

W Health System Reform in Mexico 5

Assessing the effect of the 2001–06 Mexican health reform: an interim report card

Emmanuela Gakidou, Rafael Lozano, Eduardo González-Pier, Jesse Abbott-Klafter, Jeremy T Barofsky, Chloe Bryson-Cahn, Dennis M Feehan, Diana K Lee, Hector Hernández-Llamas, Christopher J L Murray

Lancet 2006; 368: 1920–35

Published Online

October 25, 2006

DOI:10.1016/S0140-

6736(06)69568-8

This is the fifth in a Series of six papers about health system reform in Mexico

Harvard Initiative for Global Health, Cambridge, MA 02138,

USA (E Gakidou PhD,

J Abbott-Klafter BA,

J T Barofsky MA,

C Bryson-Cahn BA,

D M Feehan BA, D K Lee BS,

Prof C J L Murray MD); University

of Queensland School of

Population Health, Brisbane,

Australia (E Gakidou,

J Abbott-Klafter); and Ministry

of Health, Mexico City, Mexico

(R Lozano MD,

E González-Pier PhD,

H Hernández-Llamas PhD)

Correspondence to:

Dr Emmanuela Gakidou

emmanuela_

gakidou@harvard.edu

Catastrophic health spending

A household is defined as having catastrophic spending when that household's health expenditure exceeds a specific percentage of total household capacity to pay. That threshold is usually defined as 30% of capacity to pay, but other thresholds are also used. Capacity to pay is defined as a household's total expenditure minus the mean food expenditure of households roughly in the middle of the income distribution.

Since 2001, Mexico has been designing, legislating, and implementing a major health-system reform. A key component was the creation of *Seguro Popular*, which is intended to expand insurance coverage over 7 years to uninsured people, nearly half the total population at the start of 2001. The reform included five actions: legislation of entitlement per family affiliated which, with full implementation, will increase public spending on health by 0·8–1·0% of gross domestic product; creation of explicit benefits packages; allocation of monies to decentralised state ministries of health in proportion to number of families affiliated; division of federal resources flowing to states into separate funds for personal and non-personal health services; and creation of a fund to protect families against catastrophic health expenditures. Using the WHO health-systems framework, we used a wide range of datasets to assess the effect of this reform on different dimensions of the health system. Key findings include: affiliation is preferentially reaching the poor and the marginalised communities; federal non-social security expenditure in real per-head terms increased by 38% from 2000 to 2005; equity of public-health expenditure across states improved; *Seguro Popular* affiliates used more inpatient and outpatient services than uninsured people; effective coverage of 11 interventions has improved between 2000 and 2005–06; inequalities in effective coverage across states and wealth deciles has decreased over this period; catastrophic expenditures for *Seguro Popular* affiliates are lower than for uninsured people even though use of services has increased. We present some lessons for Mexico based on this interim evaluation and explore implications for other countries considering health reforms.

Background

Vicente Fox took office as President of Mexico on Dec 1, 2000, bringing with him a new Minister of Health, Julio Frenk, and a vision to reform the health system. Building on the health-system performance assessment presented in the World Health Report 2000, which identified a major problem in Mexico with **catastrophic health spending**, the administration worked on the policy formulation and political consensus necessary to reform the health system.^{1–3} The main policy shift continued the trend toward an increased share of general taxation to fund health benefits, which began in 1997 for salaried formal sector employees enrolled in social security schemes. The argument for improving equity by extending this tax-based source of funding to those outside the formal sector, while reducing catastrophic health spending and improving access to care, appealed to many political parties. In 2000, about half of all Mexican households had no health insurance,⁴ relying mostly on services provided by the Ministry of Health or paying out-of-pocket for care provided in the private sector. Although political support for the reform resulted from the problem of catastrophic payments in people without insurance, the reform law enacted on May 15, 2003, had broad-reaching objectives.⁵

On Jan 1, 2004, the reform of the General Health Law established the System of Social Protection in Health, which included *Seguro Popular*, the health-care insurance component of the reform. This scheme finances personal health interventions through a broad package of care for enrollees.⁵ Over a legally mandated 7-year phase-in, *Seguro*

Popular is being expanded to cover all uninsured households. The law stipulates that priority for affiliation should be given to poor families in areas with high deprivation, and to rural and indigenous population groups.⁵ To finance the System of Social Protection in Health, contributions are made by the federal and state governments, and by families. Frenk and colleagues^{1,4,6} describe the content of the reform and the financing mechanism in detail.

The System for Social Protection in Health has been set up to be more broad-reaching than an insurance scheme. It involves five actions that comprise the health reform. First, public financing per family is linked to the social contribution—ie, the amount allocated per family in the formal sector in the tax-financed part of social security. This arrangement creates an entitlement for families in *Seguro Popular* similar to that of families receiving social security benefits, and is predicted to increase public financing from 3·1% of the gross domestic product (GDP) in 2003 by 0·8–1·0% of GDP over 7 years.⁷

Second, the packages of individual health services are explicit and are made known to all enrollees, the State Ministries of Health, and to the taxpayers. In principle, this practice gives affiliates an opportunity to demand the services and benefits provided by this programme.

Third, the State Ministries of Health receive funds in proportion to the number of families that voluntarily affiliate each year. Affiliation expires after a year and families can opt to re-affiliate, creating a powerful incentive for states to improve service provision and encourage re-affiliation.

Fourth, federal money is divided into two parts: a fund for non-personal services and a fund for personal services. This strategy aims to ensure that, in the long run, financing for public-health interventions cannot be rerouted to clinical interventions.

Fifth, a catastrophic fund was created from federal monies to directly finance care for specific conditions for which treatment often results in catastrophic expenditure and that are not included in the essential package of services. Conditions currently covered by the fund include treatment for HIV (antiretroviral therapy), childhood leukaemia, cervical cancer, and prematurely born babies.

These five actions taken by the federal Ministry of Health during this administration are referred to here as the 2001–06 Mexican health reform. Although the law was passed in 2003, and implemented in January, 2004, negotiations for the establishment of the System of Social Protection in Health started in 2001, with a pilot phase involving 20 states by the end of 2002. Here we examine changes from 2001 to the present. In view of the broad nature of the reform, its full effect will probably take many years to unfold. Nevertheless, there are potentially important lessons to be learned from an interim assessment.

Much has been written about health reforms in developing countries.^{8–14} Major reforms in Taiwan,^{15–18} South Korea,^{19–21} Thailand,^{22–24} Zambia,^{25,26} Chile,^{27,28} Colombia,^{29–31} Uganda,³² and Mexico^{4,6,33} have been the subject of much published work. Remarkably, few studies have been able to quantify the effects of reforms on use of health-care services or on household health-care payments, controlling for other factors;^{24,31,32,34–36} almost none have been able to systematically examine effects on coverage or effective coverage of important interventions, responsiveness of care, or health outcomes.³⁴ Too often, the overall effect of a major health-system reform remains undocumented, restricting opportunities for learning about what works, what does not, and what factors affect success.

In this evaluation, we consider three perspectives. First, we assess the system-wide perspective, to study the effects at the national and state levels. What has been the overall effect on the performance of the Mexican health system, taking into account all the potential positive and negative **externalities** of the programme? Have resources for health increased, has population effective coverage expanded, and have health outcomes improved? Second, we explore the community perspective in states where *Seguro Popular* has been

Externalities

In economics, an externality is an effect from one production activity that has consequences for another activity or set of individuals and is not reflected in market prices even where a market exists. Externalities can be either positive, when an external benefit is generated, or negative, when an external cost is generated from a market transaction. In this paper, we investigate whether *Seguro Popular* affiliation by some individuals in a given municipality raises health-service use for everyone in that municipality. We find evidence that suggests that as cumulative *Seguro Popular* affiliation increases, use of health services for everyone in that municipality also increases. This finding is possibly due to *Seguro Popular* funds being used to improve Ministry of Health hospitals.

Panel: The WHO Health Systems Performance Assessment Framework

This framework identifies four functions that all systems undertake: financing, service provision, resource generation, and stewardship.^{37,38} Financing is the way by which revenues are collected, accumulated in fund pools, and allocated to specific health actions. Service provision refers to the way inputs are combined to deliver health interventions, including both personal and non-personal services. Resource generation includes institutions that produce inputs—particularly human resources, physical resources such as facilities and equipment, and knowledge. Stewardship involves setting, implementing and monitoring the rules of the game for the health system; assuring a level playing field among all actors in the system (particularly purchasers, providers, and patients); and identifying strategic directions for the health system as a whole.

Health systems are ultimately meant to contribute to social goals. The WHO framework identifies three intrinsic goals for health systems: increase population health (average level and distribution), increase responsiveness (average level and distribution), and increase fairness of financial contribution. Indicators and measurement strategies for each of these social outcomes have been proposed and in some cases measured.³⁷ Figure 1 illustrates the relation between the four functions of health systems and the final social goals or outcomes.

The WHO framework as presented in 2003³⁸ included a new emphasis on monitoring the pathway through which service provision could increase population health and reduce health inequalities. The actions of health systems improve individuals' health by the delivery of appropriate and high-quality interventions to those who need them. This concept is called effective coverage. Figure 1 highlights that effective coverage, as an output of the health system, is the pathway through which service provision improves health.

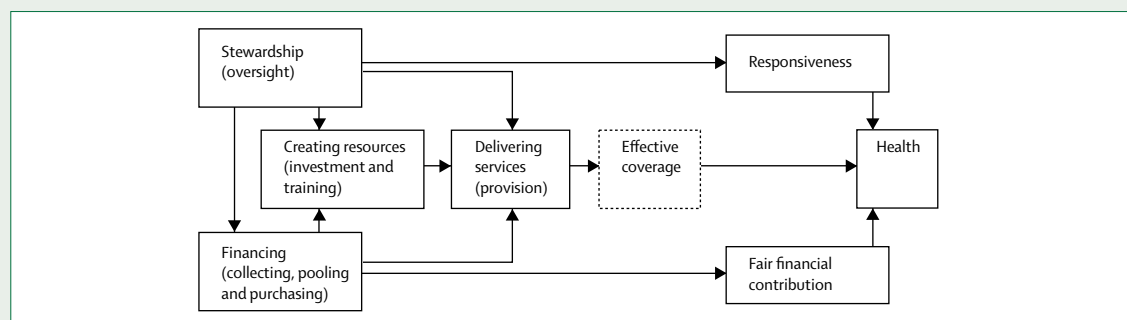


Figure 1: Relation between functions and social goals of health systems

	Data unit	Used to measure
ENSA 2000	Nationally and state representative demographics and health survey, n=190 214	Coverage, responsiveness
ENSANut 2005–06	Nationally and state representative demographic and health survey; also records use, biomarkers, and risk factors; n=206 700	Catastrophic expenditure, coverage, responsiveness, hospital use, functional health status
ENED 2002–03	Nationally and state representative health survey of households and individuals; n=38 746	Responsiveness
ENIGH 2000, 2004	Nationally representative household expenditure survey; n= 11 781 (2000) and 25 548 (2004)	Catastrophic expenditure
Census 2000, 2005	10% sample of all Mexican citizens; n=10 million (2000) and 10.2 million (2005)	Affiliation
SEED, 1995–2005	Ministry of Health death certificate registry	Mortality outcomes
SAEH 2000–05	Ministry of Health hospital discharge records	Hospital use
SICUENTAS, 2000–2005	Record of national and state public health expenditure	Health expenditure
Padrón del Seguro Popular 2002–06	Registry of all individuals affiliated to <i>Seguro Popular</i>	Affiliation
SINERHIAS	Ministry of Health Infrastructure Database	Doctors and nurses per 1000 people
Health Statistics Bulletin 2000–05	Public and private health system information on physical, human, and financial resources, discharges, and visits available by state and institution	Health expenditure and health system resources

For more details see supplementary information, section 8

Table 1: Sources of data used (study name, years)

For all supplementary information see <http://www.globalhealth.harvard.edu/mexicolancet.html> and http://sinais.salud.gob.mx/evaluation_mexican_health_reform

	System-wide	<i>Seguro Popular</i> communities	<i>Seguro Popular</i> affiliates
Functions			
Financing	Yes		
Human resources	Yes		
Stewardship	Yes		
Provision	Yes	Yes	Yes
Outputs			
Effective coverage	Yes	Yes	Yes
Outcomes			
Health	Yes	Yes	Yes
Responsiveness	Yes	Yes	Yes
Financing	Yes		Yes

Table 2: Analytical perspectives investigated for each health-system function or goal, on the basis of available data

Supply-side interventions
Refers to changes from the provision side of services, that is changes in hospital infrastructure, equipment, and quality of Ministry of Health services in response to the increased funds and anticipated demand from services as a result of *Seguro Popular*.

rolled out: have states responded to the programme with **supply-side interventions**? Are incentives to health-care providers translating into improved service provision for communities with *Seguro Popular*, both for the affiliated and the uninsured population? The third perspective is the effect on *Seguro Popular* enrollees compared with similar individuals who are not enrolled. Does *Seguro Popular* affiliation, holding other factors constant, increase use of health-care services, raise effective coverage, improve health outcomes, or decrease catastrophic spending?

The law and the Ministry of Health have encouraged enrolment of families likely to have higher health-care

costs by identifying and prioritising populations in greatest need and by encouraging families with expected medical expenditures, such as those with pregnant women, to affiliate. This practice might increase the possibility of observing biased results, in which *Seguro Popular* affiliates seem sicker than the uninsured population. A study of localities (small administrative areas) randomised to start *Seguro Popular* affiliation at different points in time over the 7-year phase-in is underway and will provide more robust information on this issue.

To organise the analysis in a systematic way, we used the WHO Health Systems Framework (panel, figure 1).^{3,37,38} This analysis has been feasible because Mexico has an extensive health-information system that can be compared with those of most high-income countries. Nevertheless, at this time it is not possible to apply the three analytical perspectives to all functions, outputs, and outcomes of the health system. The emerging picture is incomplete and preliminary; the full effects of the reform are yet to be seen.

Evidence synthesis

Table 1 summarises the sources of data used in this assessment. This section begins with an analysis of the profile of *Seguro Popular* enrollees. We then consider the main functions of financing, resource generation, stewardship, and provision, and effective coverage, which is a key output of the health system. Finally, we examine the key outcomes of health systems: health, responsiveness, and fairness in financial contribution. Table 2 summarises the perspectives that, on the basis of available evidence, we were able to address for each health system function, output, and outcome.

Affiliation

Figure 2 shows the number of individuals affiliated to *Seguro Popular* by quarter, based on the official registry of the *Seguro Popular* Commission. Affiliation began in 2002 in five pilot states and was already taking place in 24 states by the time the law took effect in January, 2004. In all years, especially 2005, a notable increase in affiliation took place during the fourth quarter, as states intensified efforts to meet affiliation targets for each year. Estimates of the total number of uninsured individuals varied between different sources, and ranged from 55% to 61% in 2000 (see supplementary table 1; supplementary information available on authors' website and on request from *The Lancet*). The 11.5 million individuals enrolled in *Seguro Popular* as of the first quarter of 2006, represent 16–18% of the total population without social security or private insurance.

To study the profile of individuals affiliating to *Seguro Popular* and the communities where they live, we used a 10% sample of the Mexican census done in October, 2005. As seen in figure 2, the number of enrollees has grown substantially since the census was taken; results presented here refer to the population affiliated at the time of the census.

Consistent with the goals of *Seguro Popular* to prioritise the bottom two income deciles, the largest fraction of affiliates was in the second lowest decile of household wealth (21%), followed by the poorest decile (19%); the proportion was lower in the higher deciles (supplementary table 2). Affiliation was taking place in highly deprived municipalities (deprivation deciles 2 and 3 with 20% of affiliates in each), but was lower in the most deprived communities (15% of affiliates). This pattern is expected and consistent with the preferential *Seguro Popular* roll-out in communities where health facilities were sufficiently equipped to provide all the services included in the package (see supplementary information section 2.3 for details on the construction of the wealth index and the community deprivation index). Rural and indigenous populations were also identified as priorities for *Seguro Popular* affiliation. Compared with the proportion of the country's population living in rural areas (23.5%), *Seguro Popular* has affiliated a much higher percentage (50.1%). Indigenous people represent 9% of affiliates, compared with 6% in the entire population. However, after controlling for wealth, rural residence, and community deprivation in a logistic regression (supplementary table 3), the probability of affiliating to *Seguro Popular* was lower for indigenous populations.

Figure 3 summarises the probability of affiliating to *Seguro Popular* by decile of wealth and community deprivation, controlling for various factors. It clearly

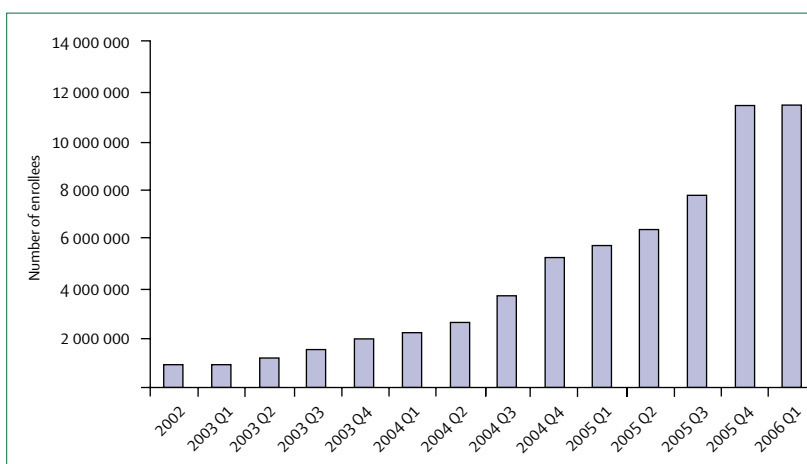


Figure 2: Number of individuals enrolled in *Seguro Popular*

shows that overall and until the 2005 census, probability of affiliation was highest in poor households in communities with low and intermediate levels of development. This pattern of affiliation has come to fill the gap that the social security system has created. Figure 4 shows the probability of receiving social security benefits by decile of wealth and community deprivation, controlling for the same factors as in figure 3. A comparison of the two figures emphasises that *Seguro Popular* is reaching the populations that

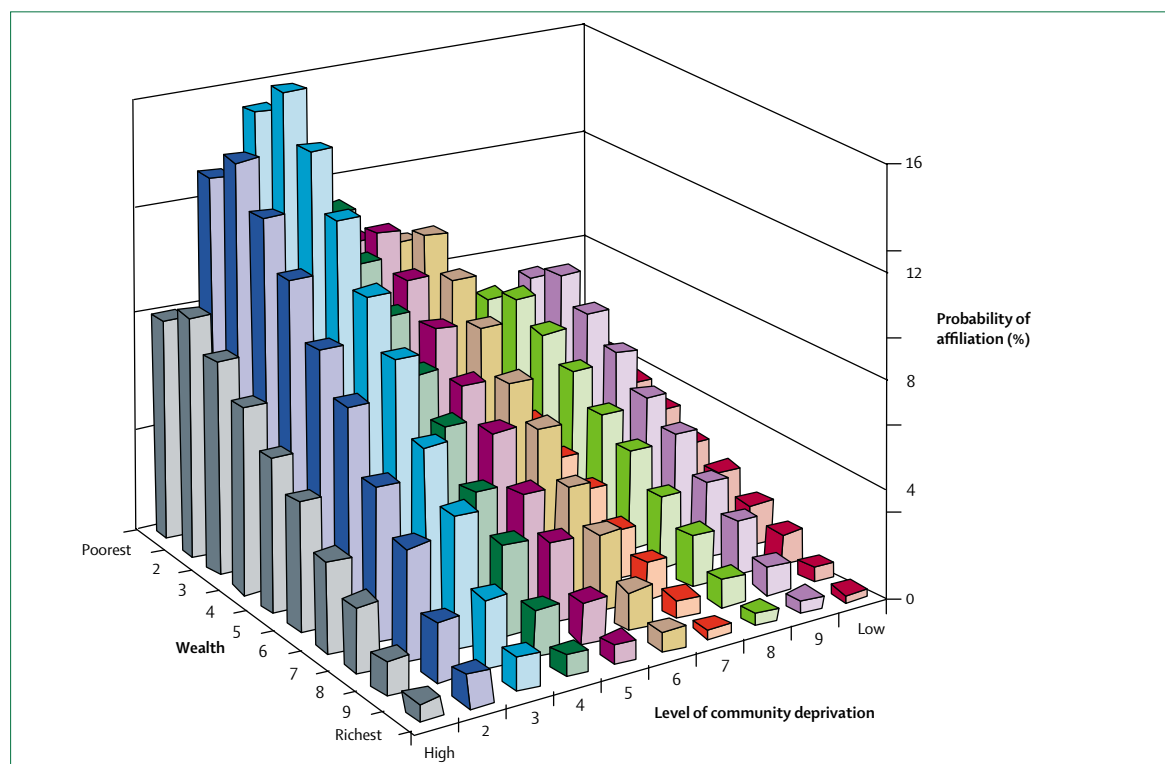


Figure 3: Probability of affiliating to *Seguro Popular* by decile of wealth and community deprivation, controlling for sex, age, indigenous origin, rural residence and household size

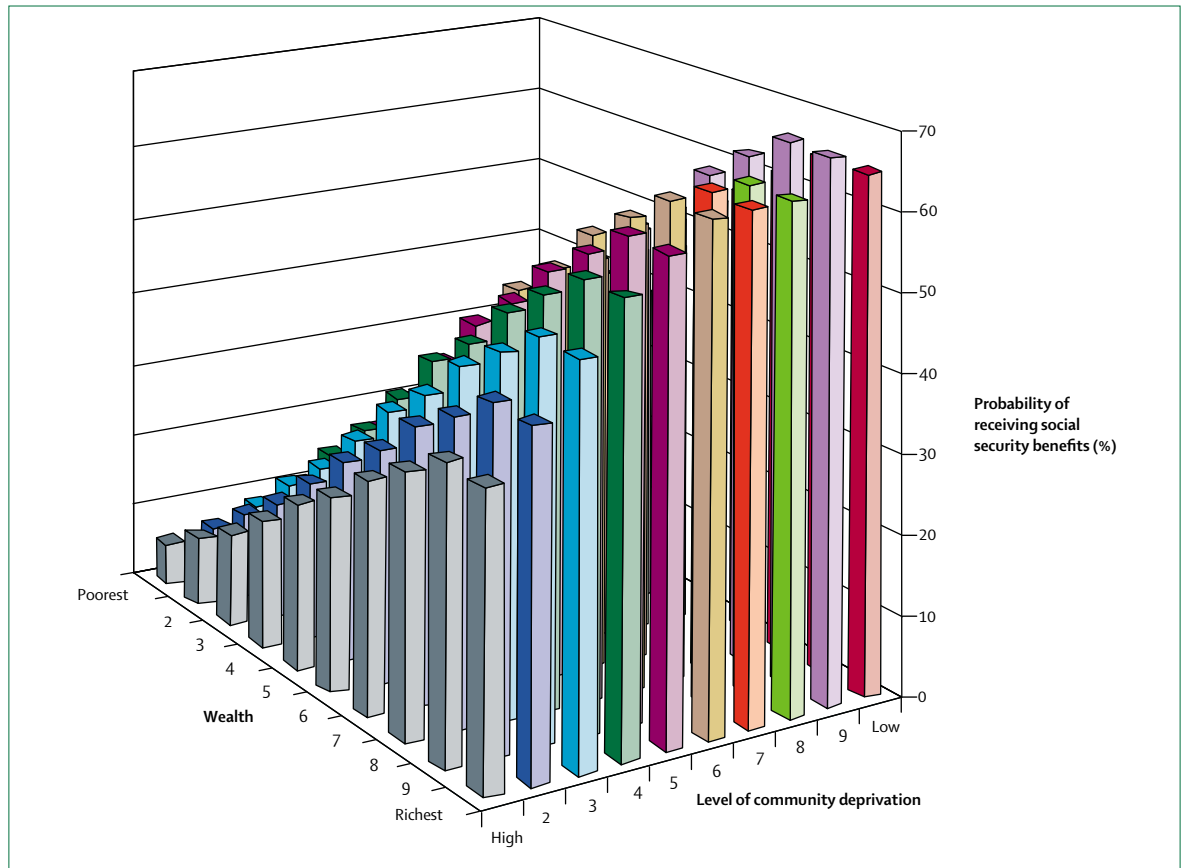


Figure 4: Probability of receiving social security benefits by decile of wealth and community deprivation, controlling for sex, age, indigenous origin, rural residence and household size

are not included in the social security sector—namely poor people living in deprived communities.

The unit of enrolment is the population living near a health facility that is equipped to provide the essential package of services of *Seguro Popular*. Because these are not administrative units, data at the level of the target population for each health facility are not available; many of the statistical analyses we present use information aggregated at the municipality level (in 2005, there were 2445 municipalities in Mexico). In many cases, a municipality includes some health facilities that are providing *Seguro Popular* services and others that are not. Since there are no restrictions on where individuals can affiliate, individuals in communities without an affiliating health centre might travel to nearby areas with access and join *Seguro Popular*.

Financing

Figure 5 shows the evolution of public and private health spending from 2000 to 2005 as a percentage of GDP. Public expenditure is divided into social security expenditures and non-social-security federal and state expenditure. Total public expenditure on health has increased from 2.6% of GDP in 2000 to 3.0% in 2005.

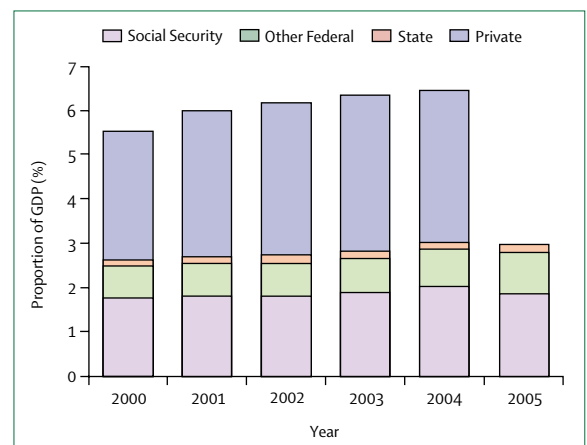


Figure 5: Total spending on health as percentage of GDP, 2000–05
Data for private spending on health in 2005 not available at present. Base year 2000. Source: SICUENTAS, Ministry of Health, Mexico.

Non-social security expenditure has increased from 0.84% of GDP in 2000 to 1.13% in 2005. Figure 5 suggests that social security spending increased from 2000 to 2004, but fell in 2005. This reduction in spending is the reason that total public expenditure on health seems to have decreased as a proportion of GDP between

	Total	Public	Private
2000	305 303 571 (5.6%)	142 155 365 (2.6%)	163 148 206 (3.0%)
2001	327 670 911 (6.0%)	147 079 110 (2.7%)	180 591 801 (3.3%)
2002	340 998 049 (6.2%)	149 639 661 (2.7%)	191 358 388 (3.5%)
2003	356 052 837 (6.3%)	157 134 499 (2.8%)	198 918 338 (3.5%)
2004	380 820 876 (6.4%)	177 012 186 (3.0%)	203 808 690 (3.5%)
2005	..	180 068 398 (3.0%)	..

Source: SICUENTAS, Ministry of Health, Mexico.

Table 3: Expenditure on health, in thousands of pesos adjusted to year 2000, and as proportion of GDP (in parentheses)

2004 and 2005. The increase in social security expenditure recorded in 2004 and the subsequent fall might have been due to changes in accounting procedures at the Mexican Institute of Social Security rather than real changes in expenditure.

From 2000–05, Mexico has maintained state-level health accounts to track public sector expenditure from all sources. Private expenditure at the state level is difficult to estimate because the National Household Income and Expenditure Surveys are not representative at the state level. Table 3 shows total expenditure on health broken down into public and private for 2000–2005. Private expenditure increased as a proportion of GDP from 2000 to 2003, but fell in 2004. The estimate for 2005 is not yet available, but since enrolment in *Seguro Popular* more than doubled in 2005, it is possible that private expenditure might have declined further.

The state health accounts provide an opportunity to assess the equity of public health expenditures across states. Between 2000 and 2005, total public health

expenditure, including social security and other federal and state expenditures, increased in real per-head terms by 20%. Inequality of public expenditure per-head across states fell, as shown by a drop in the Gini coefficient from 0.22 in 2000 to 0.19 in 2005. The reform has had a greater effect on federal non-social-security expenditure, which increased in real per-head terms by 38% between 2000 and 2005. A substantial component of this increase is related to *Seguro Popular* payments triggered by the timing of the roll-out of the programme. Some states, such as Aguascalientes, Campeche, Colima, Jalisco, and Tabasco, have been enrolling families in *Seguro Popular* since 2002. As a consequence, the Gini coefficient of federal non-social-security expenditure across states has dropped from 0.29 in 2000 to 0.26 in 2005. The 38% increase in real per-head expenditure might be one of the more important drivers of health-system change.

A notable omission from this evaluation is an assessment of the administrative costs of the reform, and of *Seguro Popular* in particular. The anticipated cost is 41.6 pesos per year per affiliated family.³⁹ However, no reliable data are available to assess the actual expenditure by the Federal and the State governments on administering *Seguro Popular*. In this respect, we were unable to compare the benefits of the reform to the transactional costs of implementing the reform. Nevertheless, changes in total non-social-security expenditure include all these administrative costs.

Human and physical resources

The Ministry of Health tracks human resources within its own facilities through the system called SINERHIAS,

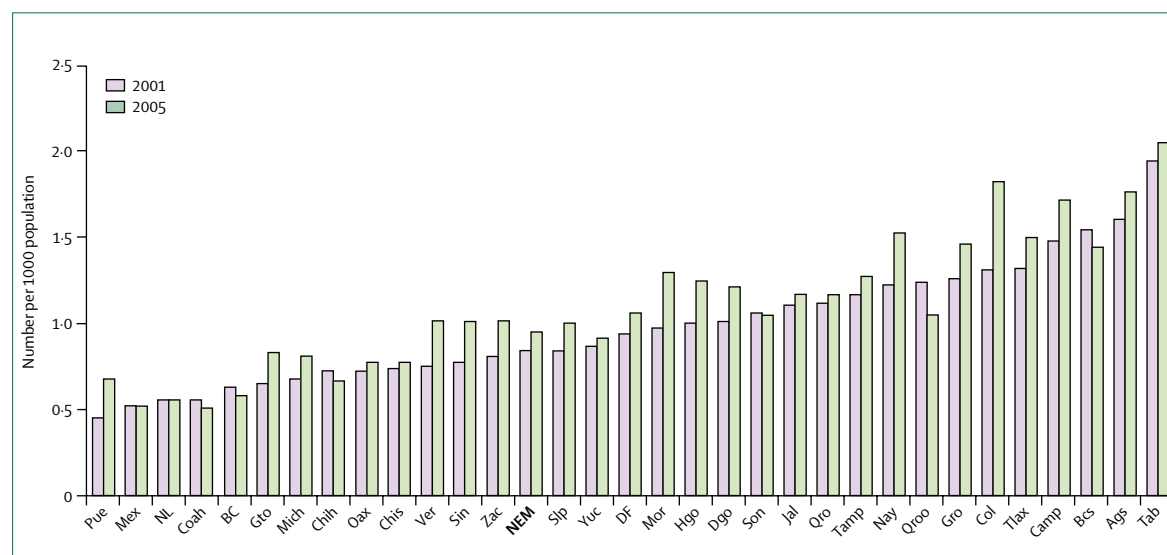


Figure 6: Doctors and nurses employed by Ministry of Health, by state, 2001 and 2005.

Numbers do not include doctors and nurses employed with temporary contracts. NEM=National estimate for Mexico. Ags=Aguascalientes. BC=Baja California. Bcs=Baja California Sur. Camp=Campeche. Coah=Coahuila. Col=Colima. Chis=Chiapas. Chih=Chihuahua. DF=Distrito Federal. Dgo=Durango. Gro=Guanajuato. Gro=Guerrero. Hgo=Hidalgo. Jal=Jalisco. Mex=México. Mich=Michoacán. Mor=Morelos. Nay=Nayarit. NL=Nuevo León. Oax=Oaxaca. Pue=Puebla. Qro=Querétaro. Qroo=Quintana Roo. Slp=San Luis Potosí. Sin=Sinaloa. Son=Sonora. Tab=Tabasco. Tamp=Tamaulipas. Tlx=Tlaxcala. Ver=Veracruz. Yuc=Yucatán. Zac=Zacatecas.

which records data for public-sector employees. One challenge in interpreting these data is that doctors and nurses employed on temporary contracts are not usually recorded in the database. With the available information, we could not estimate the number of health professionals on temporary contracts during the relevant period. Bearing this limitation in mind, figure 6 shows the number of doctors and nurses employed by the Ministry of Health per 1000 population in 2001 and 2005. At the national level, the number has increased from 0·83 to 0·94 over the 5 years. The ratio of employment of health-care professionals between the states with the largest and smallest numbers of such employees fell from 4·27 to 4·03. The state with the greatest concentration of nurses and doctors in 2001 and 2005 was Tabasco. The state with the lowest concentration in 2001, Puebla, had moved up a few places in 2005; Coahuila had the lowest proportion in 2005.

Data on human resources are not available at a level of aggregation that would allow us to evaluate *Seguro Popular* communities separately. The aforementioned randomised study will allow the direct comparison of effects on human resources in communities with and without access to the scheme.

The effect of the reform on facility infrastructure is also important to monitor. Since 2002, the Ministry of Health has maintained a database on equipment and diagnostic technologies, such as MRI, CT scanners, ultrasound, and radiation therapy equipment. Because the quality and coverage of the registry has increased over the years, interpretation of changes over time is difficult. For more details, see the supplementary information on the authors' website (section 3 and supplementary figure 1).

Stewardship

Assessing changes in stewardship is challenging because important aspects of stewardship are difficult to quantify and purely qualitative statements can be difficult to validate.⁴⁰ Despite this inherent limitation, changes in four areas are thought to be important to the reform.

	Fraction of population			
	2000	(95% CI)	2005-06	(95% CI)
Perceived need for care				
Total	18·0	(17·8-18·6)	15·5	(15·0-15·9)
Uninsured	17·0	(16·8-17·9)	14·6	(14·0-15·2)
<i>Seguro Popular</i>	16·3	(15·3-17·3)
Social security	19·0	(18·6-20·0)	16·4	(15·7-17·1)
Use of services, conditional on perceived need				
Total	61·2	(60·0-62·5)	64·5	(63·1-65·9)
Uninsured	54·7	(52·9-56·4)	58·3	(56·2-60·3)
<i>Seguro Popular</i>	63·8	(60·6-66·9)
Social security	68·5	(66·7-70·4)	71·3	(69·1-73·6)

Table 4: Age-standardised perceived need for care and use of services conditional on perceived need, by insurance status for 2000 and 2005-06

First, two new independent Federal Commissions have been created under the overall umbrella of the Ministry of Health. The first is the commission in charge of managing *Seguro Popular*, including management of the affiliation process and the transfer of resources to the states. The second is the Federal Commission for Sanitary Risks; this institution has regulatory oversight for food, drugs, new technologies, and environmental exposures.

Second, the Ministry of Health has significantly strengthened its capacity to monitor population health, effective coverage of interventions, health risks, and health outcomes. A system of national surveys (see table 1 for examples) has been established. Vital registration and service delivery registries have been modernised. Computerised patient medical records are being phased in. Maintaining state health accounts to track all public resources for health has become integrated as a planned and budgeted activity for the Federal and State Ministries of Health. Despite this progress, however, data about service delivery from providers remain fragmented, with only limited sharing of information between the social security institutions and the Ministry of Health.

Third, benchmarking state health-system performance and reporting the results to the public through the annual Citizen's Accountability Forum has become a planned and budgeted activity for the Federal and State Ministries of Health. Finally, an office of evaluation within the Ministry of Health has been created that, among other functions, has funded a series of independent studies of different aspects of the implementation of the reform.

Provision

To assess the effect of the reform on the provision of health-care services, we explored changes in use and effective coverage. Effective coverage represents the key output of service provision, and is defined as the fraction of the potential health gain that could be delivered by the health system through an intervention that is actually delivered.⁴¹ It can be thought of as use of a service conditional on true need and adjusted for the quality of the intervention. In theory, we can also examine effective coverage for the health system as a whole by considering the main interventions that will improve health.^{42,43}

Use of many services begins with perceived need by individuals. Many services cannot be delivered unless the individual realises that they can benefit from care. Self-perceived need, however, is a complex function of capacity to benefit from a health intervention and of several factors that affect perception of health and the potential of health services to improve health. Here, we assess patterns of self-perceived need and use of services, which provide important insights into the mechanisms through which *Seguro Popular* affiliates may end up with improved coverage.

Health-service use

Table 4 shows perceived need for care and use of services conditional on perceived need between 2000 and

2005–06. Perceived need has fallen between the two surveys; in 2005–06, *Seguro Popular* affiliates reported higher perceived need than did uninsured people. This difference might have arisen because individuals who expect to need care are preferentially affiliating to *Seguro Popular*, or because the act of affiliation changes individuals' perception of need. Changes in self-perceived need do not necessarily mean that *Seguro Popular* affiliates would have greater levels of true need measured according to objective criteria. Although the average perceived need has fallen between the surveys, use conditional on perceived need had increased between 2000 and 2005–06. Use of services was significantly greater for *Seguro Popular* affiliates than for uninsured people. Use conditional on perceived need was lower for *Seguro Popular* affiliates than for social security enrollees.

Using the ENSANut 2005–06 data (see table 1) we assessed differences in perceived need and self-reported service use by insurance status, controlling for wealth quintile, age, sex, education, urban or rural residence, indigeneity, municipality deprivation, and crude community mortality rate; the details of this analysis are presented in the supplementary information, section 4.1. We investigated whether individuals enrolled in *Seguro Popular* reported increased use of services and whether there is an externality of *Seguro Popular* for the communities with high levels of enrolment. The results presented in table 5 (and in supplementary table 5) show that *Seguro Popular* enrollees have a higher probability of service use conditional on perceived need than do uninsured individuals. Additionally, we noted an independent effect of living in a community with high *Seguro Popular* affiliation; service use increases from 58% to 64% when community affiliation to *Seguro Popular* rises from 0% to 20% and all other factors are equal. In other words, there is evidence of a supply-side externality at the municipality level, since the results show that, conditional on self-reported need, the individuals in municipalities where *Seguro Popular* is present have higher service use than those living in municipalities that are not yet participating in the scheme.

The effect of *Seguro Popular* on rates of service use at the municipality level can also be studied with the Ministry of Health hospital discharge database. We looked at overall discharge rates per head and for some specific causes where *Seguro Popular* might have an effect in the short-term, such as births, HIV/AIDS, appendicitis, childhood leukaemia, and hernias. Various models were used and the results were robust to model specification (details presented in supplementary tables 7–9). Table 6 summarises the coefficients for the variable measuring affiliation to *Seguro Popular*, based on a random-effects multivariate regression model. The coefficient on the variable measuring *Seguro Popular* enrolment is statistically significant for all-cause hospitalisation rates and for all individual causes mentioned above, implying

	Probability	(95% CI)
Community enrolment in <i>Seguro Popular</i>		
No <i>Seguro Popular</i>	58.5%	(57.2–59.8)
20% of total population	61.4%	(59.7–63.1)
40% of total population	64.1%	(60.4–68.1)
Type of insurance		
Uninsured	54.4%	(53.0–55.7)
<i>Seguro Popular</i>	61.6%	(59.2–64.1)
Social Security	64.9%	(63.3–66.4)

Table 5: Probability of using health services, conditional on perceived need, by insurance status, controlling for other determinants of use

that municipalities with higher levels of *Seguro Popular* enrolment have greater rates of hospitalisation. The effect of the scheme on discharges is largest for childhood leukaemia, which is one of the conditions covered by the catastrophic fund. The effect for births, although much smaller, is still significant. This finding could be due to the fact that 93% of all births nationally are delivered in hospitals, as increasing the proportion of births delivered in hospital has been a government priority area. The large effect of *Seguro Popular* on rate of discharges for hernia and appendicitis suggests that in communities with high affiliation, individuals with acute medical problems are using services more than in non-*Seguro Popular* communities. One interpretation of this finding is that *Seguro Popular* is removing the financial barrier to use of health-care services for unplanned medical events.

The data for social security and private sector institutions were not made available; thus, we could not ascertain whether the increase in admissions for communities with *Seguro Popular* was due to an overall increase in total rates of admissions or a shift from the private sector to the public sector. The latter, however, seems unlikely, because *Seguro Popular* is affiliating largely in deprived areas with few private sector hospitals.

Composite coverage

In this section, we shift attention to the actual delivery of interventions to those who need them—namely the concept of effective coverage. In Mexico, much effort has

	Average discharges per 1000 population	Regression coefficient of <i>Seguro Popular</i> enrolment variable (SE)	Percentage increase for <i>Seguro Popular</i> enrolment*
All causes	13.32	9.44 (1.05)	71
Births	3.54	2.66 (0.43)	75
HIV	0.02	0.02 (0.01)	118
Childhood leukaemia	0.05	0.13 (0.01)	275
Appendicitis	0.28	0.31 (0.05)	112
Hernia	0.32	0.48 (0.06)	152

*Estimated by taking coefficient from regression and estimating change in average number of discharges by going from 0% to 100% affiliation.

Table 6: Effect of *Seguro Popular* on hospital discharge rates for all causes and selected causes

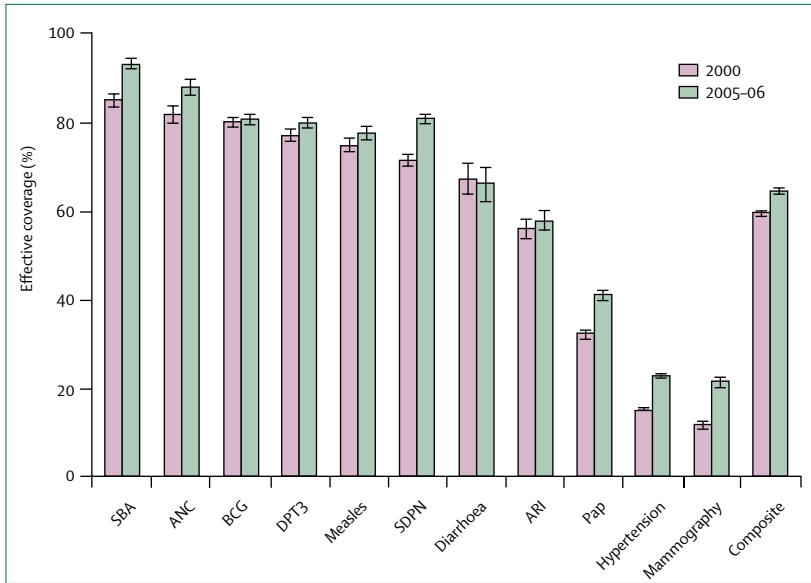


Figure 7: Changes in effective coverage between 2000 and 2005-06 for 11 interventions and composite measure, with 95% CI

SBA=skilled birth attendance. ANC=antenatal care. BCG=vaccine for tuberculosis. DPT3=three doses of diphtheria toxoid, tetanus toxoid, and pertussis vaccine. SDPN=services delivered to premature neonates. ARI=acute respiratory infections. Pap=cervical cancer screening with Pap smear.

table 10), directly comparable measurements were possible for 2000 and 2005-06 using the two waves of National Health Surveys and hospital discharge data for premature neonates. This set is heavily weighted towards maternal and child health interventions. A notable omission is information on diabetes, the second leading cause of death in Mexico. Changes in the coverage of diabetes over the time period will soon be estimated; however, at the time of writing, the 2005-06 data on blood sugar and haemoglobin A1c were not available. The set of 11 interventions is limited by differences in the questionnaires. Estimates presented here cannot be directly compared with those reported by Lozano and colleagues,⁴¹ because the definition of antenatal care had to be modified to allow for comparisons between 2000 and 2005. Of the 11 interventions available for comparison, we can estimate the quality component of effective coverage only for four: skilled birth attendance, care of premature neonates, acute respiratory infections in children, and hypertension. The estimates we show represent crude coverage for the other seven interventions.

Figure 7 shows that coverage has increased for most of the 11 interventions over the 5-year period. Interventions with low coverage in 2000, such as treatment of hypertension, mammography, cervical cancer screening, skilled birth attendance, and management of premature births showed substantial increases. *Seguro Popular* covers a more extensive package of services than that represented in this chart, but data availability for 2000 and 2005-06 restrict the set of interventions that can be strictly compared.

been invested in developing effective coverage metrics to quantify the delivery of key interventions to the population with a true need for them.^{41,44} Estimates of effective coverage would provide a more precise picture of how provision of services has changed during the reform. For 11 indicators (detailed definitions shown in supplementary

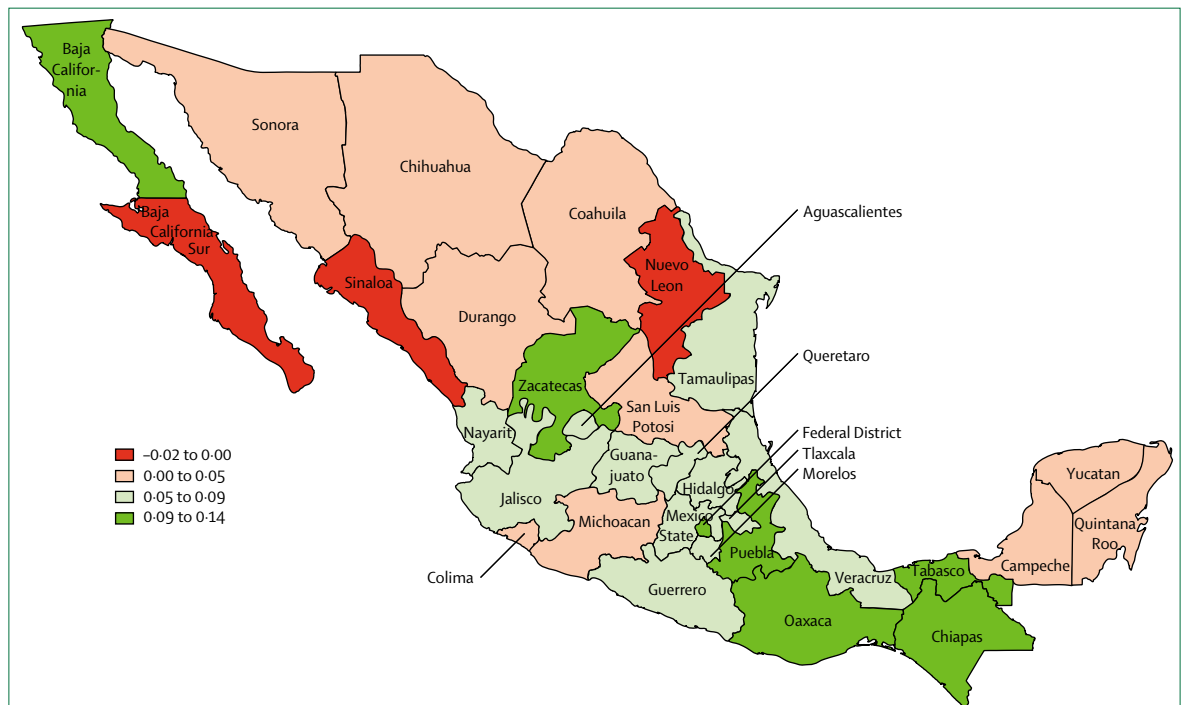


Figure 8: Absolute changes in composite coverage between 2000 and 2005-06, by state

Using the 11 interventions, we estimated a composite measure of coverage at the state level for 2000 and 2005–06. Details of methods are presented by Lozano and colleagues.⁴¹ Figure 8 shows the absolute change in composite coverage for each state during this time. Some of the largest increases over the period of reform have been in the poorest states, which had the lowest levels of coverage in 2000 (see supplementary figure 2), such as Chiapas, Oaxaca, Guerrero, Puebla, and Veracruz. Figure 9 shows the decrease in inequalities in composite coverage between 2000 and 2005–06 across wealth deciles. Whereas all deciles have improved over the period, the largest increases in composite coverage have been observed for the population in the lowest wealth deciles. The difference between the poorest and richest decile has dropped in absolute terms from 13% to 7%, while the ratio has dropped from 1·27 to 1·11.

Overall, figures 8 and 9 show that inequalities in composite coverage have been greatly reduced over the past 5 years, since coverage has increased the most in the poorest states and for the poorest deciles of the population. Figure 8 shows that composite coverage of the national and state health systems has increased during the reform. Table 7 shows that, compared with 2000, greater coverage was seen for those receiving social security benefits and for the uninsured in 2005–06. *Seguro Popular* affiliates had significantly higher composite coverage than uninsured people in 2005, and both groups had significantly higher composite coverage than the uninsured in 2000, suggesting that improvements in coverage have benefited both the uninsured and the *Seguro Popular* affiliates. Individuals in the social security system had higher composite coverage than the uninsured in both 2000 and 2005, but in 2005 their coverage did not significantly differ from that of *Seguro Popular* affiliates.

The numbers shown in table 7 are not adjusted for other known determinants of coverage. To test whether *Seguro Popular* affiliates had higher levels of coverage than uninsured people, we used logistic regression on coverage rates for the 11 interventions from the ENSANut 2005–06 (supplementary table 11 shows results on probability of being covered, controlling for age, sex, education, rural residence, wealth quintile, indigeneity, community deprivation, and community crude mortality rate). The analysis showed that *Seguro Popular* affiliates had significantly higher levels of coverage than did uninsured people for hypertension treatment, mammography, cervical cancer screening, and acute respiratory infections in children. For childhood immunisations, treatment of childhood diarrhoea, antenatal care, and skilled birth attendance, the difference between *Seguro Popular* affiliates and the uninsured population was not significant. The absence of an effect for some of these interventions might be attributable to overall high levels of coverage resulting from national programmes.

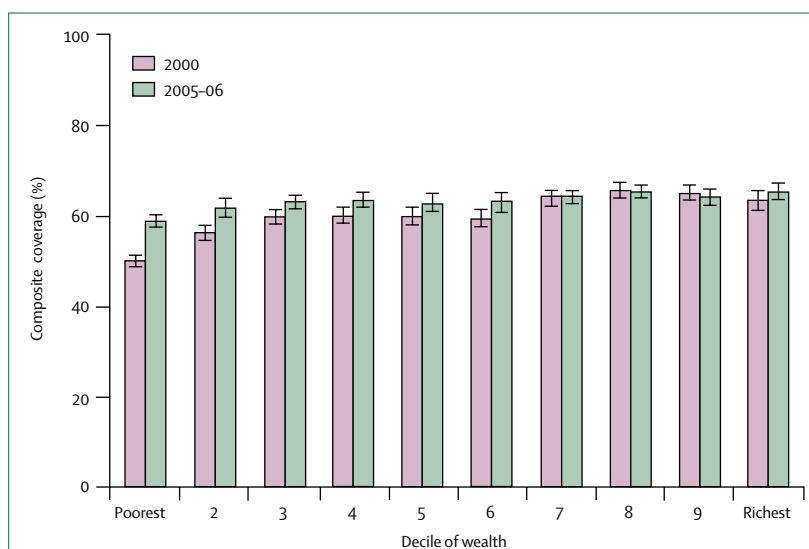


Figure 9: Inequalities in composite coverage by wealth decile with 95% CI, 2000 and 2005–06

Health

During the period of reform, striking changes in health outcomes are unlikely to be observed. Nevertheless, we systematically examined all major causes of death to see whether age-standardised death rates had changed. Table 8 shows that age-standardised mortality for all causes combined and for the major cause-groups has fallen since 2000. This decline, however, should be judged in the context that age-specific mortality rates in

	Uninsured	<i>Seguro Popular</i>	Social security
2000	56·3 (55·7–57·0)	..	65·4 (65·4–66·2)
2005–06	65·5 (64·8–66·1)	70·2 (68·9–71·4)	70·9 (70·1–71·8)

Table 7: Composite coverage (95% CI) by type of insurance

	1995	2000	2005
All causes			
Male	5·419	4·851	4·500
Female	4·187	3·812	3·655
Communicable, maternal, perinatal, nutritional conditions			
Male	0·878	0·730	0·638
Female	0·768	0·593	0·536
Noncommunicable diseases			
Male	3·425	3·214	3·137
Female	3·118	2·937	2·868
Injuries			
Male	1·041	0·825	0·658
Female	0·229	0·200	0·177
Ill-defined causes			
Male	0·075	0·082	0·068
Female	0·072	0·083	0·074

Table 8: Age-standardised mortality rates per 1000 population by sex for all causes and major cause groups, 1995–2005

Mexico have been consistently falling over several years.

Also of interest is the effect of the reform on functional health status, which could, in principle, respond more quickly than table mortality to health-system intervention. For example, expanded treatment of cataracts or coverage with glasses might change the distribution of visual impairment in the short-term. Unfortunately, comparable data do not exist to allow an analysis of such changes. An analysis of self-reported health on five domains is available in the supplementary information (section 5 and supplementary table 12).

Responsiveness

The ENED 2002–03 survey included a detailed module on health-care responsiveness, which showed that users of social security services had consistently lower levels of responsiveness than users of services from the Ministry of Health and private providers.⁴⁵

The ENSA 2000 and the ENSANut 2005–06 did not include questions on responsiveness and asked only a summary question on perceived quality of care. This more general question was the only information available for assessment of changes in responsiveness over the period of the reform. Logistic regression on perceived quality of care in 2000 and 2005–06 showed that users of social security services reported lower quality in 2000 and 2005–06, compared with users of Ministry of Health and private services (details of analysis in supplementary information section 6 and supplementary table 13). In the 2005–06 data, there was no significant difference between uninsured people and *Seguro Popular* affiliates in perceived quality of care. Also, communities with higher levels of *Seguro Popular* affiliation did not report higher levels of perceived quality of care.

Catastrophic health expenditures

Protecting the population against catastrophic health expenditures was one of the key motivators of the reform process. Knaul and colleagues^{2,46} used the National Household Income and Expenditure Surveys to trace the evolution of catastrophic and impoverishing payments for health care from 1992–2005 and reported that all the indicators of financial protection showed an improvement since 2000, implying that the reform has had a positive effect.

We used the health expenditure module in the ENSANut 2005–06 to examine the effect of *Seguro Popular* affiliation on health expenditure. In the section on health-care service use above, we showed that affiliates have a higher perceived need and higher levels of use, conditional on perceived need. All other things being equal, these effects might have led to increased out-of-pocket payments and possible increases in catastrophic payments. We noted two effects in the ENSANut data that suggest that *Seguro Popular* is having a protective effect against catastrophic payments.

First, we explored whether *Seguro Popular* affiliates incurred lower prescription drug expenditures, since Knaul and colleagues⁴⁷ have shown that drug expenditures constitute a large proportion of spending on health for poor households. Data from ENSANut showed that the proportion of individuals paying for medication among *Seguro Popular* affiliates (41·3%), although significantly lower than that in uninsured people (73·8%), was high, and was greater than in individuals receiving social security benefits (30·7%). These results do not change when controlling for sociodemographic and economic characteristics of the respondents (details of regressions in supplementary information section 7.1 and supplementary table 14).

We also investigated whether being affiliated to *Seguro Popular* significantly reduced the amount spent on prescribed medications, by multivariate OLS regression (supplementary table 15). The results suggest that—controlling for age, sex, household size, education, wealth quintile, community deprivation, rural residence, and having a child or an elderly person in the household—*Seguro Popular* affiliates have on average 14·2% lower expenditures on drugs than do uninsured people ($p < 0\cdot0005$). Individuals in the social security system incur on average 12·5% lower expenditures than uninsured people. This finding suggests that although the probability of paying for drugs is much lower for *Seguro Popular* affiliates than for uninsured people, the amount of reduction in medication expenditure is not large. *Seguro Popular* might be covering drugs that are predominantly low cost, and therefore, although a large proportion of affiliates benefit, the financial protection effect is not great. Both these findings suggest that *Seguro Popular* affiliates incur significantly lower expenditures and at significantly lower probabilities than do uninsured people; however, the package of drugs available to them might need to be expanded to cover more high-cost medications.

Second, we looked at whether *Seguro Popular* has a protective effect against catastrophic payments at the population level, and for the subgroup of households that reported use of outpatient or inpatient services. The results were robust to the choice of method used for calculating catastrophic payments and across thresholds of defining catastrophic expenditure (details in supplementary information section 7.2 and supplementary tables 17–22; findings discussed in greater length by Knaul and colleagues²). Logistic regression results suggested that *Seguro Popular* protects against catastrophic payments at the population level. The effect is much stronger and statistically significant for all measures when applied to the subset of households with either a hospital admission in the past year or an outpatient visit in the 2 weeks preceding the survey (15 575 of 43 214 households). Figure 10 shows the probability of having a catastrophic expenditure for households that reported use of health care services. The protective effect of *Seguro*

Popular was not as large as that of social security, although for some of the measures in the analysis the effect was not significantly different between the two groups.

Lessons for Mexico

In other countries, periods of major reform have often been accompanied by worsening performance^{9,26} but this situation has not arisen in Mexico. Overall Mexican health system performance has improved during the period of the negotiation, legislation, and partial implementation of the reform. Increases have been noted in resources for uninsured people, the equality of distribution of these resources across states, and effective coverage for the country and for uninsured people, and catastrophic health payments have declined. Perhaps most importantly, during this period, the Mexican health system has been increasingly effective at reaching the poor. These improvements have occurred during a period of major transition in the health system and in the roles of the Federal and State Ministries of Health.

The System of Social Protection in Health is still in the early phases of implementation; nevertheless, the evidence is positive. Affiliation is reaching the poorer groups, use of health-care services has increased for affiliates, and effective coverage for hypertension, mammography, cervical cancer screening, and acute respiratory infections has shown significant increases. These improvements in service delivery are being accompanied by declines in catastrophic spending, which might be attributable to financial protection provided by the *Seguro Popular* essential package or the conditions covered by the catastrophic fund. We also noted evidence of a supply-side response by the State Ministries of Health. Non-affiliates living in communities with significant levels of affiliation are benefiting from these changes.

If the reform stays intact through the presidential transition on Dec 1, 2006, the planned expansion of affiliation will lead to substantial increases in funding flowing from the Federal government to the states in proportion to the number of affiliated families. The reform has legislated an entitlement which, when fully implemented, will reduce inequality across states in spending per uninsured individual. Inequality has not yet declined greatly because most of the increase in affiliation and resources is yet to come. This expansion will depend on the federal government being able to raise the extra resources, which, in turn, might depend on the ability of the next administration to legislate fiscal reform.⁷

The next phase of expansion for the reform might prove to be more challenging for two reasons. First, state ministries of health have been initially targeting localities with a certain level of health system infrastructure. The challenge of expanding farther into the most deprived communities, while simultaneously handling the steadily growing volume of service implied by the expansion, will probably require active efforts by the states to expand human resources, supply logistics, and physical

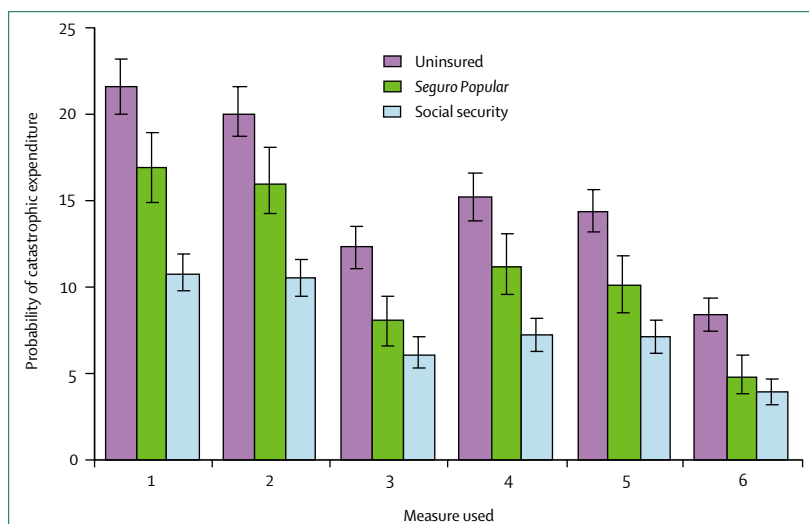


Figure 10: Probability of incurring catastrophic expenditures for households using health services with 95% CI, controlling for sociodemographic and economic characteristics, according to six different measures

infrastructure. New resources linked to affiliation will help states to accomplish these tasks, but improving human resources and infrastructure have inherent time lags, even if effective strategies to achieve these ends are adopted by the states. During this transitional period, states will face a serious challenge in maintaining high levels of satisfaction among affiliates and encouraging them to reaffiliate. The results from ENSANut 2005–06 suggest that perception of quality of services by *Seguro Popular* affiliates did not differ from that of uninsured people, nor was it increased in communities with access to *Seguro Popular*. The Federal Ministry of Health will need to monitor carefully to ensure that states actively pursue affiliation in the most deprived communities and use increased resources to address infrastructure problems that exist in some of these settings.

Second, at present most of the affiliates are being classified by *Seguro Popular* as belonging to the lowest income quintile and therefore do not have to pay a household insurance premium. A comparison of the wealth profile of affiliates derived from the census with that reported by the *Seguro Popular* Commission suggests that many households that are not in the lowest quintile of wealth are being affiliated to *Seguro Popular*, but are being classified as belonging to the lowest quintile.⁴⁸ According to the law, households belonging to income quintiles two or higher must pay a family contribution, which rises with income. Classification of most households as belonging to the lowest quintile at the time of affiliation cannot be sustained in the long-term. Further expansion into higher income households might involve collection of this family contribution, which will require that the wealthier households value the services provided. In this analysis we have not been able to quantify the administrative costs of the affiliation process, but it is likely that these costs will increase per family as affiliation is expanded into higher-

income groups and the most marginalised communities—a double challenge presented by the coming years of *Seguro Popular* extension.

The reform has created a powerful incentive for the states tied to voluntary affiliation. Affiliates know the contents of the package and will demand the drugs, staff, and equipment needed to deliver the package. Consumers, however, are often poor judges of technical quality and tend to judge perceived quality on the basis of responsiveness.¹¹ Additionally, perceived quality of care by *Seguro Popular* affiliates is unlikely to be a function of the effective delivery of the interventions delivered to the community rather than to individuals. For these reasons, monitoring effective coverage of both personal and non-personal interventions, with emphasis on the measurement of technical quality of care, will gain importance. Mexico has made substantial advances in this area but an annual reporting framework to ensure that high quality interventions are being delivered to those who need them will need to be developed. These efforts must continue and be expanded to more adequately capture the effective coverage of interventions for non-communicable diseases and injuries. As the reform progresses, the financial incentive for states to get households to reaffiliate will only increase. Two related adverse effects might occur if too much effort is devoted to increasing responsiveness for affiliates: resources might be pulled away from non-affiliates until universal coverage is attained, and technical quality could be sacrificed for responsiveness.

Further investments are crucial in two areas of the information system: monitoring the administrative costs of *Seguro Popular*, which is essential for assessments of changes in efficiency of the Mexican health system; and monitoring human and physical infrastructure, resources which are gaining attention as important drivers of health-system change. It is important for the Ministry of Health to invest in better monitoring and reporting systems to enable future assessments of the effect of the reform on these key functions.⁴⁹

The reform has created a mechanism to preserve funding for non-personal health services. Given the advanced state of the epidemiological transition in Mexico, with 82% of the burden due to non-communicable diseases and injuries, it will be extremely important for the package of community and public health interventions to be broadened to deal with major causes of the burden of disease.⁵⁰ The obesity epidemic, road traffic accidents, and alcohol dependence are examples of major threats that are not yet well addressed in the package. Additionally, diabetes is steadily becoming more frequent in Mexico and current strategies are failing to stem this increase; since this condition is the second leading cause of death, a more coherent strategy needs to be formulated and incorporated into the package of services.

The philosophy of the reform has been to redesign the Mexican health system so that different actors fulfil

different functions rather than preserving the current vertically segmented system.^{4,51} However, the reform has left untouched the social security sector in Mexico, which accounts for 62% of public expenditures on health. The political necessity of leaving this sector alone is understandable; previous health reforms in the 1990s failed because of resistance from the social security institute and its employees.³³ As *Seguro Popular* becomes fully implemented, the gap in government spending on individuals in the social security system and those in *Seguro Popular* is expected to narrow substantially. This narrowing, if accompanied by more responsive care with equivalent technical quality provided in the Ministry of Health facilities, might create opportunities to pursue broader changes in the organisation of the functions of the Mexican health system.

Global lessons

The past 15 years have witnessed a wave of health reforms in developing countries including Colombia, Chile, Zambia, Thailand, Poland, and others. The effect of these reforms has been much debated.^{4,6,8–36} In almost every case, there is uncertainty about what has happened because of insufficient measurements of key health-system functions and outputs, such as effective coverage. The reform in Mexico has been different for two reasons. First, the investments over a decade and a half in the Mexican health information system mean that we know substantially more about the consequences of reform in Mexico than elsewhere. Second and more importantly, so far the reform in Mexico has had a positive effect: inequalities have been reduced, effective coverage is increasing, and catastrophic spending has fallen. Currently, differences between *Seguro Popular* affiliates and uninsured individuals, controlling for wealth, marginality, age, sex, indigeneity, and rural residence suggest that further expansion of the scheme could have larger benefits. These results, of course, must be tempered by all the problems associated with cross-sectional observational studies.

In view of the five distinct components to the reform, how can we draw lessons from Mexico's experience for other countries? Which of the components is key to success and in what contexts? Are they inextricably linked? For other countries in Latin America with vertically segmented systems dominated by social security organisations for formal sector employees, the Mexican reform package may be directly relevant. For countries in other regions, with a different mix of financing and provision arrangements, each of the components of the reform package needs to be carefully considered.

An innovation in Mexico that is relevant to many countries in Africa, Asia, and the Middle East is the successful legislation of an entitlement for uninsured people, such that with the expansion of affiliation the Ministry of Finance is obligated to fund increased expenditures for the states. In Mexico, the major increase

in funding will come in the next years as affiliation expands. The opportunity to create this entitlement is related to the previous reform, which shifted a significant share of social security financing to tax financing, based on the amount referred to as the social contribution.

A powerful political argument has been made that all citizens should be treated equally in terms of the social contribution. The political discourse surrounding insurance, even when most insurance is financed from general taxation, differs from simple lobbying for an increase in the Ministry of Health budget. Research linking investments in health to improved economic performance was also helpful in securing Ministry of Finance support for the entitlement.^{52,53} The creation of a largely tax-financed insurance system and the political strategy used to promote this system in Mexico provides an attractive alternative for community health insurance programmes or the expansion of private insurance in developing countries.

Creation of an explicit benefits package has been criticised by some as abrogating existing rights of citizens to health care.⁵⁴ Experience in Mexico, however, shows that the explicit package can be an important instrument for accountability. The package is a tripartite social contract between *Seguro Popular* affiliates, the State Ministries of Health, and the taxpayers. Because the package is clearly defined, affiliates can demand that the staff, drugs, and equipment needed to deliver the package be available. Taxpayers can demand evidence from the government that the package is being delivered and effective coverage is increasing. Yearly expansion of the package provides a transparent mechanism to respond to public demands for inclusion of new interventions. The explicit package is also a powerful way to increase equity. As need for interventions in the package is greater in the disadvantaged, resources should flow disproportionately to them. The creation of an explicit package through a transparent, accountable process is a device that is relevant to nearly all developing and developed countries.⁵⁰

Perhaps the most interesting component of the Mexican reform is that resources flow to the State Ministries of Health as a function of affiliation and reaffiliation. The State Ministries of Health must ensure that affiliates are sufficiently satisfied with service delivery to reaffiliate each year. Unlike other reform mechanisms such as purchaser-provider splits or contracting, this reform does not go into great detail about how the states should spend increased resources to deliver the *Seguro Popular* package to the affiliates.⁵¹ Instead, a powerful financial incentive is created for the states to figure out how to do this for themselves. This approach can be used only in settings with enough decentralisation of managerial capacity. In some respects, it is similar to the strategy adopted by the Global Alliance for Vaccines and Immunisation (GAVI) to provide incentives to countries to increase coverage of the third dose of diphtheria,

tetanus, and pertussis vaccine (DTP3) through reward payments.⁵⁵ GAVI has increased DTP3 coverage in countries with baseline coverage of less than 65%.⁵⁶ The Mexican reform provides a new example of creating incentives for decentralised administrative units within a country to deliver care.

Powerful financial incentives can have unintended adverse effects. Possible adverse effects include: resources could be targeted only to affiliates leaving non-affiliates with worse care, responsiveness of care may improve at the cost of technical quality and curative interventions may crowd out preventive interventions. Anticipating some of these issues, the reform legislation included two mechanisms to avoid adverse effects: the creation of separate fund pools for resources going to the states for personal services and for public health interventions, and the designation of explicit packages for both. Although not detailed in the legislation, the third force moderating the potential adverse effect of the incentives on state ministries of health is a strong commitment to monitoring and evaluation. Benchmarking performance at the subnational level in this environment is critical.⁴¹ Benchmarking efforts using effective coverage in Mexico and in other countries where the epidemiological transition is advanced must be designed to capture the main affordable interventions that address non-communicable diseases and injuries, in addition to maternal and child health interventions. Other policy instruments, such as performance-related funding that is mentioned in the legislation, might also be needed so that the Federal Ministry of Health can act to counter adverse effects detected in state benchmarking data.

The catastrophic fund is also an important component of the reform for other countries to carefully consider. The fund is a mechanism for reducing certain forms of catastrophic payment but also played a central role in the political economy of the reform. Passing the legislation required buy-in from all parties and several critical constituencies. The main issue that created the political space to propose the reform in the beginning was catastrophic health expenditures, a problem for poor and some middle-class households. It was effectively articulated that the catastrophic fund would benefit a broad section of Mexico and thus had wide appeal. As the catastrophic fund still covers a limited set of conditions and began implementation in 2004, the actual benefits to the middle class have not been documented to date. Nevertheless, one message for other countries is that reforms, even if they primarily benefit the poor, can benefit from being packaged with broad effects and beneficiaries. Too often reforms only for the poor are poor reforms. In this respect, World Bank policy views that the government should focus exclusively on delivering public goods and on financing services for the poor may be misguided.⁵⁷

Mexico also provides a real-world illustration of the benefits and potential for shared learning from monitoring and evaluation. Mexico invested in rigorous

randomised evaluation of another major social programme, *Oportunidades*, which targeted the poor and included cash transfers and required health and education service use.^{58,59} The Ministry has followed this effort with a substantial commitment to monitoring and evaluation of the health reform, including an ongoing randomised study of the effect of *Seguro Popular* affiliation. These experiences emphasise that monitoring and evaluation should not be a post-hoc research activity. Real-world reforms are complex, often with unexpected consequences. Good statistical systems and national analytical capacity can identify difficulties early and help find policy options to address these problems. Monitoring and assessment require more than good statistical systems. They also require the right institutional architecture to sustain independence, technical competence, and a commitment to transparency.

Lancet Health System Reform in Mexico Series steering committee

Felicia Marie Knaul (Chair), Emmanuela Gakidou, Eduardo González-Pier, Rafael Lozano, Jaime Sepúlveda.

Contributors

E Gakidou, R Lozano, J Abbott-Klafter, J Barofsky, C Bryson-Cahn, D Feehan, D Lee, and C J L Murray did the analytical work. E González-Pier and H Hernández-Llamas contributed to the interpretation of the findings and the description of the reform. E Gakidou and C J L Murray drafted the manuscript; R Lozano, E González-Pier, J Abbott-Klafter, J Barofsky, C Bryson-Cahn, D Feehan, D Lee, and H Hernández-Llamas contributed to the revisions. All authors have read and approved the final manuscript.

Conflict of interest statement

H Hernández-Llamas was the National Coordinator of the *Seguro Popular* programme from October, 2001, to March, 2004. The other authors declare that they have no conflict of interest.

Acknowledgments

We thank the following individuals whose contributions helped greatly in the completion of this paper: Mauricio Hernández-Avila, Felicia Knaul, Michael Reich, and Jaime Sepúlveda for comments; Ari Friedman and Michael Lisman for research assistance; the National Institute for Public Health in Mexico (Instituto Nacional de Salud Pública) for implementing the health surveys used in the analysis and for making the ENSANut 2005–06 data available within 2 months of fieldwork completion, especially Juan Rivera, Teresa Shaman, and Mauricio Hernández-Avila; the team that provided databases and parallel analysis, including Patricia Fernández-Ham, Vanessa Vázquez, María Victoria Castro and Diana Avila.

References

- Frenk J, González-Pier E, Gómez-Dantés O, Lezana MA, Knaul FM. Comprehensive reform to improve health-system performance in Mexico. *Lancet* 2006; **368**: 1524–34.
- Knaul FM, Arreola-Ornelas H, Méndez-Carniado O, et al. Evidence is good for your health system: policy reform to remedy catastrophic and impoverishing health spending in Mexico. *Lancet* 2006; published online Oct 25. DOI:10.1016/S0140-6736(06)69565-2.
- WHO. World health report 2000. Geneva: World Health Organization, 2000.
- Frenk J, Sepúlveda J, Gomez-Dantes O, Knaul F. Evidence-based health policy: three generations of reform in Mexico. *Lancet* 2003; **362**: 1667–71.
- Secretaría de Hacienda y Crédito Público de México. Segunda Resolución de Modificaciones a la Resolución Miscelánea Fiscal para 2003. Diario Oficial de la Federación. 5-15-0003. May 15, 2003: http://www.dof.gob.mx/2003/mayo/dof_15-05-2003.pdf (accessed Oct 11, 2006).
- Knaul FM, Frenk J. Health insurance in Mexico: achieving universal coverage through structural reform. *Health Aff (Millwood)* 2005; **24**: 1467–76.
- Organization for Economic Co-operation and Development. OECD Reviews of Health Care Systems—Mexico. Paris: OECD Publishing, 2005.
- Daniels N, Flores W, Pannarunothai S, et al. An evidence-based approach to benchmarking the fairness of health-sector reform in developing countries. *Bull World Health Organ* 2005; **83**: 534–40.
- Homedes N, Ugalde A. Why neoliberal health reforms have failed in Latin America. *Health Policy* 2005; **71**: 83–96.
- Lloyd-Sherlock P. When social health insurance goes wrong: lessons from Argentina and Mexico. *Soc Policy Adm* 2006; **40**: 353–68.
- McPake B, Mills A. What can we learn from international comparisons of health systems and health system reform? *Bull World Health Organ* 2000; **78**: 811–20.
- Nelson JM. The politics of health sector reform: cross-national comparisons. In: Kaufman RRN, ed. Crucial needs, weak incentives: social sector reform, democratization, and globalization in Latin America. Washington, DC: Woodrow Wilson Center Press, 2004: 23–64.
- Roberts MJ. Getting health reform right: a guide to improving performance and equity. New York: Oxford University Press, 2004.
- Twaddle AC. Health care reform around the world. Westport: Auburn House, 2002.
- Chen CS, Liu TC. The Taiwan National Health Insurance program and full infant immunization coverage. *Am J Public Health* 2005; **95**: 305–11.
- Cheng TM. Taiwan's new national health insurance program: genesis and experience so far. *Health Aff (Millwood)* 2003; **22**: 61–76.
- Lu JF, Hsiao WC. Does universal health insurance make health care unaffordable? Lessons from Taiwan. *Health Aff (Millwood)* 2003; **22**: 77–88.
- Cheng S, Chiang T. The effect of universal health insurance on health care utilization in Taiwan. Results from a natural experiment. *JAMA* 1997; **278**: 89–93.
- Jeong HS. Health care reform and change in public-private mix of financing: a Korean case. *Health Policy* 2005; **74**: 133–45.
- Kwon S. Payment system reform for health care providers in Korea. *Health Policy Plan* 2003; **18**: 84–92.
- Lee JC. Health care reform in South Korea: success or failure? *Am J Public Health* 2003; **93**: 48–51.
- Pachanee CA, Wibulpolprasert S. Incoherent policies on universal coverage of health insurance and promotion of international trade in health services in Thailand. *Health Policy Plan* 2006; **21**: 310–18.
- Pannarunothai S, Patmasirawat D, Srithamrongsawat S. Universal health coverage in Thailand: ideas for reform and policy struggling. *Health Policy* 2004; **68**: 17–30.
- Suraratdecha C, Saithanu S, Tangcharoensathien V. Is universal coverage a solution for disparities in health care? Findings from three low-income provinces of Thailand. *Health Policy* 2005; **73**: 272–84.
- Gilson L, Doherty J, Lake S, McIntyre D, Mwikisa C, Thomas S. The SAZA study: implementing health financing reform in South Africa and Zambia. *Health Policy Plan* 2003; **18**: 31–46.
- van der Geest S, Macwan'gi M, Kamwanga J, Mulikelela D, Mazimba A, Mwangelwa M. User fees and drugs: what did the health reforms in Zambia achieve? *Health Policy Plan* 2000; **15**: 59–65.
- Barrientos A. Health policy in Chile: the return of the public sector? *Bull Lat Am Res* 2002; **21**: 442–59.
- Holst J, Laaser U, Hohmann J. Chilean health insurance system: a source of inequity and selective social insecurity. *J Public Health* 2004; **12**: 271–82.
- McPake B, Yepes FJ, Lake S, Sanchez LH. Is the Colombian health system reform improving the performance of public hospitals in Bogota? *Health Policy Plan* 2003; **18**: 182–94.
- Restrepo HE, Valencia H. Implementation of a new health system in Colombia: is this favourable for health determinants? *J Epidemiol Community Health* 2002; **56**: 742–43.
- Trujillo A, Portillo J, Vernon J. The impact of subsidized health insurance for the poor. Evaluating the Colombian experience using propensity score matching. *Int J Health Care Finance Econ* 2005; **5**: 211–39.
- Xu K, Evans DB, Kadama P, et al. Understanding the impact of the elimination of user fees: utilization and catastrophic health expenditures in Uganda. *Soc Sci Med* 2006; **62**: 866–76.

- 33 Rossetti AG. Change teams and vested interests: social security health reform in Mexico. In: Kaufman RRJ, ed. *Crucial needs, weak incentives: social sector reform, democratization, and globalization in Latin America*. Washington, DC: Woodrow Wilson Center Press, 2004: 65–92.
- 34 Brownell MD, Roos NP, Roos LL. Monitoring health reform: a report card approach. *Soc Sci Med* 2001 March; **52**: 657–70.
- 35 Gotsadze G, Zoidze A, Vasadze O. Reform strategies in Georgia and their impact on health care provision in rural areas: evidence from a household survey. *Soc Sci Med* 2005; **60**: 809–21.
- 36 Yip W, Berman P. Targeted health insurance in a low income country and its impact on access and equity in access: Egypt's school health insurance. *Health Economics* 2001; **10**: 207–20.
- 37 Murray CJL, Frenk J. A framework for assessing the performance of health systems. *Bull World Health Organ* 2000; **78**: 717–31.
- 38 Murray CJL, Evans DB, eds. *Health systems performance assessment: debates, methods and empiricism*. Geneva: World Health Organization, 2003.
- 39 Comisión Nacional de Protección Social en Salud. *Criterios presupuestales 2006: gasto de operación*. Mexico DF: Secretaria de Salud, 2006.
- 40 Travis P, Egger D, Davies P, et al. Subnational health systems performance assessment: objectives, challenges and strategies. In: Murray CJL, Evans DB, eds. *Health systems performance assessment: debates, methods and empiricism*. Geneva: World Health Organization, 2003: 809–22.
- 41 Lozano R, Soliz P, Gakidou E, et al. Benchmarking of performance of Mexican states with effective coverage. *Lancet* 2006; published online Oct 25. DOI:10.1016/S0140-6736(06)69566-4.
- 42 Shengelia B, Murray CJL, Adams OB. Beyond access and utilization: defining and measuring health system coverage. In: Murray CJL, Evans DB, eds. *Health systems performance assessment*. Geneva: World Health Organization, 2003: 221–34.
- 43 Shengelia B, Tandon A, Adams OB, Murray CJ. Access, utilization, quality, and effective coverage: an integrated conceptual framework and measurement strategy. *Soc Sci Med* 2005; **61**: 97–109.
- 44 Mexican Ministry of Health. *Effective coverage of the health system in Mexico 2000–2003*. Mexico, DF: Mexican Ministry of Health 2006.
- 45 Harvard Initiative for Global Health, Mexico Ministry of Health, National Institute of Public Health (Mexico). *Mexico health metrics 2005*. Cambridge: Harvard Initiative for Global Health, 2005.
- 46 Knaul F, Arreola H, Méndez O. Protección financiera en salud, México 1992 a 2004. *Salud Pública de México* 2005; **47**: 430–39.
- 47 Knaul F, Arreola H, Borja C. El sistema de protección social en México: efectos potenciales sobre la justicia financiera y los gastos catastróficos de los hogares. In: Knaul F, Nigenda G, eds. *Caleidoscopio de la Salud*. México: FUNSALUD, 2003: 275–94.
- 48 Comisión Nacional de Protección Social en Salud. *Informe de resultados—primer trimestre de 2006*. Mexico DF: Secretaria de Salud; 2006.
- 49 Chen L, Evans T, Anand S, et al. Human resources for health: overcoming the crisis. *Lancet* 2004; **364**: 1984–90.
- 50 González-Pier E, Gutiérrez-Delgado C, Stevens G, et al. Priority setting for health interventions in Mexico's System of Social Protection in Health. *Lancet* 2006; published online Oct 25; DOI: 10.1016/S0140-6736(06)69567-6.
- 51 Londono J, Frenk J. Structured pluralism: towards an innovative model for health system reform in Latin America. *Health Policy* 1997; **41**: 1–36.
- 52 Bhargava A, Jamison DT, Lau LJ, Murray CJL. Modeling the effects of health on economic growth. *J Health Econ* 2001; **20**: 423–40.
- 53 WHO Commission on Macroeconomics and Health. *Macroeconomics and health: investing in health for economic development*. Geneva: World Health Organization, 2001.
- 54 Laurell AC. What does Latin American social medicine do when it governs? The case of the Mexico City government. *Am J Public Health* 2003; **93**: 2028–31.
- 55 GAVI. Report of the Seventh GAVI Board Meeting. Annex 1. Proposal on calculating GAVI reward shares. Stockholm: GAVI Alliance, 2006.
- 56 Lu C, Michaud C, Gakidou E, Khan K, Murray CJL. Effect of the Global Alliance for Vaccines and Immunisation on diphtheria, tetanus, and pertussis vaccine coverage: an independent assessment. *Lancet* 2006; **368**: 1088–95.
- 57 World Bank. *World development report 2004: making services work for poor people*. New York: Oxford University Press, 2004.
- 58 Gertler P. Do conditional cash transfers improve child health? Evidence from PROGRESA's control randomized experiment. *Am Econ Rev* 2006; **94**: 336–42.
- 59 Skoufias E. *PROGRESA and its impacts on the welfare of rural households in Mexico*. Washington: International Food Policy Research Institute, 2005.