all related issues, it seems useful to consider the dimensions of health and economic development, on which the returns from new economic research are likely to be greatest. The purpose of this paper is to consider some aspects of such a process. Section 1 sketches out some considerations in determining economic research priorities. Section 2 summarizes the health conditions that have been the focus of recent research in economics on health and development. Section 3 describes the predominant health problems in the developing countries—and how these are expected to evolve in the next quarter century. Section 4 concludes with a discussion of what implications these patterns in projected health/disease conditions might have for prioritizing economic research on health and development.

1 FRAMEWORK FOR CONSIDERING ECONOMIC RESEARCH PRIORITIES ON HEALTH AND DEVELOPMENT

Undertaking research on the economic aspects of health and development is making an investment under uncertainty. The expected rates of return would seem to be the greatest (i) if the research served to exploit well the general insights that economics brings into such effort, and (ii) if the research focused on the health/disease conditions for which the potential gains from such effort are the greatest.¹

1.1 Insights that economics brings to such research

The economic approach to such research includes at least two broad elements: (i) how economists think about the factors that determine individual and group behaviours and (ii) how economists think about policy alternatives.

Individual and group behaviour—Economists posit that individuals or groups such as families or bureaucracies or health-service providers behave as if they are maximizing their welfare subject to the constraints that the decisionmakers (i.e., these individuals or other decisionmakers in the relevant groups) understand that they face in terms of resources, policies, markets, social networks and political groups. This has several important implications:

- Individuals, families and other groups respond to changes in their perceptions of these constraints by changing some or all of their behaviour patterns. If poor malnourished families have increased resources due to some policy change, for example, they will use these as they perceive as best, which does not necessarily mean dedicating most of the additional resources to better health or nutrition even this had been the intent of those designing the policies. If policies are directed towards improving the nutrition of particular types of household members such as pre-school or school-age children, for example, households are likely to shift part of these gains to other household members by allocating fewer resources to the intended beneficiaries of the policies. If effective, efforts to preclude households or other entities from making such re-allocations would result in a smaller increase in welfare from these resources as assessed by the decisionmakers (as opposed to policymakers or international experts) than would occur without these efforts. Policy evaluations that ignore such individual and group decisions are likely to overstate the direct policy impacts and miss indirect effects. Nature of the constraints, moreover, is likely to

¹Behrman (2007) is a recent effort to estimate the benefits relative to the costs for recent applied research (impact evaluation) in a particular development context in which health interventions are part of a package of interventions. The estimates presented in Behrman (2007) illustrate the not-surprising importance that the scale of possible effects has, which is akin to the concern of the present paper.

differ substantially in different locations due to different environments in terms of markets, policies, legal systems and natural and disease conditions, all of which may feedback in terms of different individual and group responses.

– Individuals, families and others make decisions within a lifecycle framework in the presence of important factors such as genetic endowments that are not observed by analysts. This means that if one wishes to find the impact of, say, early childhood health and nutritional status on later life education or labour market outcomes, it may be critical to control for endogenous choices related to early childhood health and nutrition. The simple associations between early childhood health and nutrition, on one hand, and subsequent educational and labour market outcomes, on the other, are likely to capture not only causal effects, but also decisions based on the household's knowledge of these (unobserved by analysts) endowments.

– For an entity such as a household to take advantage of policy changes, such as new health interventions, it typically must use additional scarce resources. At times there are monetary costs. But almost always there are time costs. To evaluate the full costs of any intervention, these private costs must be included, rather than just the direct governmental costs of the intervention.

– Policymakers and implementers also have objectives and respond to incentives. For evaluation of health (as well as other) policies, therefore, it probably is essential to control for the factors that determine the policies and the distribution of related goods and services across potential clients. If health policies are designed to favour poorer individuals and this is not controlled in the analysis, for example, the associations between the policies and the health outcomes are likely to be underestimates of the true impacts of the policies on health—and vice versa if policies favour the better-off because they have more political power.

– Estimation methods and special data must be used to determine the impact (not just the association) of one variable choice on another (e.g., the impact of health on productivity) and to control for unobserved factors that might otherwise cause biases in efforts to estimate causal effects. Good experimental assessments can provide important useful information and should be undertaken more widely with respect to situations in which programme roll-out occurs over time, providing potentially valuable opportunities for experiments through random assignment of how the programme is rolled out.² But experiments have their limitations. They cannot be used to evaluate counterfactual policies, including policies that extend for longer time periods than the duration of the experiment or are in different environments with respect to markets, policies, and natural and disease conditions. This econometric methods to control for endogenous behaviours in the presence of important unobserved variables and structural models may be important tools that should be used.³

²An important and very visible recent example is the Mexican *PROGRESA/Oportunidades* anti-poverty human resource programme which randomly assigned initial treatment to 320 of the 506 rural communities in the original evaluation sample with 186 control communities included in the programme two years later (e.g., Behrman and Hoddinott, 2005, Behrman and Skoufias, 2006; Gertler, 2000).

³Relevant econometric methods include instrumental variable estimates, fixed effects and propensity score matching to control for endogenous right-side variables, measurement errors, unobserved factors and selected subsamples and having as good comparison groups as possible. For some recent examples pertaining to the analysis of human resources in developing-country contexts, see Alderman, Hoddinott and Kinsey (2006), Behrman and Hoddinott (2005), Behrman, Parker and Todd (2008). For an example of a structural model, see Todd and Wolpin (2006), a study in which they use the baseline data from the Mexican *PROGRESA* programme to estimate a structural model of family behavior, test the model against the experimental evaluation data generated to evaluate the programme (and find that the model generally performs well), and then apply the model to explore counterfactual policies such as different target groups or different payment schedules.

Basic policy motivations—Economists consider two basic motivations for policies: (i) to improve efficiency or productivity and (ii) to improve distribution of resources. A situation is inefficient if one entity, given the resources and constraints, can be improved without making any other entity worse off. A situation is efficient if at the margin the incentives for all members of society to undertake an action are just equivalent to the marginal (or additional) social cost of resources for that action. Social resource costs may differ from private resource costs because the market prices paid by private individuals may be more or less than the true marginal social costs of the good or service obtained. This difference may be due to so-called ‘market failures’ (e.g., failure of market prices to capture spillover or external effects such as those related to the spread of contagious diseases or pollution; poorly functioning capital markets for human resource investments; poorly functioning markets for information because of its public good aspects). Differences between private and social incentives also may stem from ‘policy failures’ in the form of governmental regulations that preclude market prices reflecting from true resource costs (e.g., minimum or maximum prices; preclusion of private entities from the provision of certain health-related services; subsidizing health services on the basis of ownership). Furthermore, the manner in which governmental revenues are raised and how they are spent affects private incentives and results in economic distortions that have been estimated to be 25 per cent of governmental budgets or more (see references in Knowles and Behrman, 2005). Some important implications of these considerations include:

- There may be efficiency-distributional tradeoffs in which policies improve one element at the cost of worsening another, so it is important to get the balance right, and this depends on how society values the productivity-distribution tradeoff. For example, from an efficiency point of view, the cost of assuring the survival of extremely low birth weight (LBW) babies may be large relative to the expected productivity and resource savings of these babies over their lifecycles.⁴ But society may decide, nevertheless, to devote considerable resources to these efforts because of the distributional concerns related to the welfare of the babies and their families
- In a number of cases the efficiency and distributional gains may be complementary, particularly if the distributional concerns focus on the poor because inefficiencies in capital and information markets are most likely to affect the poor. A programme that improves health awareness, for example, is likely to increase efficiency (because private markets are likely to be poor producers of such information) and help the poor in particular (because they are likely to be the most misinformed).
- Just because an intervention has high returns (e.g., provision of micronutrients in some contexts) does not necessarily mean that public resources should be devoted to support it. If the private returns are high, then the incentive is strong for private investments to maximize private welfare. This may occur, for example, with the fortification costs for some micronutrients being passed on to consumers. Only when social returns are greater than private returns is there an efficiency justification for using public resources to support the intervention. Again, equity considerations are additional but conceptually distinct considerations.
- There should be sensitivity to important differences between the intrinsic and instrumental values of health, the latter of which relates to resources saved and productivity gained with better health, but which is ignored in much of the health literature. Yet in populations with poor health, the potential productivity gains from improved health in some respects may be large, even in the majority of the gains.⁵

⁴For example, Alderman and Behrman (2006) estimate that the value of one low birth weight (LBW) averted in a stylized low income country is US\$510 with a 5 per cent discount rate. For equity or anti-poverty reasons, society may want to devote more resources to reducing LBW than would be warranted solely on the basis of calculations on resource and productivity gains.

– Attention must be paid to private and social resource costs as well as to the impacts of interventions.⁶ The integration of costs and benefits into benefit/cost or internal rate-of-returns estimates permits prioritization among possibly very different interventions. It also permits establishing policy hierarchies among alternative policy options for attaining a given goal. Generally in such policy hierarchies, policies tend to rank higher if they are more direct (thus having lower distortion costs) and if they use price rather than quantitative mechanisms (thus with more transparent effects).

– Often, an important part of the costs are the lags in impact since more immediate impacts generate resources that can be reinvested, so discounting both costs and benefits is important.⁷ Therefore, in evaluations of interventions to improve health and nutrition in early life, for example, a resource gain of a given magnitude resulting from reduced childhood morbidity is worth significantly more in terms of present discounted value (PDV) than an equal resource gain from reduced adult chronic diseases. At a 5 per cent (10 per cent) discount rate, for example, the PDV of US\$10,000 in resource gains from reduced adult chronic morbidity in 60 years is US\$535 (US\$33). Therefore a saving of US\$1,000 from reduced infant morbidity has a much higher PDV than the saving of US\$10,000 accrued 60 years later in connection with the types of adult chronic diseases emphasized by Barker (1998) and others.⁸

– Both the benefits and costs are likely to be context-dependent due to variations in markets, policies, culture and natural and disease conditions. Therefore even very well-based estimates of benefits/costs in a particular context, such as from good controlled experiments, should not be generalized to other developing-country context without an examination of its critical dimensions. Interdisciplinary efforts to develop better understanding of particular biomedical mechanisms and context are likely to have high payoffs.

1.2 For what types of health/disease conditions are the potential gains of research likely to be greatest?

The considerations in section 1.1 relate to the types of economic research on health and development that are likely to produce the greatest gains; in a nutshell, research that exploits the comparative advantage of economics with respect to the relevance and analysis of behaviour patterns and policy alternatives.

But there is, in addition, the question of identifying the types of health/disease conditions on which further effort is likely to have the highest payoffs. The answer depends on at least two factors: (i) what health/disease conditions are most widespread, a relevant question because of the public-good nature of research, which means that benefits are likely to be much greater for a given amount of research on a widespread health/disease condition than on a more limited affliction and (ii) where knowledge is relatively limited which, in turn, would seem to point to areas experiencing most rapid change.

⁵For example, the overall benefits in the Alderman and Behrman (2006) estimates of the value of improving one baby's status from LBW to non-LBW are dominated by the impact on productivity through reduced stunting and cognitive ability (working in part through its effects on the amount of schooling acquired), with these two benefits accounting for over half (57 per cent) of the total. Behrman, Alderman and Hodinott (2004) provide some other examples.

⁶Much of the economics and biomedical literature focuses on impacts of health-related interventions without consideration of the costs. To assess relative priorities, both impact and costs must be included in the evaluation. Behrman, Alderman and Hodinott (2004) provide for some health-related interventions examples of estimates of benefits relative to costs.

⁷Some argue that it is not appropriate to use discount rates for evaluating health interventions. But this position seems to ignore the opportunity costs of using resources that could have high returns from improved health in the near future and be reinvested to obtain still further gains as opposed to using the same resources for health improvement in the distant future, foregoing the gains in the meantime.

⁸Recent evidence suggests, however, that some of the gains from averting chronic diseases may occur much earlier in the lifecycle in at least some developing-country contexts than in the developed world. For example, when the onset of diabetes appears to occur, it inflicts those in South Asia at a much younger age than those in Europe.

While available indicators of these factors are fairly limited, they permit some assessments that are of interest and which suggest that current economic research and health and development may not be well targeted. The remainder of this paper describes, first, in terms of broad health/disease categories the distribution of recent economic research on health in developing countries and then examines the projected levels and changes in developing-country health/disease categories and how these relate to economic research on developing-country health.

2 WHAT HAS BEEN THE FOCUS OF RECENT ECONOMIC RESEARCH ON HEALTH AND DEVELOPMENT?

2.1 Recent economic research on health and development

To characterize recent economic research on health and development, we conduct a search using EconLit, the American Economic Association's electronic bibliographic database. This online database abstracts and indexes an array of international economic journal articles, books, book reviews, collective volume articles, working papers and dissertations, with greater emphasis on published studies. We define our search to studies written between 1990 and 2005 in order to discern any recent trends, and to countries considered as 'developing.'

With these parameters in place, we search for the three aggregate categories used by the Global Burden of Disease/World Health Organization (GBD/WHO):

- communicable, maternal, perinatal and nutritional conditions (CMPNC),
- noncommunicable diseases (NCD), and
- injuries (I).

Appendix Table 1A gives the major more disaggregated disease and health conditions within each category. In our search, we list within each category as many descriptors as possible in order to generate the most complete record (i.e., for communicable diseases we include tuberculosis or STDs or HIV or AIDS or syphilis, etc.). The broadest category by far was injuries, which included everything from everyday automobile accidents to large-scale ethnic violence. Once the initial search was completed, we downloaded the records into a Procite database in order to conduct a more accurate check of the classifications by examining abstracts, for instance. While the procedure undoubtedly gives a noisy measure of the distribution of health-related economic research in the developing countries because not all research venues are covered by EconLit, it does systematically cover the majority of peer-reviewed research which often sets the tone for the research issues considered important in the field.

Figures 1 and 2 summarize the time patterns of the economic studies related to the three major GBD/WHO health conditions/disease categories in the developing countries during the 1990–2005 period, while Chart 3 gives the composition of these studies for the entire period. The total number of EconLit-recorded studies on developing-country health in 1990–92 was relatively small, 17 per year. There was considerable increase, averaging 15.4 per cent per year, increasing the total study number to 126 per year for 2003–05. Thus, economic research interest in health and development has expanded rapidly. In terms of the three basic categories, the dominant category throughout the period—and the one with the most rapid growth—has been communicable, maternal, perinatal and nutritional conditions (CMPNC), the category that has traditionally, at least prior to the onslaught of the epidemiological and nutritional transitions, been considered as the dominant locus of health/disease problems in the developing countries. The CMPNC category accounted for 60 per cent of the studies over the entire 1990–2005 period, and had an annual average exponential growth rate of 16.3 per cent. The second most

important category, both in terms of levels and growth rates, was injuries, one of the three GBD/WHO aggregate categories, accounting for 35 per cent of the total over the 1990–2005, and with an annual average exponential growth rate of similar studies of 15.3 per cent. A distant third with respect to both the level and the growth of studies was non-communicable diseases (NCD), a category which traditionally has been considered to represent primarily developed-country diseases. NCD accounted for only 5 per cent of the 1990–2005 studies and had an annual growth rate of only 9.6 per cent. Thus, in terms of preference, economists working on developing-country health issues apparently believed—and still increasingly believe—that they can make the greatest research contribution by focusing foremost on CPMNC and secondarily on injuries, with very little attention to NCD.

But the aggregates—particularly the CPMNC aggregate—are misleading in an important respect or, perhaps it is more accurate to say, that they reveal only part of the story. Much economic research on developing-country health—and its research share is increasing—has been directed towards one disease that is part of the CPMNC aggregate: HIV/AIDS. HIV/AIDS-related studies increased between 1990–92 and 2003–05 by 22.3 per cent per annum (Chart 4) and accounted for 47 per cent of all studies for the whole 1990–2005 period (Chart 5) and over half (52 per cent) in 2005, the last full year for which the data are available (Chart 6). Studies on developing-country health that exclude HIV/AIDS increased at a substantial rate of 11.5 per cent per annum, but this constitutes only slightly more than half of the annual increase rate of HIV/AIDS-related developing-country studies (Chart 4). Among diseases and health conditions other than HIV/AIDS, the injuries category accounts for the most rapid growth (15.3 per cent) and the largest share (35 per cent). Then comes the group of the non-communicable (NCD) diseases (9.6 per cent growth rate, 5 per cent share) but communicable, maternal, perinatal and nutritional conditions (CMPNC) other than HIV/AIDS are next in terms of their share (6.1 per cent growth rate, 13 per cent share). Thus, the earlier statement should perhaps be amended to say the economic researchers working on health in developing countries apparently believed—and still increasingly believe—that they can make the greatest research contribution by focusing primarily on HIV/AIDS and secondarily on injuries, but very little with regard to NCDs and CMPNCs other than HIV/AIDS.

2.2 Selected indicators for focusing greater operational international attention to health and development

The target of international operational attention to developing-country health/diseases often seems to resemble the emphasis summarized earlier, but with a somewhat broader scope on diseases/health conditions in the CMPNC aggregate in addition to HIV/AIDS. The Global Fund, for example, focuses on three major infectious diseases: HIV/AIDS, malaria and tuberculosis. The Copenhagen Consensus, in its effort to systematically establish global priorities, includes only infectious diseases and malnutrition, major subcategories of the CMPNC aggregate, but does not even consider non-communicable diseases or injuries as high-priority candidates for increased support. The Center for Global Development recently released a report on public health indicators for assessing developing-country commitment to health. One indicator refers to general public sector health support ('government public health spending') and the other seven refer primarily to aspects of CMPNC ('DTP3 immunization rate...', under-five mortality rate, stunting, skilled birth attendants, contraceptive prevalence rate, unmet need for family planning, access to water', Becker, Pickett and Levine, 2006). The top US foundations awarding international grants for health have focused primarily, and in some cases, exclusively, on the CMPNC category, with little attention to non-communicable diseases or injuries (Appendix B). For example, the Bill and Melinda Gates Foundation—which dominates the US field of foundation resources targeted towards international health (with allocations almost ten times the amount of the next nine foundations circa 2004)—has outlined on its website the priorities of 'acute diarrhoeal illness, acute lower respiratory

infections, child health, HIV/AIDS, malaria, poor nutrition, reproductive and maternal health, tuberculosis, vaccine-preventable diseases, and other infectious diseases'. The Millennium Development Goals (MDGs) mention explicitly only diseases and conditions in the CMPNC category (e.g., Goal 1: Eradicate extreme poverty and hunger..., Goal 4: Reduce child mortality, Goal 5: Improve maternal health, Goal 6: Combat HIV/AIDS, malaria and other diseases).

3 PREDOMINANT HEALTH PROBLEMS IN THE DEVELOPING COUNTRIES, AND HOW THEY ARE PROJECTED TO EVOLVE

If economic research on health and development is forward-looking, then recent research would seem to have the highest payoffs, *ceteris paribus*, for diseases/health conditions where the effects, both current and projected, are considerable, and which could produce large increases in future effects (section 1.2). This section summarizes these patterns.

To summarize these patterns, we use the DALYS (disability-adjusted-life-years) projected for 2005, 2015 and 2030 because these seem to us to be best indicators available that are comprehensive in terms of geographical and disease/health conditions coverage and include future projections of at least the intrinsic value of good health.⁹ In particular, we use the DALYS in the basic scenarios available in Annexes 15–26 on the WHO website. These cover many health/disease conditions that are aggregated in the CMPNC, NCD and injuries, i.e., the same three categories utilized in section 2. Appendix Table 1A gives the per cent distribution of DALYS, with various subaggregates, in the WHO projections for 2005, 2015 and 2030 for all the categories and subcategories that account for at least 1 per cent of the total for all developing or for low-income developing countries in at least one of these three years.

3.1 Composition and projected future changes in DALYS for three GBD/WHO aggregate categories

Charts 7A and 7B summarize the projected composition of DALYS for the three GBD/WHO aggregate categories for all developing and low-income developing countries. The projections for all developing countries for 2005 indicate that NCD account for 48 per cent of the DALYS, CMPNC 41 per cent, and injuries 13 per cent. The projections for 2030 indicate an increase in NCD to 54 per cent, a decrease in CMPNC to 32 per cent, and an increase in injuries to 14 per cent. The projections for 2005 on the part of low-income developing countries indicate that NCD account for 35 per cent of the DALYS, CMPNC 53 per cent, and injuries 12 per cent, while the projections for 2030 show an increase in NCD to 45 per cent, a decrease in CMPNC to 41 per cent, and an increase in injuries to 14 per cent. Charts 7C and 7D compare male versus female DALYS overall and for the three aggregate categories for the same two country aggregates. These suggest gender gaps: males are projected to experience poorer health than females, increasingly so over time largely because of the much greater losses from injuries projected for the males.

The composition of DALYS projected for different years, of course, does not in itself indicate whether the projections predict an improvement or deterioration in health. Table 2 provides for both gendered combined and individually the ratio of DALYS per capita projected to 2030 versus those in 2005 for all developing and low-income countries. These ratios are given for all causes in the three major aggregates. Because of the probable importance of HIV/AIDS,

⁹DALYS do not include the productivity gains and resources saved through the avoidance of morbidity, which would seem to be central aspects of an instrumental value for health (e.g., see Behrman, Alderman and Hoddinott 2004). However, in some variants of available DALY calculations, gains in prime-age adult years are weighted more heavily than those for younger and older individuals, which might be interpreted as a crude attempt to adjust for productivity effects. See Lopez et al. (2006) and the references therein for extensive discussion of DALYS, and Mathers and Loncar (2006) for extensive discussion of the GBD/WHO projections of DALYS.

the CMPNC category is subdivided to both include and exclude HIV/AIDS. Overall, health is projected to improve, with a 10 per cent decline in per capita DALYS for all developing countries and 18 per cent decline for low-income developing countries. The gender gap also appears to be increasing in favour of females, who are projected to have larger declines particularly in the low-income developing countries. The disaggregations indicate that these projected declines are primarily due to large decreases in CMPNC, except for HIV/AIDS, for males and more so for females (which by 2030 should be about half the 2005 levels) and, second, to a decline in injuries for females. The decline in the non-HIV/AIDS CMPNC total induces a 25–41 per cent reduction in the overall CMPNC aggregate despite the HIV/AIDS component increasing from 44 to 77 per cent. In contrast, slight increases are projected for both genders for NCD in the range of 5 to 8 per cent, and in the range of 2 to 12 per cent for males with respect to injuries.

Thus, the primary observation of these comparisons for this paper is that the shares of NCD relative to CMPNC and the changes in these shares over time seem to be in sharp contrast to the composition of recent economic research summarized in section 2. Because of the widespread concern over the gender gap in human resources, it is also of interest to note that the projected gender gaps primarily and increasingly favour females.

3.2 Composition and projected future changes in DALYS for more disaggregated GBD/WHO subcategories

As the case of HIV/AIDS indicates, it is of value to consider greater disaggregation than the three basic GBD/WHO categories. We do so now, first with respect to the percentage shares of DALYS over time and then with respect to the percentage changes in particular subcategories over time.

Percentage shares in total DALYS for ten leading subcategories—Table 3 gives the percentage shares of total DALYS for the leading causes projected for 2005, 2015 and 2030 and ordinal rankings of the top conditions for 2005 and 2030. Of course, these rankings depend in part on the aggregations being used. For instance, each of the 16 individual types of cancer that are aggregated into malignant neoplasms would be ranked much lower than in this aggregate subcategory. We use the same aggregation as in the GBD/WHO tables for all diseases, with the exception of ‘infectious and parasitic diseases’ which we disaggregate to one level lower because some diseases included in this subcategory (e.g., HIV/AIDS, diarrhoeal diseases, malaria, tuberculosis) have been the focus of considerable attention.

Four subcategories of the CMPNC aggregate in 2005 are among the top ten causes for all developing as well as low-income developing countries. HIV/AIDS is a very important CMPNC subcategory that is projected to gain importance, moving from fifth largest cause in 2005 to second in 2030 for all developing countries and from sixth position to third for low-income developing countries. The other fairly highly ranking CMPNC subcategories in 2005 include perinatal conditions (ranking fourth for both country groups), respiratory infections (6th for all and 5th for low-income developing countries), and diarrhoeal diseases (10th for both country groups). But in the projections for 2030, the first two slide to 9th and 10th ranking positions, and the third drops out of the list of top ten causes of death. Therefore at this level of aggregation, only HIV/AIDS in the 2030 projections is among the top eight causes in the CMPNC subcategories.

There are five subcategories of the NCD aggregate among the list of top ten causes for all developing countries in 2005, and four of these are in the top ten for low-income countries in 2005. These include neuropsychiatric conditions and cardiovascular diseases, both of which are at or near the top for both country groups for both 2005 and 2030; sense organ diseases and respiratory diseases move up several spots in the rankings between 2005 and 2030, and

malignant neoplasms stay ranked as about the seventh or eighth cause. As a result of these shifts, the 2030 projections include four NCD subcategories among the top six, even though only neuropsychiatric conditions and cardiovascular diseases were within the top six among the NCD subcategories for either country group in 2005.

Unintentional injuries are projected to rank high in 2005 and to move up one place in 2030 (from third to fourth position for all developing countries, from second to first for low-income countries). Intentional injuries rank seventh in both 2005 and 2030 for low-income countries, and rise from 11th to eighth position for all developing countries.

Subcategories that are projected to increase most rapidly between 2005 and 2030—Table 4 gives the ratio of the 2030 to the 2005 DALYS and the ranking position for the top 20 subcategories for all and low-income developing countries in terms of projected growth at a similar level of aggregation as in Table 3 (e.g., respiratory diseases, sense organ diseases) and at one additional level of disaggregation. Subcategories that are relatively large, and rapidly increasing with respect to constituting at least 1 per cent of the DALYS in 2030 are indicated in bold.

In the CMPNC aggregate category, HIV/AIDS ranks high with ratios, respectively, of 166 per cent and 151 per cent, ranking third among all developing countries and sixth among low-income developing countries. But among all the other diseases/conditions in the CMPNC group, only two sexually transmitted diseases (STDs) are among the top 20 for either country group: chlamydia ranks sixth and 15th for all and low-income developing countries, respectively, and gonorrhoea 16th for all developing countries (although not near the top 20 for low-income developing countries).

War, in the injuries category, is placed quite high: fifth among all developing countries and third among low-income developing countries. Road traffic accidents also are in the top 20 for both country groups: 20th for all developing countries and seventh for low-income developing countries.

But the NCD aggregate category exhibits a vast majority of the rapidly increasing conditions: 15 of the 20 health/disease conditions for all developing countries and 16 of the 20 for low-income developing countries. And among these, four are listed among the top five causes for at least one of the country groups: diabetes mellitus (1st and 4th, respectively, for all and for low-income developing countries), chronic pulmonary disease (2nd for both country groups), Parkinson disease (4th, 1st) and trachea, bronchus, lung cancers (7th, 5th). Three of these four (all but Parkinson disease) plus respiratory and sense organ diseases (and some of the major subcategories of each) also are relatively large in the sense that they are projected to account for more than 1 per cent of total DALYS in 2030. The remaining NCD subcategories among the top 20 conditions include Alzheimer and other dementias (9th and 18th), benign prostatic hypertrophy (19th for all developing countries) and various cancer types (prostate, bladder and cervix uteri for both country groupings; corpus uteri, breast, oesophagus, melanoma and other skin cancers and liver cancers for the low-income countries).

4 CONCLUSIONS

Economic research on health in the developing countries has the potential to make an important contribution to our understanding of how behaviour affects health outcomes and how policy priorities should be explored. Based on the crude analysis that we have undertaken, economic research on developing-country health has expanded rapidly since 1990. Both the composition of such research over the 1990–2005 period and the expansion in these studies have been dominated by attention, first, to HIV/AIDS and, second, to injuries. Relatively little attention

has been paid to non-communicable diseases or to communicable, maternal, perinatal and nutritional conditions other than HIV/AIDS. Some indicators of more operational international health interventions also imply a focus on HIV/AIDS together with other aspects of CMPNC (e.g., other infectious diseases, reproductive health, perinatal diseases), but relatively much less on injuries than in the economics research.

Among the important criteria for targeting specific diseases/conditions would seem to be (i) the relative prevalence of the burden of different diseases/conditions and (ii) the expected future rate of increase of different diseases/conditions. Examination of GBD/WHO projections for DALYS for all developing as well as low-income developing countries for 2005–2030, subject to appropriate qualifications regarding measurement and projections, suggests that HIV/AIDS and certain injury subcategories satisfy both criteria to warrant special emphasis.

HIV/AIDS, although ranked relatively, is not at the top of the list according to either criteria. Some communicable, maternal, perinatal and nutritional conditions other than HIV/AIDS are among the top ten in importance in 2005 (e.g., perinatal conditions, respiratory infections, diarrhoeal diseases), but are projected to be relatively less important in 2030, and not among the top eight subcategories. In addition to HIV/AIDS, in the communicable, maternal, perinatal and nutritional conditions category, only certain STDs (chlamydia, gonorrhoea) are projected to be among the 20 most rapidly growing conditions between 2005 and 2030. Unintentional injuries rank quite high and intentional injuries fairly high in the share and increase of DALYS, somewhat higher for low-income developing countries than for all developing countries.

Non-communicable diseases are very high in the shares of DALYS, with neuropsychiatric conditions, cardiovascular diseases, sense organ diseases (for all developing countries) and respiratory diseases (for low-income developing countries) accounting for three of the five top shares projected for 2030. Some specific non-communicable diseases also have high projected growth rates, accounting for 75 per cent of the subcategories projected to be the fastest growing for the quarter century period of 2005–30, with diabetes mellitus, chronic obstructive pulmonary diseases and Parkinson disease among the four subcategories with the highest projected growth and with respiratory diseases, sense organ diseases and various malignant neoplasms also in the top 20 group.¹⁰

Chart 8 vividly illustrates the relations between the distribution of social science studies with respect to major health/disease conditions in the developing countries relative to the shares of DALYS. Chart 8A shows the 2005 distribution of studies relative to the distribution of the shares of 2005 DALYS in 2005; the studies per DALY on HIV/AIDS (859 per cent of the average) and on injuries (266 per cent) are far above average, with the result that the share of CMPNC that encompasses HIV/AIDS also is above average (146 per cent). In sharp contrast, the study shares of NCD (12 per cent), CMPNC-HIV/AIDS (24 per cent) and the total excluding HIV/AIDS (52 per cent) are far below average. If the only criteria in the distribution of studies were the 2005 DALYS shares, then this patterns suggests substantial misallocations towards HIV/AIDS and injuries. But if the research is forward-looking, then the shares of DALYS at some future time may be more relevant because the greatest potential arise from both the shares in DALYS and the conditions in which the DALYS are expected to increase relatively rapidly. Both of these can be summarized by expected future shares in DALYS. Chart 8B presents estimates similar to Chart 8A, but using as the reference the estimated 2030 DALY shares and, assuming even further forward-looking behaviour, the 1990–2005 studies for the study share.

¹⁰By affirming the importance of non-communicable diseases both now and in the future, we are not trying to ‘reinvent the wheel’ or to claim great originality of insight. This development has long been emphasized by many researchers concerned with demographic, epidemiological and nutritional transitions. They are central, for example, in much of the literature related to ‘global burden of disease’ (e.g., Jamison et al., 2006, Lopez et al., 2006 and the references therein). We are merely attempting to document these projected changes and how they differ from the emphasis in recent economic research on health and development.

The percentages in these figures differ but the general characterization is basically the same: the studies per DALY on HIV/AIDS (424 per cent of the average) and on injuries (254 per cent) are far above average, with the result that the share of CMPNC encompassing the HIV/AIDS component also is far above average (187 per cent). And, again in sharp contrast, the shares of NCD (10 per cent), CMPNC-HIV/AIDS (63 per cent) and the total excluding HIV/AIDS (60 per cent) are far below average.

As is indicated by the two criteria based on the current and estimated future shares in DALYS, the recent economic research on health in developing countries is substantially overfocused on HIV/AIDS and injuries, and underfocused on non-communicable diseases and to a lesser extent on the CMPNC category other than HIV/AIDS.¹¹ This opens the possibility for individuals or organizations initiating, re-evaluating or increasing their economic research on health and development to make a significant contribution by focusing particularly on the analysis of behaviour and policy choices related to non-communicable diseases. Careful consideration must, of course, be given to other demands, some of which are discussed above (section 1), but on the basis of these two criteria, potential contributions are likely to be greatest from research with such a focus. Researchers need to think hard about these considerations before making the final decision as to where to place their bets for achieving the highest return investments in their future research on health and development.

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ACRONYMS

CPMNC	communicable, maternal, perinatal and nutritional conditions
DALYs	disability-adjusted-life-years measurement
GBD	Global Burden of Disease/World Health Organization
NCD	non-communicable diseases
PDV	present discounted value
STDs	sexually transmitted diseases
WHO	World Health Organization

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¹¹Suhrcke et al. (2005: 11–12) present an excellent recent survey of economic analysis of chronic diseases that is complementary with the emphasis in this paper. They summarize five central points:

(1) Chronic diseases are not limited to wealthy nations and the rich within countries, nor do they afflict only the elderly... (2) The economic burden of chronic disease is [significant and] manifold in all levels of society, imposing costs at the individual, family, community and national levels.... (3) There are conditions under which the observed economic consequences of chronic disease or related risk factors can justify public-policy intervention from an 'efficiency' perspective.... (4) Effective interventions that improve social outcomes do exist, and they are available at reasonable costs.... (5) There are significant gaps in current knowledge and research, especially as they relate to developing countries.

We suggest that the significant gaps mentioned in point 5 reflect in part the substantial relative underallocation of economic research to chronic diseases.

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APPENDIX B: TOP TEN US FOUNDATIONS FOCUSING ON INTERNATIONAL HEALTH

The main US foundations awarding international grants for health have focused primarily, and in some cases, exclusively, on the CMPNC category, with little attention to non-communicable diseases or injuries. In terms of the dollar value of grants (circa 2004), the top foundations are:

Foundation	Status	Grants	
		Value, US\$	No.
1 Bill & Melinda Gates Foundation	independent	1,191,312,272	93
2 Ford Foundation	independent	29,443,920	149
3 Rockefeller Foundation	independent	22,876,052	80
4 David and Lucile Packard Foundation	independent	17,833,750	38
5 William and Flora Hewlett Foundation	independent	17,235,000	29
6 John D. and Catherine T. MacArthur Foundation	independent	11,201,000	40
7 Merck Company Foundation	company-sponsored	8,254,833	5
8 Ted Arison Family Foundation	independent	6,664,160	16
9 Bristol-Myers Squibb Foundation	company sponsored	6,635,751	91
10 Conrad N. Hilton Foundation	independent	6,055,780	16

Note: International grants include cross-border grants and grants to US-based international programmes.

Source: The Foundation Center (2006). Based on all awarded grants of US\$10,000 or more in a sample of 1,172 larger US private and community foundations.

We undertook further research on the top five organizations to summarize their health related goals:

– The *Bill and Melinda Gates Foundation* has become the leader in the international health community. The foundation's stated priorities are 'acute diarrhoeal illness, acute lower respiratory infections, child health, HIV/AIDS, malaria, poor nutrition, reproductive and maternal health, tuberculosis, vaccine-preventable diseases, and other infectious diseases'. As of 2006, their global health expenditure had reached US\$6,509,318,891 (US\$1.9 billion of which was targeted to HIV, TB, and reproductive health related projects; US\$1.5 billion to infectious diseases; US\$2.4 billion to global health strategies)

– The *Ford Foundation* does not have a specific health programme, but it does address global sexual and reproductive health in all three of its development programmes. As articulated by the foundation, 'grant making emphasizes community-based responses to growing needs for prevention strategies and appropriate policies. It also focuses on empowering women and youth to participate in improving reproductive health and related policies'.

– The mission statement of the *Rockefeller Foundation's* health programme is to 'reduce avoidable and unfair differences in the health status of populations'. Three strategies are deployed to achieve this goal; the development of better health products, the fighting of AIDS, and the strengthening of country health systems.

– The *David and Lucile Packard Foundation's* population programme strives to improve global reproductive health through three primary venues: the improvement of access to safe abortion/post-abortion care; the linkage of HIV and family planning programmes and services, and third, the provision of international advocacy for family planning in development frameworks.

– The international population oriented goals of the *William and Flora Hewlett Foundation* are focused on reproductive health, family planning, and HIV/AIDS programme. With an emphasis on Sub-Saharan Africa and South Asia, the foundation attempts to improve access to family planning/reproductive health care and develop a new generation of population scientists.

Thus all five foundations focus primarily, and in some cases, exclusively, on the CMPNC category, with scant attention to non-communicable diseases (NCD) or injuries.

Chart 1.
Studies Covered by EconLit on Three Major GBD/WHO Health/Disease Categories in Developing Countries

Chart 2.
Average Exponential Growth Rates between 1990–2 and 2003–5 in Number of Studies on
Three GBD/WHO Major Categories in Developing Countries

Chart 3.
Distribution of Studies in 1990–2005 Among Three Major GBD/WHO Categories

Chart 4.
Exponential Annual Growth Rates between 1990–2 and 2003–5 of Studies on Aggregate Disease Categories in Developing Countries with HIV/AIDS Separate

Chart 5.
Distribution of EconLit Studies for 1990–2005 Among Three Major GBD/WHO Categories with HIV/AIDS Separate

Chart 6.
Distribution of EconLit Studies in 2005 Among Three Major GBD/WHO Categories with HIV/
AIDS Separate

Chart 7A **Chart 7B**

Chart 7C **Chart 7D** **Chart 7.**

Chart 7A. % Composition of DALYs Projected for Three Major GBD/WHO Categories for All Developing Countries

Chart 7B. % Composition of Projected DALYs for Three Major GBD/WHO Categories for Low-Income Countries

Chart 7C. DALYs per Male Relative to DALYs per Female for Three Major GBD/WHO Categories for All Developing Countries

Chart 7D. DALYs per Male Relative to DALYs per Female for Three Major GBD/WHO
Categories for Low-Income Countries

Chart 8A **Chart 8B** **Chart 8.**

Chart 8A. % Ratio of Share of Studies in 2005 to Share of DALYS in 2005 in All Developing Countries

Chart 8B. % Ratio of Share of Studies in 1990–2005 to Share of DALYS in 2030 in All Developing Countries

TABLE 1

COPENHAGEN CONSENSUS RANKINGS OF BEST OPPORTUNITIES FOR INVESTING EXTRA RESOURCES IN DEVELOPING COUNTRIES

Project rating		Challenge	Opportunity
Very good	1	Diseases	Control of HIV/AIDS
	2	Malnutrition	Providing micro nutrients
	3	Subsidies and trade	Trade liberalization
	4	Diseases	Control of malaria
Good	5	Malnutrition	Development of new agricultural technologies
	6	Sanitation & water	Small-scale water technology for livelihoods
	7	Sanitation & water	Community-managed water supply and sanitation
	8	Sanitation & water	Research on water productivity in food production
	9	Government	Lowering the cost of starting a new business
Fair	10	Migration	Lowering barriers to migration for skilled workers
	11	Malnutrition	Improving infant and child nutrition
	12	Malnutrition	Reducing the prevalence of low birth weight
	13	Diseases	Scaled-up basic health services
Bad	14	Migration	Guest worker programmes for the unskilled
	15	Climate	Optimal carbon tax
	16	Climate	The Kyoto Protocol
	17	Climate	Value-at-risk carbon tax

Note: These are the 17 ranked opportunities among about 40 options in ten challenge areas. See Lomberg (2004) for details. The opportunities in bold relate directly to health and nutritional status.

TABLE 2

OVERALL AND THREE MAJOR GBD/WHO AGGREGATES WITH HIV/AIDS ALSO ISOLATED (2030 DALYS PER CAPITA)/(2005 DALYS PER CAPITA)

Causes	All developing countries			Low-income developing countries		
	Total	Males	Females	Total	Males	Females
All causes	90	93	86	82	87	78
CMRNC	69	75	64	63	68	59
Including HIV/AIDS	166	177	156	151	158	144
Excluding HIV/AIDS	53	57	49	50	54	47
NCD	107	105	108	106	107	105
Injuries	95	102	87	101	112	85

TABLE 3
RANKING OF TOP CAUSES AMONG PROJECTED DALYS FOR ALL DEVELOPING AND LOW-INCOME DEVELOPING COUNTRIES

		Ranking of top disease conditions						% Share of total DALYS for leading projected causes					
		Developing countries:			Low-income			Developing countries:			Low income		
		All	2030	2005	All	2030	2005	All	2030	2005	All	2030	2005
Causes ranked by all developing countries, 2005		Aggregate tripartite category of causes											
Neuropsychiatric condition				1	1	1	2	12.2	13.0	13.3	11.4	11.7	11.8
Cardiovascular diseases				2	3	3	4	9.9	10.2	10.9	10.2	10.2	10.5
Unintentional injuries				3	4	2	1	9.3	9.5	9.5	11.3	11.5	11.8
Perinatal conditions				4	9	4	9	6.7	5.6	4.1	7.0	5.9	4.3
HIV/AIDS				5	2	6	3	6.0	8.2	11.0	5.9	8.6	11.2
Respiratory infections				6	10	5	10	6.3	4.7	3.1	6.2	4.8	3.3
Sense organ diseases				7	5	9	6	5.0	6.0	7.3	4.5	5.1	6.0
Malignant neoplasms				8	7	8	8	4.5	5.1	5.8	4.6	5.1	5.8
Respiratory diseases				9	6	11	5	3.8	4.7	6.1	4.0	5.0	6.4
Diarrhoeal diseases				10	13	10	12	4.3	3.2	2.1	4.3	3.2	2.2
Intentional injuries				11	8	7	7	3.5	3.8	4.1	4.9	5.3	6.0

TABLE 4

DISAGGREGATED CATEGORIES FOR WHICH THE TOTAL IS PROJECTED TO INCREASE BY MORE THAN 20% (IN BOLD) FOR ALL DEVELOPING COUNTRIES (2030 DALYS PER CAPITA)/(2005 DALYS PER CAPITA)

Rank for total		All developing countries				Low-income developing countries			
All	Low-income	Causes (bold if >1% of DALYs in 2030 for all & low-income developing countries)	Total	Male	Female	Total	Male	Female	
1	4	Diabetes mellitus	181	161	196	160	151	168	
2	2	Chronic obstructive pulmonary disease	174	179	168	169	180	156	
3	6	HIV/AIDS	166	177	156	151	158	144	
4	1	Parkinson disease	166	159	171	174	167	181	
5	3	<i>Wat^d</i>	160	166	155	165	170	157	
6	15	Chlamydia	153	161	147	124	136	120	
7	5	Trachea, bronchus, lung cancers	149	148	160	160	163	158	
8	8	Respiratory diseases^d	143	148	139	137	145	128	
9	18	Alzheimer and other dementias	139	128	144	121	112	126	
10	10	Cataracts	139	134	141	129	126	130	
11	9	Glaucoma	135	131	137	137	136	136	
12	11	Prostate cancer	133	138		129	132		
13	16	Sense organ diseases^b	131	126	134	126	123	128	
14	13	Vision disorders, age-related	127	120	131	128	125	130	
15	19	Bladder cancer	127	129	128	123	130	117	
16	46	Gonorrhoea	125	124	125	105	105	105	
17	17	Cervix uteri cancer	125		121	125		122	
18	23	Hearing loss, adult onset	123	120	127	121	118	124	
19	24	Benign prostatic hypertrophy	121	126		120	124		
20	7	Road traffic accidents	121	126	114	138	148	121	
21	12	Corpus uteri cancer	119		115	129		125	
23	14	Breast cancer	117	79	113	128	57	125	
24	20	Oesophagus cancer	117	114	124	123	119	130	
25	21	Malignant neoplasms ^c	115	116	115	123	123	123	
29	22	Ovary cancer	110		106	123		119	

Rank for total		All developing countries			Low-income developing countries		
All	Low-income	Causes (bold if >1% of DALYs in 2030 for all & low-income developing countries)			Total	Male	Female
30	15	Melanoma and other skin cancers			109	106	111
35	18	Liver cancer			105	106	108
					127	119	134
					125	127	125

Notes:

- ^aIncludes chronic obstructive pulmonary disease also listed here.
- ^bIncludes cataracts, glaucoma, vision disorders age related and hearing lost adult onset, also listed here.
- ^cIncludes prostate, bladder, cervix uteri, corpus uteri, breast, oesophagus, ovary, melanoma and other skin and liver cancers, also listed here.
- ^dWar is greater than 1% of the 2030 DALYs for low-income (but not all) developing countries.

APPENDIX TABLE 1A

ALL CAUSES PROJECTED IN CERTAIN YEARS TO BE AT LEAST 1% OF TOTAL DALYS OVERALL, OR FOR FEMALES OR MALES
 CONSIDERED SEPARATELY
 ROW NUMBERING CORRESPONDS TO THE SOURCE (WWW.WHO.ORG ANNEXES 8–26)

	All developing countries			Low-income developing countries		
	2005	2015	2030	2005	2015	2030
Population (millions)	5,495	6,121	6,890	2,699	3,154	3,772
All causes	100%	100%	100%	100%	100%	100%
Communicable, maternal, perinatal & nutritional conditions	41	37	32	53	48	41
A. Infectious and parasitic diseases	24	23	23	31	30	28
1. Tuberculosis	3	3	3	3	3	3
2. STDs excluding HIV	1	1	1	1	1	1
b. Chlamydia	0	0	0	0	0	0
3. HIV/AIDS	6	8	11	7	9	12
4. Diarrhoeal diseases	4	3	2	6	4	3
5. Childhood-cluster diseases	3	2	1	4	3	2
a. Pertussis	1	1	0	1	1	1
d. Measles	1	1	1	2	2	1
8. Malaria	2	2	2	4	3	2
9. Tropical-cluster diseases	1	1	1	1	1	1
e. lymphatic Filariasis	0	0	0	1	0	0
B. Respiratory infections	6	5	3	8	7	4
1. Lower respiratory infections	6	5	3	8	6	4
C. Maternal conditions	2	2	1	3	2	2
D. Perinatal conditions I	7	6	4	8	7	5
E. Nutritional deficiencies	2	2	1	3	2	1
1. Protein-energy malnutrition	1	1	1	1	1	1
4. Iron-deficiency anaemia	1	1	0	1	1	0
Noncommunicable diseases	46	50	54	35	39	45
A. Malignant neoplasms	5	5	6	3	3	4
3. Stomach cancer	1	1	1	0	0	0
5. Liver cancer	0	1	1	0	0	0

		All developing countries			Low-income developing countries		
		2005	2015	2030	2005	2015	2030
B.	7. Trachea, bronchus, lung cancers	1	1	1	0	0	1
	9. Breast cancer	0	0	0	0	0	0
	10. Cervix uteri cancer	0	0	0	0	0	0
	Other neoplasms	0	0	0	0	0	0
	Diabetes mellitus	1	2	2	1	1	2
	Endocrine disorders	0	0	1	0	0	0
	Neuropsychiatric conditions	12	13	13	9	10	11
	1. Unipolar depressive disorders	4	5	5	3	4	4
	2. Bipolar disorder	1	1	1	1	1	1
	3. Schizophrenia	1	1	1	1	1	1
C.	4. Epilepsy	1	1	1	0	1	1
	5. Alcohol use disorders	1	1	1	0	0	0
	6. Alzheimer and other dementias	0	1	1	0	0	0
	9. Drug use disorders	0	0	0	0	0	0
	12. Panic disorder	0	0	0	0	0	0
	14. Migraine	0	0	0	0	0	0
	Sense organ diseases	5	6	7	4	5	6
	1. Glaucoma	0	0	0	0	0	0
	2. Cataracts	2	2	3	2	2	3
	3. Vision disorders, age-related	1	1	1	0	1	1
D.	4. Hearing loss, adult onset	2	2	2	1	2	2
	Cardiovascular diseases	10	10	11	8	9	10
	2. Hypertensive heart disease	1	1	1	0	0	0
	3. Ischemic heart disease	4	4	4	4	4	4
	4. Cerebrovascular disease	3	3	4	2	2	3
	Respiratory diseases	4	5	6	3	4	5
	1. Chronic obstructive pulmonary disease	2	3	4	1	2	3
	2. Asthma	1	1	1	1	1	1
	Digestive diseases	3	3	2	3	2	2
	2. Cirrhosis of the liver		1	1	1	1	1
E.	Genitourinary diseases	1	1	1	1	1	1

		All developing countries			Low-income developing countries		
		2005	2015	2030	2005	2015	2030
L.	1. Nephritis and nephrosis	1	1	1	1	1	1
	Musculoskeletal diseases	2	2	2	1	1	2
	1. Rheumatoid arthritis	0	0	0	0	0	0
	2. Osteoarthritis	1	1	1	1	1	1
	Congenital anomalies	2	2	1	2	2	1
M.	Oral conditions	0	1	1	0	0	0
Injuries		13	13	14	12	13	14
A.	Unintentional injuries	9	10	10	9	10	10
	1. Road traffic accidents	3	3	4	2	3	4
	2. Poisonings	0	0	0	0	0	0
	3. Falls	1	1	1	1	1	1
	4. Fires	1	1	1	1	1	1
	5. Drownings	1	1	1	1	1	1
	6. Other unintentional injuries	3	3	3	3	3	4
	Intentional injuries	3	4	4	3	3	4
	1. Self-inflicted injuries	1	1	1	1	1	1
	2. Violence	2	2	2	1	1	1
	3. War	0	1	1	1	1	1

Note: Conditions showing 0% for all six entries have at least one projected value of 1% for females, with the exception of drug use disorder and poisonings, both cases in which there is at least one projected value of 1% for males.