Health System Reform in Mexico 2

Priority setting for health interventions in Mexico's System of Social Protection in Health

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Explicit priority setting presents Mexico with the opportunity to match the pressure and complexity of an advancing epidemiological transition with evidence-based policies driven by a fundamental concern for how to make the best use of scarce resources to improve population health. The Mexican priority-setting experience describes how standardised analytical approaches to decision making, mainly burden of disease and cost-effectiveness analyses, combine with other criteria—eg, being responsive to the legitimate non-health expectations of patients and ensuring fair financing across households—to design and implement a set of three differentiated health intervention packages. This process is a key element of a wider set of reform components aimed at extending health insurance, especially to the poor. The most relevant policy implications include lessons on the use of available and proven analytical tools to set national health priorities, the usefulness of priority-setting results to guide long-term capacity development, the importance of favouring an institutionalised approach to cost-effectiveness analysis, and the need for local technical capacity strengthening as an essential step to balance health-maximising arguments and other non-health criteria in a transparent and systematic process.

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Health conditions in Mexico have improved substantially over the past 50 years. Between 1955 and 2005, life expectancy at birth increased by 45% to reach 75·4 years, and infant mortality rates fell by 83%.[1,2] The steady rise in the average level of population health, however, has been accompanied by persistent inequalities across different segments of the population over time.[3] For instance, child mortality in the affluent state of Nuevo León is half of that seen in the less developed state of Chiapas. Likewise, although the epidemiological transition is now well advanced across Mexico, mortality from communicable diseases in the lowest income decile of the population is twice as high as that in the highest decile.

The epidemiological transition in Mexico presents new challenges to a health system that has traditionally prioritised programmes for communicable diseases and reproductive health. Despite chronic underfunding, substantial gains have been realised in this traditional agenda through a focus on community-based interventions that are widely recognised as being highly cost effective. For example, a comprehensive national immunisation programme attains coverage rates consistently above 95% and has dramatically reduced mortality from vaccine-preventable diseases, while oral rehydration therapy has reduced deaths from diarrhoea from 14% of all deaths in 1950 to less than 1% today.[3,4] However, emerging non-communicable diseases have been less readily incorporated into the list of priority interventions covered by public providers to the uninsured. As a consequence, unmet demand has been serviced by the mostly unregulated private sector, with more than half of total spending on health paid out of pocket.[5–7]

Over the years, pressure has mounted for the public health-care system to ensure access to high-quality primary care and hospital-based services. In 2003, a major health reform created the System of Social Protection in Health (SSPH), generating new financial rules to fund population-based interventions and personal health-care interventions, the latter being financed through an insurance-based component called Popular Health Insurance, or *Seguro Popular* (panel 1).[8,9] In real terms, public expenditure for the uninsured has increased by 61% between 2001 and 2006. Through *Seguro Popular* alone, the mean per-family allocation of public resources for personal health services will increase in real terms from US$268 in 2001—before the programme was first piloted—to $677 in 2010, when full coverage is expected.[6]

For the new funding to translate into those services that best address the emerging challenges of chronic diseases and injuries, the reform has demanded rigorous evidence on the magnitude of different health problems and on the benefits and costs of different health interventions. Furthermore, decisions to include new interventions through a more democratic and participatory process have required an exercise in priority setting that is not only evidence based but also equitable, transparent, and contestable.

We present experiences in priority setting in Mexico and draw a series of lessons with potential relevance to other countries. We describe the interaction between an advancing epidemiological transition and a set of policies associated with package formulation. We also summarise the analytical inputs, main findings, and key lessons from experience derived from SSPH implementation.

Panel 1: Mexican reform and the System of Social Protection in Health (SSPH)[8,10,11]

Context of reform

- Fragmented health system characterised by large, centrally managed and uncoordinated social insurance institutions and devolved and underfunded state delivery systems for the uninsured; weak stewardship by the federal Ministry of Heath; and an unregulated private sector mostly financed with out-of-pocket payments by the uninsured and those unsatisfied with the quality of public providers.
- Half the Mexican population uninsured—ie, without access to publicly funded health-care insurance.
- Increasing pressure resulting from demographic and epidemiological transitions, and increased consciousness of social right to health protection from a more democratic, informed, and demanding society.
- Financial imbalances concerning a low level of overall health spending (5·6% of gross domestic product in 2000); a raised share of out-of-pocket spending (52%); unequal per-head public resource allocation between the insured through social security and the uninsured (2·3 to 1), and unequal per-head federal allocation among states (5 to 1 between most and least favoured states); inequitable per-head state contributions to finance health care (115 to 1 between states with most and least per-head contributions to health spending).*

Key features of reform

- *Seguro Popular* pilot programme started in 2001; new law for the creation of the SSPH passed by Congress in April, 2003; law in effect starting January, 2004.
- Reform aims to promote universal access to social protection in health under a 7-year phase-in. The reform builds upon ongoing efforts to strengthen the stewardship function of the health system and policies aimed at improving coordination between public institutions.
- Reform introduces new financial arrangements between states and especially for federal government to fund personal health services. Public-health interventions (mainly public-health goods and community-based interventions) are financially protected from budget pressure from health-care demand.
- Public health and community-based interventions are offered to the population regardless of health insurance status, with focus on vulnerable, at-risk, or underserved populations. Interventions are financed under a separate fund, mainly through federal funds, although states could fund complementary interventions at the local level.
- Personal health services are provided through *Seguro Popular*, the subsidised insurance-based component of the SSPH. The eligible population is that without access to social insurance.
- *Seguro Popular* is funded on the basis of a legislated financial entitlement per affiliated family. This federally funded social contribution is equivalent to the general tax-financed amount granted by the federal government to the population in the private labour market benefiting from social security. *Seguro Popular* includes additional statutory federal and state government contributions per family, which are defined as a function of this entitlement.
- Under *Seguro Popular*, monies are allocated to decentralised state ministries of health in proportion to the number of families voluntarily affiliated each year.
- Families also contribute with a means-tested annual payment. The two lower income deciles are exempted but are requested to participate in health promotion activities.
- Affiliation to *Seguro Popular* provides access to explicit benefits included in a package of essential health-care interventions managed and delivered at the state level, and a package of high-complexity health-care interventions through a fund for protection against catastrophic health spending administered at the federal level.

* 2002 figures.

Epidemiological transition

Following the general model of the epidemiological transition, the pattern of causes of death in Mexico has evolved rapidly over the past decades (figure 1).[12] Communicable diseases accounted for 70% of all deaths nationally in 1955, but now account for only 12% of deaths. Over the same interval the proportion of all deaths due to non-communicable diseases has risen from 23% to 75%.

National figures mask a certain degree of variation in the extent of the epidemiological transition across different subpopulations in Mexico. For example, the proportion of deaths attributable to communicable diseases is 2·2 times higher in the state of Chiapas (one of the poorest in the country) than in the state of Sinaloa (one of the most affluent). By making analogous comparisons across municipalities grouped by levels of community deprivation with an index constructed from seven sociodemographic indicators (as described elsewhere[10]), the contribution of communicable diseases is seen to be 1·9 times higher in the poorest population decile than in the richest decile. Despite this variation, the shift from communicable to non-communicable diseases in the lowest socioeconomic strata lags behind the national trend only by around 10 years, which indicates an advanced epidemiological transition even in the most disadvantaged groups. Analysis of specific causes of death provides further evidence of the advanced transition, with ischaemic heart disease, stroke, and diabetes among the five leading causes of death in all 32 states.

Priority setting for health interventions

The history of priority setting for health interventions offers an example of how internal and external pressures have combined to create a unique policy environment for health reform (figure 2). The concept of designing a package of essential health-care interventions on the basis of burden of disease and cost-effectiveness considerations was introduced by the World Bank in the 1993 World Development Report.[13] The following year, the *Fundación Mexicana para la Salud* applied the same approach in Mexico through the Economy and Health Report,[14] proposing specific reforms including the use of an explicit priority-setting process and a set of basic interventions to be considered in an essential health-care package.[14] The definition and introduction of such a package signified a shift from previous policy efforts—which focused to a great extent on ad-hoc supply-side strategies to extend access to health care—to a more equitable and rational resource allocation process to steer supply-related efforts towards increasing coverage in deprived areas in the midst of economic crisis.

The proposal to define an explicit intervention package was revisited in 1996 when the Programme for Extension of Coverage (*Programa de Ampliación de Cobertura*, PAC) emerged as a consequence of debt renegotiations with

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the World Bank after Mexico's financial crisis of 1995. At the time, the Mexican Ministry of Health had decided to resume the devolution of health-care provision to the states that had been initiated in 1987 but stalled soon thereafter for political reasons. The new conditional transfers associated with the delivery of the package of basic services proposed under PAC would soon provide the Ministry with the policy incentives to strengthen stewardship in the devolved state health services. Covering 34 health-care interventions in 13 different categories of community based and preventive personal care, PAC was adopted as the health component of the poverty alleviation programme *PROGRESA*, later reformulated as *Oportunidades* and now covering 5 million families. PAC matured as a centrally managed programme, but by 2001 it was evident that the 34 covered interventions provided insufficient protection for its chronically underserved, rural poor, target population.[15]

With the arrival of a new administration in 2001, three fundamental policy premises guided the priority-setting process. First, substantial new funding was to be made available through a shift from supply-side financing towards allocating funds on a per-family basis, adjusted for health needs. Second, community-based and public-health interventions—which had proven highly effective over the years—had to be protected from being undermanaged or underfinanced as a result of a reform process centred on improving access to facility-based health-care services. Third, all previous supply-side allocations and prevailing delivery programmes (most notably PAC) had to be made compatible with the new financial and organisational structure.

An explicitly defined suite of coverage packages was conceived as the basis for a three-way social contract between the federal government, the states, and the affiliated families. For the federal government, such packages provided the means to direct the new funds to

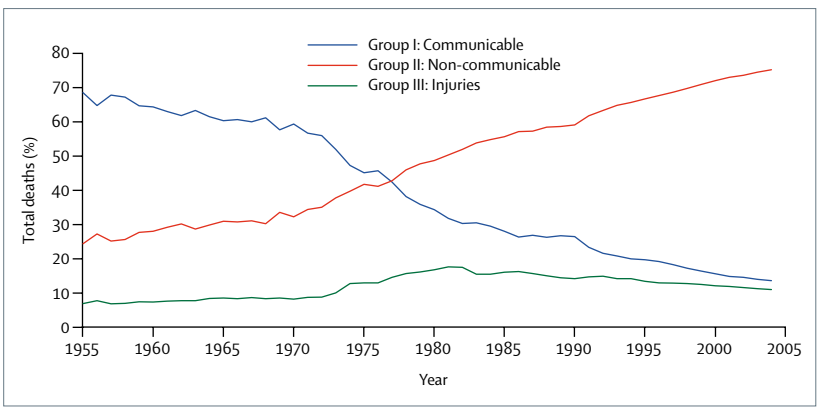

Figure 1: **Distribution of deaths across broad cause groups, 1955–2004**[1,2]
Group I comprises communicable diseases, maternal and perinatal conditions, and nutritional deficiencies; group II comprises non-communicable diseases; and group III comprises injuries.

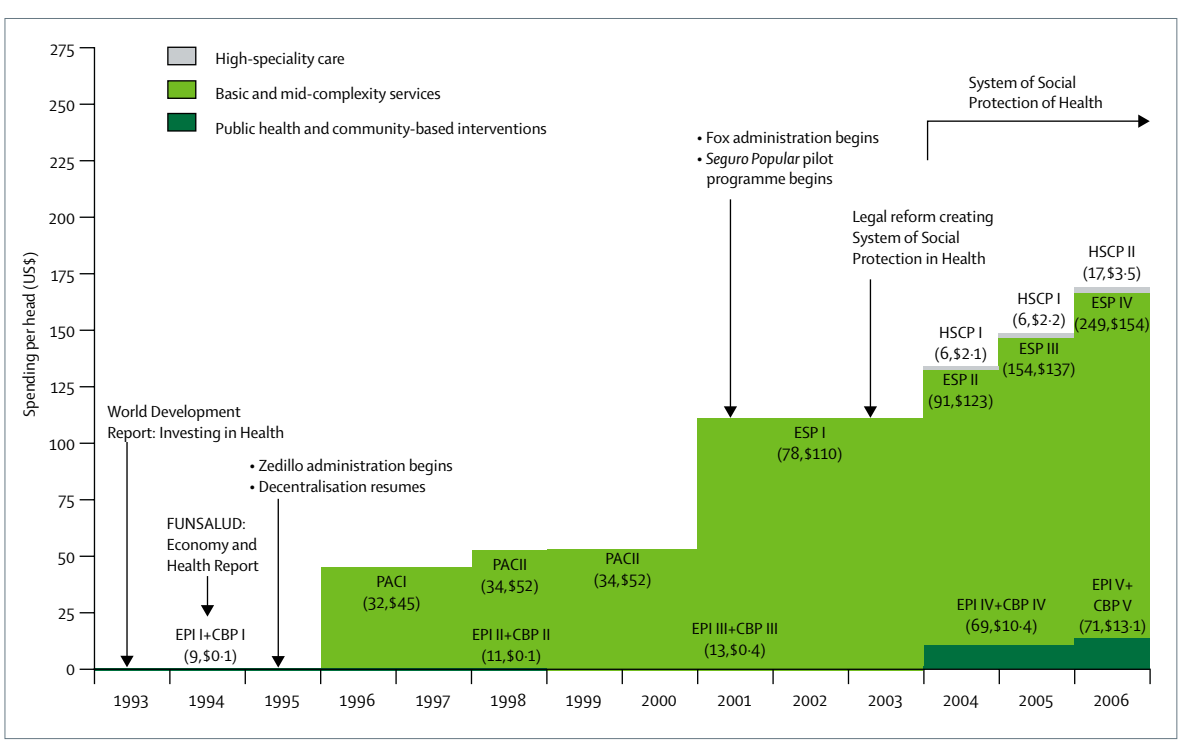

Figure 2: **Evolution and policy highlights in package formulation, 1993–2006**[4,6,8–10]
Number of interventions and annual cost per head (in US$) presented in parentheses. PAC I's 32 interventions were originally grouped in 12 health-care categories. PAC II's 34 interventions were presented as 13 categories. EPI+CBP and HSCP only cover variable costs, whereas PAC and ESP represent total costs. CBP=community-based package; EPI=expanded programme immunisations; PAC=extension of coverage package; ESP=essential services package; FUNSALUD=*Fundación Mexicana para la Salud*; HSCP=high-specialty care package.

the most pressing health needs, especially those relating to emerging non-communicable diseases, and to benchmark performance across states. For the states, they provided a formula for equitable allocation of federal funds and the possibility to leverage these funds for the construction of new facilities. Finally, the packages allowed affiliated families to demand coverage of explicit services and thus hold state providers accountable for the promised delivery of health care.

The SSPH responded to the complexity of the evolving epidemiological pattern and the need for both differentiated financing arrangements and criteria for priority setting among interventions with a gradual phase-in of three distinct packages: (1) a set of public health and community-based interventions funded at the federal level and selected mainly on the basis of considerations of burden of disease, equity, and cost effectiveness; (2) a state-administered package of low-complexity and medium-complexity health-care interventions, informed not only by cost-effectiveness considerations but also by the need to increase and regulate access to primary and hospital care for newly affiliated families; and (3) a centrally managed package of high-complexity health care interventions drawn up on the basis of the need to diversify financial risk among states, with capacity constraints and social pressures having important roles in the priority-setting process. Figure 2 illustrates the evolution of these three packages, including scope, per-head costs, and some relevant policy highlights.

The interventions included in the public health and community-based services are mainly those carried over from the existing expanded programme for immunisations and community-based packages implemented during the initial wave of priority setting. These interventions—eg, those aimed at expanding national immunisation programmes, reducing chronic malnutrition and dehydration from diarrhoea, and providing clean water—have traditionally dominated the design of cost-effective packages of services in line with international recommendations.[16–18] Nevertheless, the SSPH created a separate fund to finance these interventions, which are delivered mainly at the local level but require central management and financing to guarantee compliance with national coverage targets and standards. The community-based package, including the expanded programme for immunisations, has grown from ten interventions at a per-head cost of $0·40 in 2001 to include, at present, 71 interventions at an estimated per-head cost of $13.[6]

The most formidable gaps in service coverage were identified within the set of interventions of basic to mid-level complexity, and thus this package received the most financial attention. Before the reform, evidence on out-of-pocket expenditures indicated a greater incidence of both catastrophic health spending (defined as a percentage, usually 30% of a household's disposable income less their spending on food) and impoverishing health spending (defined as spending that pushes household income below a poverty line threshold) in poor and uninsured populations. Furthermore, evidence showed an increased concentration of out-of-pocket health expenditures on nominally low-cost items—eg, ambulatory care and drugs—in families in the lowest income quintiles. Whereas the share of out-of-pocket spending dedicated to drugs and ambulatory care accounted for 75% of out-of-pocket health spending in the lowest income quintile, the same share in the highest income quintile was only 34%.[7] In response to this problem, design of the essential package for *Seguro Popular* has been informed both by cost-effectiveness considerations and by the aim of reducing out-of-pocket payments for personal services borne by the programme's target population.

As new funds have become available and transferred to states according to affiliation targets, the package has been extended from the initial 34 interventions included in PAC, to 78 under the *Seguro Popular* pilot programme, to 249 interventions at present, covering most causes of primary care consultations and almost 95% of all causes of hospital admissions at a per-head cost of $154 per year.[19]

High-specialty care has proven to be the most complex and challenging set of interventions to define, finance, and deliver. Initially this package was broadly devised under the new law as a list of four major disease categories (cancer, cardiovascular disease including stroke, severe injuries, and HIV/AIDS) and four procedure clusters (long-term physical rehabilitation, transplants, dialysis, and neonatal intensive care). However, institutional and organisational constraints soon became apparent. First, implementation required information systems that would allow for aggregation and packaging of diagnoses and procedures that could easily be reimbursed to providers from a centrally managed fund. Second, the proposed inclusion of new interventions on the basis of evidence of cost effectiveness had to be balanced against an array of ethical and political considerations, including pressure from patient advocacy and industry interest groups. Finally, supply was slow to respond, especially in underserved areas where the availability of specialists had become the main bottleneck. Nevertheless, the centrally managed fund for the protection against catastrophic spending (known as *Fondo de Protección contra Gastos Catastróficos*, FPGC) now covers 17 interventions, including treatments for 11 childhood cancers, cervical cancer treatment, management of neonatal sepsis and respiratory insufficiency, premature newborn care, antiretroviral therapy for HIV/AIDS, and cataract surgery, at an average per-head cost of $3·5.

Evidence for priority setting

As the design and implementation of the three intervention packages offered under SSPH have proceeded, systematic efforts to build the evidence base

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for prioritisation of health interventions in Mexico have concentrated on two major sets of analytical inputs for decision making. Estimates of the burden of disease have been developed to assess the magnitude of different health problems, and cost-effectiveness analyses have been used to weigh the potential population-level benefits of different interventions against their economic costs. Panel 2 summarises the key data sources and technical resources that were used to do these analyses.

Burden of diseases, injuries, and risk factors

We have analysed the national burden of disease and undertaken a comparative risk assessment in Mexico with standardised approaches used internationally.[17] Supplementary information on the methods used is available on the authors' website. Table 1 and table 2 show the leading causes of mortality and lost years of healthy life defined in terms of disease and injury categories or in terms of risk factors. Eight of the 12 leading causes of death, that together account for more than three-quarters of all deaths, are non-communicable diseases, confirming the advanced epidemiological and risk transitions in Mexico (table 1). The leading causes of death are much the same in men and women, with a more important role for injuries in men than in women, and breast and cervical cancers among the major killers of women.

Calculations of disease burden made on the basis of disability-adjusted life years represent years of healthy life lost.[17] Burden measures weight deaths at different ages by the duration of life lost compared with a reference standard (and thus attach greater weight to mortality in young children). Nevertheless, non-communicable diseases and injuries rather than infectious diseases and other childhood illnesses constitute the leading causes of disability-adjusted life years in Mexico. Disease burden measures also extend mortality-based measures by accounting for non-fatal outcomes in units that allow combination with measures of premature death. Neuropsychiatric conditions such as depression and alcohol use cause few direct deaths but result in loss of health through morbidity, and thus rank among the leading causes of disease burden, especially in women.

Mortality and burden of disease from risk factors with potential for preventive interventions further emphasise the pattern of epidemiological transition in Mexico (table 2). Alcohol use, overweight and obesity, and raised blood glucose and blood pressure are the leading causes of mortality and disease burden overall. Low fruit and vegetable consumption and tobacco use also have large effects on mortality for both sexes, while unsafe sex is a leading risk factor for lost years of healthy life for women.

The specific diseases, injuries, and risk factors that are the leading causes of disease burden in Mexico illustrate that interventions for analysis—and, ultimately, delivery—can be drawn from a menu of personal and population-level behavioural and pharmacological options that cross all three intervention packages, as seen in the example of type 2 diabetes and elevated blood glucose (panel 3).

Panel 2: **Key data sources and technical resources used in burden of disease and cost-effectiveness analyses**

Administrative registry data

- *SEED—Ministry of Health vital registration database, 2001–05*
  Sistema Estadístico, Epidemiológico de las Defunciones (SEED) is a mortality registry maintained by the Mexican Ministry of Health. Individual-level mortality data are available via death certificates and include sociodemographic characteristics, geography, and multiple causes of death coded according to the International Classification of Diseases, tenth revision (ICD-10).
- *INEGI—National Institute of Statistics, Geography and Informatics vital registration database, 2000–04*
  The *Instituto Nacional de Estadística, Geografía e Informática* (INEGI) vital registration database contains individual-level mortality data much like SEED; however, a single cause of death is recorded.
- *SAEH—Ministry of Health hospital discharge database, 2000–05*
  The *Subsistema Automatizado de Egresos Hospitalarios* (SAEH) is a hospital discharge database for all Ministry of Health hospitals that includes patient-level data on causes of hospitalisation classified by ICD-10 codes, diagnostic and treatment procedures and results, in-hospital mortality, reasons for discharge, number of in-hospital bed days, and insurance status.
- *IMSS—Mexican Institute of Social Security hospital discharge database, 2004–05*
  This hospital discharge database covers all of the *Instituto Mexicano del Seguro Social* (IMSS) hospitals and includes much the same patient-level data as SAEH.

Population projections

- *CONAPO—National Council of Population projections, 2000–05*
  The *Consejo Nacional de Población* (CONAPO) has projections of population numbers over time by age, sex, state, and insurance status, based on official surveys and censuses.

Household surveys

- *ENSANut—National health and nutrition survey, 2005–06*
  The *Encuesta Nacional de Salud y Nutrición* (ENSANut) is a national and state representative health and nutrition survey implemented by the National Institute of Public Health. It records information on household (n=47 695) and individual (n=206 700) characteristics, including health insurance, risk factors (smoking, alcohol use), biomarkers (cholesterol, hypertension, plasma glucose, haemoglobin A_{1c}), use of services, and health states.

Technical resources

- *WHO CHOICE—WHO tools for cost-effectiveness analysis*
  WHO's Choosing Interventions that are Cost-effective (WHO CHOICE) project has developed a standardised approach to cost-effectiveness analysis at a regional level. Available tools include a five-state epidemiological model (PopMod) to estimate population-level intervention effects, costing templates and country price estimation models, and intervention effectiveness templates for contextualising regional analyses of selected diseases and risk factors.

For **supplementary information** see http://www.globalhealth.harvard.edu/MexicoLancet.html

Cost-effectiveness of health interventions

Although the need for economic assessment as an input to resource-constrained health planning has been recognised widely, the actual use of information on the cost-effectiveness of different health interventions to inform priority setting remains limited in most

	Proportion of total for both sexes	Proportion of total for men	Proportion of total for women
Mortality			
Ischaemic heart disease	13·3%	12·9%	13·9%
Diabetes mellitus	9·9%	8·0%	12·4%
Cerebrovascular disease	6·1%	5·2%	7·3%
Cirrhosis of the liver	5·6%	7·6%	2·9%
Road traffic accidents	4·4%	6·1%	2·1%
Chronic obstructive pulmonary disease	4·0%	4·1%	4·0%
Lower respiratory infections	3·6%	3·5%	3·8%
Hypertensive heart disease	3·3%	2·6%	4·2%
Birth asphyxia and birth trauma	2·9%	3·1%	2·6%
Nephritis and nephrosis	2·7%	2·6%	2·8%
Violence	2·2%	3·4%	..
Trachea, bronchus, and lung cancers	1·6%	..	..
Prostate cancer	..	2·0%	..
Breast cancer	..	..	2·3%
Cervix-uterine cancer	..	..	2·3%
Disability-adjusted life years			
Unipolar depressive disorders	6·4%	4·4%	8·9%
Road traffic accidents	4·6%	6·5%	2·4%
Birth asphyxia and birth trauma	4·2%	4·6%	3·7%
Diabetes mellitus	3·6%	3·1%	4·3%
Ischaemic heart disease	3·2%	3·7%	2·7%
Cirrhosis of the liver	3·1%	4·5%	..
Violence	2·9%	4·7%	..
Asthma	2·5%	2·4%	2·5%
Alcohol use disorders	2·5%	3·7%	..
Schizophrenia	2·1%	..	2·3%
Cerebrovascular disease	2·1%	1·9%	2·2%
Congenital heart anomalies	2·1%	2·0%	2·1%
Endocrine disorders	..	..	2·1%
Lower respiratory infections	..	2·0%	..
Cataracts	..	..	2·0%
Migraine	..	..	2·0%

Authors' calculations. Data are reported only for the 12 leading causes in each sex category.

Table 1: **Leading causes of mortality and disability-adjusted life years by disease and injury category, 2004**

developing countries. Important technical impediments remain. On the one hand, there is valid concern that simple extrapolation of international estimates might misguide national resource allocation decisions. On the other hand, undertaking country-specific cost-effectiveness analyses requires extensive, reliable, and valid data and local technical analytical capacity that is not always readily available.

Recent advances in international cost-effectiveness analysis—most notably WHO's CHOICE (CHoosing Interventions that are Cost-Effective) project and the recent update of the Disease Control Priorities Project (DCP2)—have produced regional results on cost-effectiveness for an array of interventions that can help inform decisions at the national level, as well as providing standardised technical tools to facilitate country-level contextualisation of these results.[16–18] As the design of intervention packages in the SSPH has evolved, new cost-effectiveness analyses have been done in Mexico for selected interventions, and a heavy emphasis has been placed on further developing the technical capacity to undertake these analyses.

New cost-effectiveness analyses have been undertaken in two phases. A first phase followed international guidelines on methods for cost-effectiveness analysis to produce disease-specific models and estimates for the following interventions: pneumococcal conjugate vaccine, influenza vaccine, rotavirus vaccine, breast cancer screening, cervical cancer screening, treatment for childhood cancers (including 11 different cancers), renal replacement therapy and renal transplantation, corneal transplantation, and neonatal intensive care. The development of standardised disease modelling software and costing templates by the CHOICE project has enabled a second phase of analyses with a standardised suite of technical tools applied across interventions. Application of CHOICE tools has been undertaken for interventions for depression, prevention and treatment of cardiovascular disease, alcohol use, cataract surgery, and breast cancer screening and treatment, and is underway for interventions for diabetes, cervical cancer, end-stage renal disease, premature newborns, road traffic accidents, vaccine-preventable diseases, chronic obstructive pulmonary disease, and asthma.

	Proportion of total for both sexes	Proportion of total for men	Proportion of total for women
Mortality			
High blood glucose	14·4%	11·9%	17·7%
High body-mass index	12·4%	10·1%	15·5%
High blood pressure	10·1%	9·0%	11·6%
Alcohol use	8·4%	12·3%	3·4%
Tobacco use	4·8%	5·8%	3·4%
Low fruit and vegetable intake	4·7%	4·7%	4·7%
Physical inactivity	4·4%	3·9%	5·1%
High cholesterol	3·6%	3·1%	4·2%
Disability-adjusted life years			
Alcohol use	7·5%	11·7%	2·5%
High body-mass index	5·3%	4·5%	6·2%
High blood glucose	5·2%	4·6%	5·8%
High blood pressure	2·4%	2·5%	2·4%
Unsafe sex	1·9%	1·9%	1·8%
Low fruit and vegetable intake	1·5%	1·6%	1·3%
High cholesterol	1·2%	1·3%	1·1%
Physical inactivity	1·2%	..	1·3%
Tobacco use	..	1·5%	..

Authors' calculations. Data are reported only for the eight leading causes in each sex category.

Table 2: **Leading causes of mortality and disability-adjusted life years by risk factor, 2004**

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Data gaps often require extrapolation of various input assumptions for economic assessments from other countries or from regional databases. In Mexico, the availability of local epidemiological and economic information has helped to reveal limitations in the transferability of conclusions from one setting to another and to develop national estimates of cost-effectiveness for selected interventions. For example, on the basis of the epidemiology of influenza-related mortality and morbidity, ascertained from vital registration and hospital databases, the cost-effectiveness of annual flu vaccination for infants and young children appears much less attractive in Mexico than analyses from other countries have indicated. We estimate that the cost per year of healthy life gained through annual flu vaccination of children aged 6–23 months substantially exceeds three times the per-head gross domestic product—a benchmark often used to discern reasonable value for money in international cost-effectiveness applications. By contrast, previous studies have found this intervention to have cost-effectiveness ratios well below one times the per-head gross domestic product, or even to be cost saving.[20,21]

As another example, distinct features of the epidemiology of breast cancer in Mexico have important implications for analysis of the economic efficiency of different intervention strategies. Analysis of death rates by age reveals that 22% of breast cancer deaths in Mexican women occur before age 45 years, by contrast with around 8% in the USA,[22] consistent with the previous report of a younger pattern of breast cancer incidence in Mexico.[23] Thus, despite lower overall incidence rates in Mexico compared with the USA, we find that the aggressive screening policy in place in Mexico for early detection of breast cancer has an estimated cost-effectiveness ratio between one and three times the per-head gross domestic product; in the USA, screening for breast cancer in women below the age of 50 years has been found to exceed typical benchmarks for cost effectiveness.[24]

Analyses of the cost-effectiveness of an array of interventions across all three intervention package offers insights that in some cases contradict the conventional wisdom on value for money within broad categories of interventions. For example, although it is widely noted that vaccines are among the best buys in health interventions, the advent of more costly vaccines—eg, pneumococcal conjugate vaccine and, most recently, vaccines against the human papilloma virus—might challenge the universal applicability of this claim. We find, for example, that the cost-effectiveness of rotavirus vaccine, the heptavalent pneumococcal conjugate vaccine for infants, and influenza vaccination for infants and young children have cost-effectiveness ratios of less than one times, one to three times, and greater than three times the per-head gross domestic product, respectively, per year of healthy life gained. Thus, specific interventions within the same broad group span the range of categories for assessing value for money of interventions, from highly cost effective to not cost effective. On the other hand, several interventions in the low- and medium-complexity packages, or even in the high-complexity package, have cost-effectiveness ratios that place them among the best values for money, including cataract surgery, treatment with antidepressants, and certain strategies for secondary prevention in ischaemic heart disease patients, all costing less than one-half of per-head gross domestic product per year of healthy life added.

***Panel 3*: Filling coverage gaps for type 2 diabetes**

- Type 2 diabetes ranks as the second leading cause of death, accounting for an estimated 10% of all deaths in 2004. Prevalence rates for type 2 diabetes have increased substantially in the past 20 years, reaching an estimated 10·2%.[11] On the basis of current ageing patterns and obesity trends (the most recent surveys show that 62·3% of the Mexican population have a body-mass index >25 kg/m^2), the number of Mexicans with type 2 diabetes is expected to rise substantially.[11]
- With the implementation of *Seguro Popular*, three new community-based preventive interventions and five treatment interventions relating to diabetes have been added to the package of essential services. In 2002, only early detection and limited pharmacological treatment were covered at a cost of $375 per patient per year. By 2006, a more comprehensive set of interventions has been gradually implemented including emergency stabilisation, and treatment of diabetic foot and chronic heart failure at a total average type 2 diabetes package cost of $2442 per diagnosed patient, a six-fold increase in resources in 4 years.[19]
- At present, cost-effectiveness analyses are underway for a range of different interventions for primary and secondary prevention for type 2 diabetes. Specific interventions now under consideration for addition to the package of essential services include treatment of complications relating to type 2 diabetes such as retinopathy and renal disease. The community-based and essential care packages currently stress preventive interventions involving personalised counselling and lifestyle changes, but these priorities could be revisited on the basis of findings from the ongoing analyses. Shortage of specialised human resources remains a major constraint to expansion of prevention services.

Non-health considerations in priority setting

Allocative efficiency, informed by cost-effectiveness analyses, is only one of several critical considerations in the priority-setting process. The health system performance framework developed by WHO stresses the importance of meeting other intrinsic goals beyond the generation of better overall population health.[25] These goals include being responsive to the legitimate non-health expectations of patients and ensuring fair financing across households. Health systems should also seek to reduce inequalities in both the distribution of health gains and levels of responsiveness across population groups. Beyond these other intrinsic health system goals, which are amenable to measurement as additional sources of evidence for priority setting, a further category of considerations includes a range of non-technical concerns, including social pressures that must be accommodated in any effort to implement reform in a democratic society.[26]

The relevance of particular non-health considerations can vary across packages. For example, equity considerations are especially pertinent to the choice of public health and community-based interventions, and reducing regressive out-of-pocket spending is an especially important aim in packaging personal health interventions. However, two additional considerations relate to all interventions: effect on budget and implementation constraints. To address the effect on budget, financial projections are made under several coverage scenarios. An intervention is considered to be a strong candidate for inclusion in the package when projections indicate budget sufficiency; otherwise, gradual coverage of target populations is considered as an alternative.

Implementation constraints are considered at the final stage in decisions to include interventions. Capacity constraints related to health-care provision are addressed by applying an accelerated accreditation process of the health units where the service will be provided. The aim of the accelerated accreditation is to grant permission to health units for providing services while allowing for a 1-year period to make the necessary improvements in infrastructure to apply for normal accreditation. The accreditation—either normal or accelerated—implies that there will be a delay in the actual start of operations while all the units comply with the standards required. The scarcity of specialists in certain areas is being addressed in the short term with a conditioned certification of medical personnel and in the long term by changing the national residency programme for medical doctors. For some interventions where a conditioned certification is not possible or the lack of medical facilities implies a strong financial commitment to capital investment in the mid term and long term, the decision might be to postpone intervention inclusion indefinitely.[8]

Examples of interventions that have not been included in the packages for budgeting reasons despite evidence of acceptable cost-effectiveness ratios include rotavirus vaccine, treatment for diabetic retinopathy, and renal transplants. Furthermore, breast cancer screening and corneal transplant are not currently covered in the basic to mid-complexity and high-complexity packages, respectively, due to implementation constraints. Treatment for early or late stage breast cancer and kidney dialysis are not yet included because of both budgetary and implementation constraints in the financing of the high-complexity package.

Equity considerations will often arise in cases where a gradual phase-in is justified either because of budget insufficiency or slow capacity response in the short term. Capacity constraints are more likely to bias initial implementation in favour of urban pro-rich communities, as in the case of interventions for non-communicable diseases. By contrast, initial implementation of several community-based interventions (eg, pneumococcal and flu immunisation programmes) is less likely to be subject to local capacity constraints and therefore implemented relatively quickly in the most deprived areas.

The arguments for the recent inclusion of treatment for acute lymphoblastic leukaemia (ALL) in children illustrates several of the points discussed above (panel 4). Treatment for ALL was the first intervention included in the package of high-specialty interventions both because it was found to be a major source of catastrophic spending and impoverishment in afflicted families and because expanded financing could substantially improve outcomes by reducing treatment interruption or abandonment. As a byproduct, the decision to cover treatment for ALL has helped to publicise and exemplify the basic concept of financial protection that drove the reform process of the SSPH.

Because priority setting implies a trade-off between different health system goals, and because these goals should in turn reflect general values of society, the move

Panel 4: **Non-health determinants—coverage of childhood leukaemia**

- Acute lymphoblastic leukaemia (ALL) is the second leading cause of death in children aged 5 to 14 years (6·3% of total deaths in that group for 2004).[2]
- Personalised chemotherapy, better control of bone-marrow transplant, and new drugs to control neutropenia episodes in ALL treatment have increased survival rates above 75% if detected early and treated appropriately. Nevertheless, treatment phases—including induction, intensification, bone-marrow transplant (if necessary), and maintenance—require on average 2·5 years for completion at an expected variable cost of $42 235 (not including fixed capital investments and human resources).[27]
- An estimated 711 children from poor, uninsured families are being diagnosed every year and because of insufficient resources in public specialty hospitals, families had been asked to pay part of the bill, mostly by buying chemotherapy drugs out-of-pocket. As a consequence, in 2003 about 26% abandoned treatment, mostly for financial reasons, and success rates reached no more than 42%.[27]
- Although cost-effectiveness analyses provided a further criterion supporting coverage for ALL treatment (found to have a cost-effectiveness ratio of less than one times the per-head Mexican gross domestic product per disability-adjusted life year averted), fast track inclusion of treatment into the SSPH high-complexity package since 2004 was made largely on the basis of other criteria, mainly the need to improve outcomes and avoid catastrophic payments and family impoverishment.[27]
- Provision is paid per case directly to accredited hospitals throughout the country. However, the main obstacles for the provision are the number of paediatric-oncology specialists (one per 38 patients for the whole national health sector), followed by poor facility conditions that do not meet minimum accreditation requirements. These obstacles are being addressed by an accelerated certification of human resources and accreditation conditional on short-term improvements.[28]
- 756 children with ALL currently under treatment are being financed by the SSPH, with preliminary results showing a considerable reduction in attrition rates.[28]
- Public awareness and active participation of society through specialised non-governmental organisations is a key factor for the successful provision of care, since such organisations are part of a national health council where providers, patients, and SSPH representatives convene to discuss advances on coverage, finance, and quality of care.
- Treatment for other types of leukaemia, as well as for ten other types of childhood cancers, will be covered by SSPH as of 2006 once findings on cost-effectiveness and budgetary sufficiency are considered.

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towards a more explicit and rational decision-making process has been essential.[29–32] The more recent efforts to institutionalise a process that is equitable, transparent, and contestable will prove useful to help manage claims (and less legitimate pressures) in interest groups including but not limited to public-health professionals, poverty-alleviation activists, clinicians, researchers, trade unions, non-governmental organisations, and business and industry advisory groups.

The development of a fair process that accounts for multiple objectives has been initially directed towards interventions in disease clusters financed by the FPGC where the more complex non-health concerns have been prevalent. This occurrence has allowed for the identification of two groups of general considerations. The first includes analytical criteria amenable to quantification, as in the case of cost-effectiveness analyses, budget availability, and implementation constraints. The second includes non-quantitative concerns that must be addressed through a deliberative process to reach consensus (when possible) by different stakeholders. These concerns include an ethical assessment addressing equity implications in population groups and a discussion of social acceptability, including concerns for responsiveness to patients' expectations.

Although the separate groups contributing to the decision process have been loosely interacting as an advisory panel for the past 6 months under the guidance of the General Heath Council (the policy body legally responsible for such decision making), a formal framework is currently being formulated to include all the operational details for the priority-setting process. The process is expected to include an initial phase where the more technical considerations will substantiate a list of candidate interventions to be considered for final approval after sequential deliberations by the ethical and social acceptability committees. This process should help define the order of inclusion of the 64 interventions that have so far been identified under the eight broad categories to be covered by 2010 under the FPGC.

Global lessons

Countries in general, but developing economies in particular, share common traits that make the mutual sharing of priority-setting experiences in health an especially useful exercise. Much of the developing world now faces an advancing epidemiological transition, as in Mexico, and concerns for the distribution of health gains are relevant worldwide. Furthermore, health-care reform and other efforts to strengthen health systems face tough competition for public funds from other valuable social programmes. An explicit priority-setting exercise presents the rare opportunity to match a particular social problem—the pressure and complexity of population health needs—with tailored, evidence-based policies driven by a fundamental concern for how best to use scarce resources to improve population health. The use of economic assessment as evidence for national health priority decisions is the subject of ongoing debate in a growing body of published work.[32–36] The most relevant global policy implications derived from the Mexican experience of priority setting can be summarised as follows.

When both the complexity and rapid increase in population health needs overwhelm the health system, the use of available and proven analytical tools is instrumental in setting national health priorities and building consensus around an effective expansion plan of access to health care. Under complex health profiles and financial constraints, explicit use of packages offers several advantages. Packages can help secure financing for a set of interventions addressing priority disease areas within a broader framework aimed at increasing coverage of community and personal health services for specific target populations. Careful consideration must be given to continuity of care between packages designed for direct, centrally managed programmes (associated with the unfinished agenda of combating communicable diseases) and packages meant to regulate access (eg, hospital-based services). Nevertheless, under devolved service delivery, evidence-based intervention packages can also offer the possibility of reconciling vertical and horizontal approaches to health-service delivery.[4,8] Furthermore, sound analysis for priority setting helps to protect financing for highly cost-effective public health and community-based interventions (which elicit no spontaneous demand for services) against strong pressure from advocacy groups for hospital-based clinical services.

Rational priority-setting results can also guide long-term organisational changes in key areas such as capacity development. Cost-effectiveness analyses, and priority setting in general, bring to light valuable opportunities to strengthen health systems. Capacity constraints and organisational issues, especially the availability of human and physical resources, can place limits on coverage expansion plans for cost-effective interventions. Evidence and consensus on the interventions that should be delivered by the health system can place unrelenting pressure for implementation constraints to be identified, for government agencies to be more coordinated, and for resources to be allocated for the new services. In sum, it can help achieve the necessary changes that could have otherwise been too lengthy or difficult to produce. Likewise explicit package formulation further helps improve the compatibility of traditionally uncoordinated instruments to regulate provision. These include master plans for new infrastructure, guidelines and protocols for new interventions, certification and accreditation procedures for quality assurance programmes, and lists of approved formularies for pharmaceuticals, associated equipments, and other therapeutic supplies.

Results from cost-effectiveness analyses can be successfully applied at different stages in the design of intervention packages; however, a systematic approach

is desirable. In the context of an explicit priority-setting exercise, cost-effectiveness information can be used for two distinct purposes. The first is to scan the horizon for missed opportunities in terms of interventions that would provide good value for money but are not currently included in the package. The second is to provide evidence that can help counter political pressures to add interventions that represent relatively poor value for money. The relevance of time constraints varies between the two types of situations; when scanning for missed opportunities, cost-effectiveness analyses can be undertaken relatively unencumbered by rigid time pressures, while when trying to counter political pressure, information must be produced rapidly enough to guide imminent decisions that are often being propelled by other interest groups. Given this dynamic, it is generally difficult to complete cost-effectiveness analyses quickly enough to respond to pressures to add specific interventions except in the setting of an institutionalised requirement that cost-effectiveness be demonstrated before any new intervention may be added.

Strengthening national capacity in priority setting is essential to allow for a proper balance under a transparent and institutionalised exercise combining health-maximising arguments and other non-health criteria. Although priority-setting tools based on health-maximising criteria—eg, disease burden and cost-effectiveness analyses—are increasingly available and can be contextualised to specific settings, many of the non-health criteria used are not only country specific but also more difficult to quantify for inclusion into systematic decision making. Dividing health interventions into different categories has helped simplify the decision-making process by emphasising the most relevant priority-setting criteria for each package. For population-based and low-complexity personal interventions, decisions are more widely made on the basis of burden of disease and cost-effectiveness analyses and thus more readily aligned with international recommendations. However, as intervention complexity increases, non-health considerations tend to gain greater prominence. When these concerns become commonplace, the need for a more institutionalised process for decision making on the basis of local expertise becomes evident. The main challenge is to turn the priority-setting process into a socially accepted exercise to define the actual limits on the legal right to health protection in a more legitimate way. No decision-making framework can guarantee effectively doing so. However, starting early and encouraging wide participation from society to inform decisions prospectively, rather than validate them after the fact, should move these efforts in a positive direction.

Finally, priority setting should be seen and understood only as a component, albeit an important one, in the cycle of rational policymaking in health. In this policy cycle, which includes planning, formulation, implementation, monitoring, and assessment, concomitant policy methodologies complement and reinforce each other and are most powerful when this wider context is recognised. Thus, priority setting can be considered an intermediate policy tool that links upstream with the planning methodologies for measuring population health and risk factors affecting health status. Downstream, it links with assessment instruments and benefit-incidence analysis measuring the effect of the delivery of priority inteventions.[37] Closing the policy loop is especially important if the results of the priority-setting exercise are to make a durable impact on decision making, since this array of interlinked methodologies sheds light on whether covered interventions are actually reaching their target populations and accommodates re-assessment and refinement of package contents as new data and evidence become available.

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Contributors

E González-Pier participated in the definition of topics, figures, tables, results interpretation, writing, and overall review of the manuscript, had full access to all the data in the study, and had final responsibility for the decision to submit for publication. C Gutiérrez-Delgado participated in the definition and production of figures, results interpretation, writing, and overall review of the manuscript. M Barraza-Lloréns participated in the results interpretation, writing and overall review of the manuscript. R Porras-Condey participated in the production of estimates and figures. G Stevens, N Carvalho, A Casey, R H Dias, Y Murakami, S Kulkarni, and K Loncich participated in data analysis and interpretation. M Ezzati participated in data analysis and interpretation, and writing of the paper. J A Salomon participated in the study design, data analysis, interpretation, writing and overall review of the manuscript. All authors saw and approved the final version of the manuscript.

Conflict of interest statement

We declare that we have no conflict of interest.

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