Variations In Prenatal Care Quality For The Rural Poor In Mexico

Indigenous women received fewer procedures than other women in private health facilities; disparities were much less prominent in public facilities.

by Sarah L. Barber, Stefano M. Bertozzi, and Paul J. Gertler

ABSTRACT: Quality is high on the Mexican health policy agenda. In this paper we evaluate the quality of prenatal care for rural low-income women. Women who obtained care from private practitioners and non-MDs received fewer procedures on average. Poverty predicts poor quality; however, indigenous women in private settings received fewer procedures, after household wealth was controlled for. We recommend strengthening clinical skills and providing incentives to adhere to quality standards. Quality reporting could promote informed employer care-purchasing and individual care-seeking choices. The national health reforms should be monitored to determine their success in not only increasing access among the poor and indigenous but also ensuring that such care meets quality norms. [*Health Affairs* 26, no. 3 (2007): w310–w323 (published online 27 March 2007; 10.1377/hlthaff.26.3.w310)]

Improving health care quality is high on the health policy agenda in Mexico. Three-fourths of Mexico's population thinks that the health system needs fundamental changes.[1] In response, the Ministry of Health (MOH) launched the Crusade for Healthcare Quality in 2001. This program promotes technical standards by establishing professional practice codes, delineating the rights of health care consumers, promoting use of clinical treatment guidelines, strengthening medical education, and establishing a semiautonomous accreditation body for all health facilities.[2] Despite the policy emphasis, few studies have evaluated variations in provider practice in Mexico.[3]

In this study we used 2003 data from rural Mexican communities in seven

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states to evaluate prenatal care quality. The data were collected among low-income households as part of an evaluation of the government's Oportunidades poverty reduction program.[4] Using information about prenatal care procedures received from 3,553 women of reproductive age, we predicted the average procedures received by clinical setting and individual characteristics in multivariate analyses. We found significant variation by public and private settings, provider qualifications, household wealth, and indigenous status.

In this paper we highlight several means of addressing quality deficiencies: improving clinical skills, providing incentives to adhere to minimum standards, strengthening regulation, and making technical quality more transparent to promote informed care-seeking choices. Mexico's national health reforms should be monitored closely to determine their success in not only increasing access but also ensuring that care meets quality norms. A better understanding of the complex factors that drive disparities in quality could inform the government's goal of reducing health inequalities in Mexico.

The Setting

■ **Policy context.** Mexico is a middle-income country of 107 million people.[5] Large income inequalities exist; 20 percent of Mexicans live in extreme poverty.[6] Only one-quarter of the population resides in rural areas, but they account for 35 percent of the poor. Health care expenditures were 6.6 percent of Mexico's gross domestic product (GDP) in 2006, or an average per capita spending of US$479. It is estimated that one-half of total health spending is out of pocket.[7] Since the mid-1980s, the Mexican constitution has guaranteed universal health care, and the government's *National Health Program 2001–2006* emphasizes equity, quality, and financial protection.[8]

Inequities in health are pronounced for Mexico's the nine to ten million indigenous people. Their infant mortality rate is 54 deaths per 1,000 live births—twice that of the rest of the population.[9] Such averages hide great heterogeneity across some sixty-three different groups. Groups speaking Chontal, for example, have relatively lower rates of infant mortality (33 deaths per 1,000 live births) compared with people who speak Tojolabal (87 per 1,000).[10] It is unclear whether poor health outcomes among the indigenous represent socioeconomic disparities, differential treatment by providers, or beliefs related to health and health-seeking behavior.

■ **Health care delivery in Mexico.** Health care in Mexico is delivered through the social security institutes, Ministry of Health and government facilities, and the private sector.[11] Health facilities operating under social security cover approximately 51 percent of the population.[12] The major institutions include the Mexican Institute for Social Security (IMSS); the Social Security Institute for Civil Servants (ISSSTE) for federal and some state employees; the state-owned oil company; and the military. Federal institutions are financed by contributions from employers, employees, and general tax revenues.

By law, all formal-sector salaried employees are required to participate in social security, and the self-employed may join voluntarily. In practice, few small firms enroll their employees, and voluntary participation is limited because of the relatively high premiums and the availability of other public- and private-sector alternatives. Other government-operated health facilities endeavor to ensure the constitutional right to universal access. Facilities operated by the MOH (SSA) or by the IMSS under contract to the SSA (IMSS Oportunidades) provide care to approximately 40 percent of the population without social security or private insurance. MOH services have largely been decentralized to the states, although the federal government retains control of human resources for health and sets national standards.

IMSS Oportunidades is operated by the IMSS; it provides ambulatory care, health education, and community development for the rural poor. It is administered centrally by the MOH and funded from general revenues. Each of the social security institutes and MOH systems maintains its own network of primary, secondary, and tertiary facilities, although limited cooperation across the various systems aims to ensure access to both primary and tertiary services.

Despite the extensive and overlapping networks of public providers, some 21 percent of social security beneficiaries and 28 percent of nonbeneficiaries also use private health care.[13] The private sector comprises a diverse range of providers and services. At the top end of the spectrum are facilities that provide internationally competitive standards of care. This analysis focuses exclusively on private providers accessed by low-income rural populations, however. This would encompass privately practicing midwives, nurses, and physicians, who are not required to meet quality, performance, or continuing education standards, in addition to nonallopathic practitioners.

Study Data And Methods

■ **Sample.** We used household data from the 2003 Encuesta de Evaluación (ENCEL), fielded in low-income communities across seven states.[14] Our analyses primarily used data from a fertility module, which targeted 10,000 women of reproductive age. The survey used a two-stage stratified sampling design. Within each state, communities were randomly selected based on a probability sample proportionate to the number of women of reproductive age. Within each community, a predetermined number of households was randomly selected based on the average number of reproductive-age women. All eligible women were interviewed in selected households. Among 14,845 women in 286 communities identified, 74 percent fully completed interviews. The most common reason cited for noncompletion was not being at home (5.1 percent); 1.8 percent refused to be interviewed.

These analyses focused on a subset of women who gave retrospective reports about prenatal services received during their most recent pregnancy between 1997 and 2003. We omitted 7 percent of women who did not seek prenatal care and

those who recently experienced a miscarriage or abortion. The latter might have received more than routine care. Given that we specifically evaluated content with regard to clinical setting, we also omitted observations where the source of care was missing. With these exclusions, our analyses focused on 3,553 women.

■ **Creating the quality scores.** The quality of prenatal care was measured by maternal reports of services received that correspond with national guidelines.[15] We identified thirteen services routinely conducted during history-taking (asked about bleeding and discharge during pregnancy), diagnostics (took blood and urine samples), physical examination (took blood pressure and weight, measured uterine height, and gave a pelvic examination), and other preventive procedures (gave tetanus toxoid and iron supplements, advised about family planning and lactation, and recorded the information). We developed a composite index, which represents the sum of positive responses as proportion of the total. The thirteen-item index has a Cronbach alpha scale reliability coefficient of 0.83, indicating a satisfactory level of internal consistency. We standardized the index to a mean of 0 and standard deviation of 1; results are expressed as standard deviations (SD) from the mean to evaluate differences relative to the sample.

■ **Methods.** Maternal reports of prenatal procedures received provide multiple data about care in each clinical setting. However, such reports might also reflect systematic differences in quality based on individual and household characteristics. To correct for this bias, the main analyses reported the adjusted mean procedures received. We estimated the adjusted means using community-fixed-effects regressions predicting the thirteen-item quality index measuring the proportion of care received on individual, household, and demographic characteristics. The fixed effects reflect the average quality received, purged of differences in characteristics.

The individual characteristics in adjusted regressions included maternal reports of previous negative birth outcomes, number of previous pregnancies, and age. A *negative birth outcome* was defined as stillbirth, miscarriage, or abortion. The number of previous pregnancies was defined categorically as one, two to four, and five or more. Maternal age was included as a continuous variable and squared.

Household socioeconomic characteristics in the adjusted regressions included age of household head, educational levels for mother and head of household, and household head's civil status. Civil status was categorized as civil union, married, or other (single, divorced, separated, or widowed). We also included dummy variables for female-headed households, indigenous households, piped water, solid walls, household size, and household demographics, in addition to monthly household spending. Indigenous households were those that spoke any indigenous language. Solid walls were stone, brick, or partition. Household demographics were the proportion of people in a given household in four age categories (0–5, 6–17, 18–49, 50 and older) by sex. Monthly household spending on food and nonfood items was used to estimate wealth. Household spending was considered more reliable than income in capturing wealth among populations with informal

or seasonal employment. Child's year of birth was included to control for maternal recall bias. Lastly, a dummy variable represented household participation in the government's Oportunidades poverty reduction program.[16]

We estimated a number of different specifications. The first set of regression models examined differences in adjusted mean quality by clinical setting and provider qualification. The survey identified fourteen settings, which we divided into four categories: (1) social security–sector clinics and hospitals; (2) IMSS Oportunidades clinics; (3) MOH and other government services; and (4) private services. In the regressions, we interacted each clinical setting with two types of provider qualifications: MDs and non-MDs. Non-MD providers in public settings included trained nurses and midwives, whereas those in private settings included both professionally trained staff and nonallopathic practitioners.

The next set of regressions examined differences in care received between the poorest and the least poor women within each clinical setting. We interacted the clinical setting with household wealth as measured by four quartiles of monthly household spending. In addition to the adjustments noted previously, we also controlled for receipt of care from an MD.

The fourth set of regressions examined how quality varied for indigenous women in public and private clinical settings and whether the level of care differed by household wealth. We combined the four clinical settings into public or private. The poorest women were defined as those in the lower two wealth quartiles, and the least poor were in the upper two quartiles. We interacted the aggregate clinical setting with indigenous status and predicted the level of care for the poorest and the least poor women. Similar to the previous regressions, we controlled for provider qualifications.

Results

Exhibit 1 presents selected frequencies and means for the rural sample as a whole and by public and private clinical setting. Women who used public facilities were poorer than those who used private settings, as measured by fewer households with piped water and solid wall construction and higher household spending on food—a key indicator of poverty. They were also slightly older (29.9 years compared with 28.8 years) and had experienced more pregnancies; moreover, a higher proportion also had previous negative birth outcomes.

We also compared the rural sample with national figures. Nearly one-quarter of the sample constituted women from indigenous households—more than twice the national average. At least one-third lived in households with dirt floors and no piped water, compared with one in ten nationally. The proportion of household spending on food was 44 percent higher in the study population, and educational levels were lower, compared with the national average. Participating households had a much higher proportion of children under age five; this is expected because the poverty program focuses on early childhood development.

EXHIBIT 1
Selected Frequencies And Means For Socieconomic And Maternal Characteristics For The Rural Study Population In Mexico, By Public And Private Clinical Settings And In Comparison With National Figures, 2003

	Rural study population			
Characteristic	**Accessed public care**	**Accessed private care**	**Average**	**National**
Socioeconomic				
Indigenous household	24.9%	22.7%	24.4%	9.8%
Dirt floors	33.9	29.1	32.9	11.1
No piped water	37.5	28.7*	35.6	10.1
Household spending on food	63.6	59.7**	62.8	43.7
Female educational levels				
None	12.8%	13.0%	12.8%	4.5%
Some or completed primary	66.5	61.7	65.5	41.6
Some or completed secondary	17.1	20.1	17.7	23.6
Technical or commercial	0.8	1.7	1.0	9.7
Preparatory or normal basic	2.4	3.1	2.5	9.7
Higher than secondary level	0.3	0.5	0.3	5.9
Not specified	0.2	0.0	0.1	5.0
Household demographics				
Males 0–5 years	13.1%	14.1%*	13.3%	7.2%
Females 0–5 years	12.4	12.7	12.4	7.0
Female-headed household	10.1%	9.8%*	10.1%	–[a]
Household size (mean no. of people)	6.0	6.2	6.0	–[a]
Solid household wall construction	56.6%	65.8%**	58.6%	–[a]
Maternal				
Maternal age (years)	29.9	28.8**	29.7	–[a]
Number of prior pregnancies				
One	18.1%	23.7%**	19.3%	–[a]
2–4	51.9	51.4	51.8	–[a]
5 or more	30.0	25.0	28.9	–[a]
Ever negative birth outcome	11.2%	8.0%**	10.5%	–[a]

SOURCES: For rural study population, Encuesta de Evaluación (ENCEL), 2003. For national data: Pan American Health Organization, "Country Health Profile: Mexico," 2001, http://www.paho.org/english/sha/prflmex.htm (accessed 24 July 2006) (indigenous population); J. Sepulveda, ed., *National Health Survey 2000* (in Spanish) (Mexico City: National Institute of Public Health and Ministry of Health, 2003) (dirt floors, no piped water, maternal educational levels, household demographics); and A. Nicita, "Efficiency and Equity of a Marginal Tax Reform: Income, Quality, and Price Elasticities for Mexico," World Bank Policy Research Paper no. 3266 (Washington: World Bank, April 2004) (percentage of household expenditures on food).

NOTES: The study population was limited to rural households participating in the survey's fertility module. National-level data represent urban and rural populations, with the exception of household food spending, reported for rural areas only. The indigenous population was estimated at 9.17 million for 1995, and the percentage reported is based on a population of 93.9 million. Estimates for the percentage of household spending on food is based on seven Mexican National Household Income and Expenditure Surveys (ENIGH) conducted during 1984–2000. Solid walls are those of stone, brick, or partition. Significance denotes differences between public and private clinical settings.

[a] Not available.

*$p \leq 0.10$ **$p \leq 0.05$

Exhibit 2 reports the unadjusted percentage for each variable in the quality index by clinical setting. The vast majority of women were weighed, got their blood pressures taken, and received a tetanus toxoid immunization. Fewer than half reported having given a blood or urine sample. The largest differences, however, were by clinical setting. Women who received care from the private sector reported lower percentages for all of the thirteen variables measured.

EXHIBIT 2
Defining 'Quality': Percentage Of Prenatal Care Procedures Received, By Clinical Setting, Rural Mexico, 2003

Procedure	Social security	IMSS Oportunidades	MOH, other gov.	Private sector	All settings
Asked about bleeding	82.24%	78.26%	74.40%	57.01%	72.28%
Asked about vaginal discharge	85.34	80.71	75.71	60.36	74.44
Blood sample taken	61.21	44.02	46.12	31.79	45.23
Urine sample taken	68.79	49.46	50.27	34.36	49.73
Blood pressure taken	95.00	94.57	94.80	73.23	90.09
Weighed	97.93	98.10	97.98	75.16	92.99
Uterine height measured	90.00	89.95	88.24	61.78	82.92
Pelvic exam	51.21	42.93	48.80	35.26	45.62
Tetanus toxoid immunization	94.48	97.28	94.26	70.14	89.33
Iron supplements	90.52	88.86	85.12	65.89	82.18
Advised about lactation	92.24	92.93	91.30	71.04	87.19
Advised about family planning methods	90.17	91.85	85.72	55.21	80.41
Recorded information	80.00	83.15	77.08	43.24	70.79

SOURCE: Encuesta de Evaluación (ENCEL), 2003.
NOTES: Chi-square tests indicate significant differences in frequencies for each procedure by clinical setting ($p \leq 0.05$). IMSS is Mexican Institute for Social Security. MOH is Ministry of Health.

Panel A of Exhibit 3 reports the percentage of prenatal visits by provider qualifications and clinical setting. The vast majority of women (81.9 percent) obtained prenatal care from MDs rather than nurses, midwives, or other providers. In private settings, however, only two-thirds received care from an MD. Comparing clinical settings, 51.4 percent of the sample sought prenatal care at MOH or other government facilities, and 78.1 percent went to any public facility.

Panel B of Exhibit 3 presents the mean quality scores for the thirteen procedures, adjusted for individual, household, and demographic differences. Women who sought care from MDs received significantly more procedures than did those treated by non-MDs in all clinical settings except IMSS Oportunidades. Women who obtained care from MDs in social security facilities received 81.9 percent of the procedures, compared with 42.9 percent for those treated by non-MDs in private settings. Panel C of Exhibit 3 replicates the analyses in panel B, but quality scores are expressed as SD units. The highest standardized quality score was 0.34 SD for MDs working in social security facilities compared with −1.32 SD for non-MDs in private clinical settings.

MDs working in private settings were associated with better quality compared with their non-MD counterparts. However, the adjusted mean for the private sector was the lowest among the four clinical settings (−0.49 SD). In contrast, social security facilities scored the highest (0.30 SD). Women who received care from public rather than private clinical settings were associated with significantly higher mean procedures on average.

Exhibit 4 presents the variation by household wealth. Recall that the spending

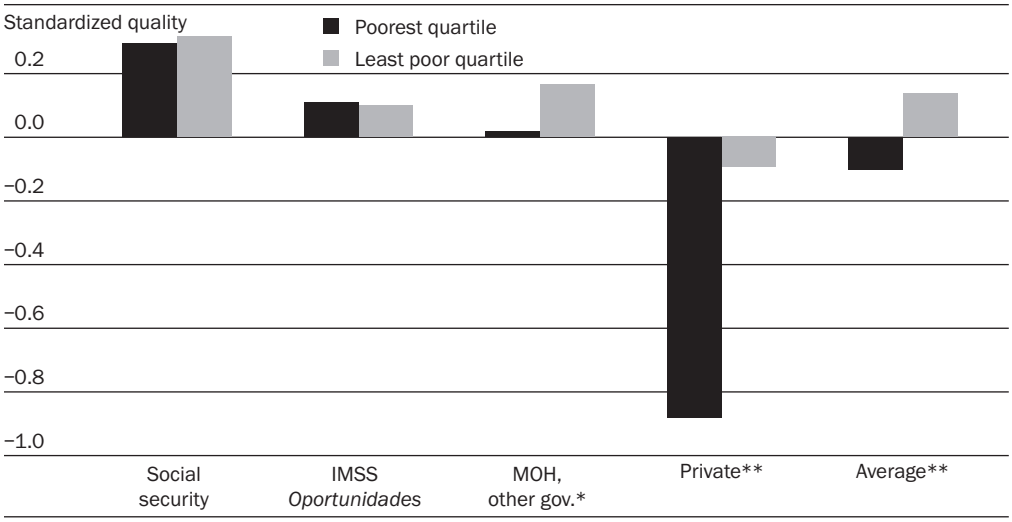
EXHIBIT 3
Percentage Of Prenatal Visits And Adjusted Mean Prenatal Procedures Received, By Provider Qualifications And Clinical Setting, Rural Mexico, 2003

Percent of visits and quality	Social security	IMSS Oportunidades	MOH, other gov.	Private sector	Average
Panel A: Percent of visits					
MD	92.41%	86.61%	84.96%	66.41%	81.87%
Nurse, midwife, other provider	7.59	17.39	15.04	33.59	18.13
Panel B: Adjusted mean procedures received (raw scores)					
MD	81.94%	77.29%	77.26%	71.42%	76.86%
Nurse, midwife, other provider	72.79	74.57	72.14	42.85	61.59
Average	81.02	76.75	76.28	62.53	74.09
Panel C: Adjusted mean procedures received (SD units)					
MD	0.34	0.14	0.14	−0.11	0.12
Nurse, midwife, other provider	−0.05	0.02	−0.08	−1.32	−0.53
Average	0.30	0.12	0.10	−0.49	0.00
Number with data	580	368	1,828	777	3,553
Percent	16.3	10.4	51.4	21.9	100.0

SOURCE: Encuesta de Evaluación (ENCEL), 2003.

NOTES: Medical doctor (MD) providers are associated with significantly higher procedures received compared with non-MDs on average and for all clinical settings with the exception of IMSS Oportunidades ($p \leq 0.05$). Means are adjusted for maternal, household socioeconomic, and demographic characteristics from community-fixed-effects models. A version of this exhibit showing 95 percent confidence intervals is available online at http://content.healthaffairs.org/cgi/content/full/hlthaff.26.3.w310/DC2. IMSS is Mexican Institute for Social Security. MOH is Ministry of Health.

EXHIBIT 4
Adjusted Mean Prenatal Procedures Received, By Clinical Setting, By Women In The Sample's Poorest And Least Poor Household Wealth Quartiles, Rural Mexico, 2003



SOURCE: Encuesta de Evaluación (ENCEL), 2003.

NOTES: The poorest quartile received significantly fewer prenatal procedures compared with the least poorest quartile on average and in two clinical settings: in private sector and in Ministry of Health (MOH) and other government facilities. Means are adjusted for maternal, household socioeconomic, and demographic characteristics and provider qualifications from community-fixed-effects models. IMSS is Mexican Institute for Social Security.

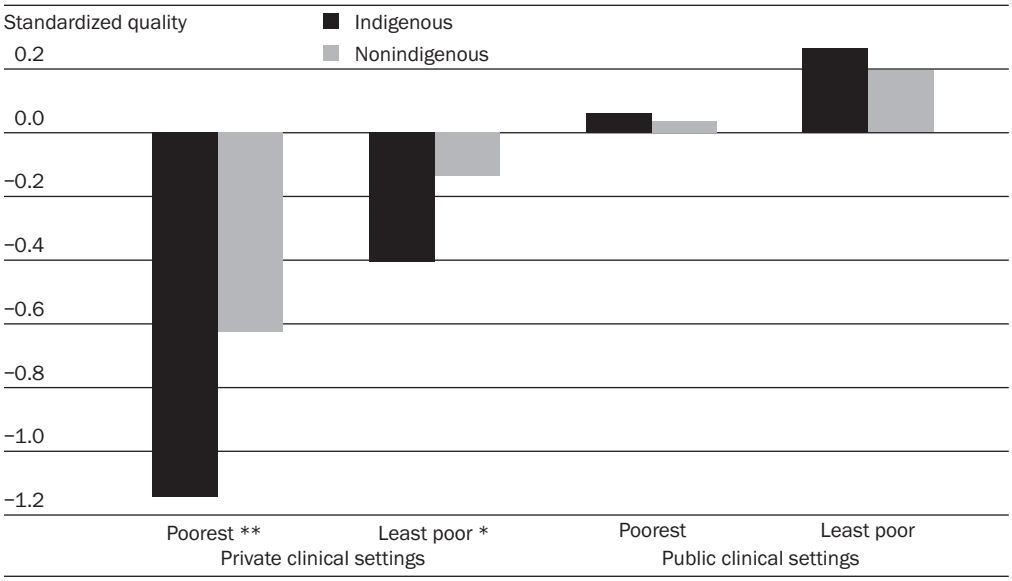
*p </= 0.10 **p </= 0.05

quartiles used to measure wealth were relative to the sample, which was drawn from the poorest segment of the population. The poorest sample quartile received significantly fewer procedures compared with the least poor on average and in two clinical settings—in the private sector and in MOH and other government facilities. The poorest who sought care in private settings were associated with care close to one standard deviation below the mean (−0.88 SD). Comparing public and private, the poor received below-average care in the private sector and above-average care in the three public clinical settings. The least poor women were associated with quality above the mean in public but not private settings.

Given strong relationships between indigenous groups and poor health, we examined quality scores for women in indigenous households by public and private clinical settings. We found significant differences in the adjusted means between indigenous and nonindigenous women who sought care from private clinical settings but no difference for public settings. We further compared the level of care received by the poorest and the least poor indigenous women in public and private settings. In this analysis, the poorest were those in the bottom two spending quartiles and the least poor, in the top two quartiles.

Exhibit 5 first presents the scores for women who received private health care. Poor indigenous women were associated with significantly fewer procedures

EXHIBIT 5
Adjusted Mean Prenatal Procedures Received In Private And Public Clinical Settings By The Poorest And Least Poor Households, By Indigenous Status, Rural Mexico, 2003



SOURCE: Encuesta de Evaluación (ENCEL), 2003.
NOTES: The poorest households are those in the lowest two wealth quartiles, and the least poor are in the highest two wealth quartiles. Differences in the adjusted mean prenatal procedures received for indigenous compared with nonindigenous women are significant in private clinical settings for the poorest and least poor. Means are adjusted for maternal, household socioeconomic, and demographic characteristics and provider qualifications from community-fixed-effects models.
*p </= 0.10 **p </= 0.05

(−1.15 SD) compared with poor nonindigenous women (−0.63 SD). Similarly, however, the least poor indigenous women also received fewer procedures in private settings compared with their nonindigenous counterparts (−0.41 SD compared with −0.14 SD; $p \leq 0.10$). No significant differences by indigenous status existed for women accessing public care.

Discussion

■ **Limitations.** The data focused on low-income rural populations and were not representative of Mexico as a whole. The private health sector was not measured comprehensively, and the findings referred to private providers accessed by the rural poor. The definition of *indigenous status* did not distinguish across diverse ethnic groups. Urban health care was examined separately.[17] We omitted from our analyses women who did not seek prenatal care—a small but vulnerable group with lower levels of education and income.

Quality can be defined in different ways. We used maternal reports of care received based on clinical guidelines describing routine procedures, similar to previous studies.[18] We controlled for possible biases in individual reporting by estimating adjusted mean quality and held constant variables that represented socioeconomic status and risk. We were unable to compare maternal reports with medical records, which are not maintained consistently or accurately across all clinical settings. Maternal reports, however, focused on concrete procedures rather than perceptions or satisfaction. We did not evaluate excess use of medical procedures. We assessed only the quality of prenatal services, which might differ from curative or chronic care. Lack of data about gestational age precluded an evaluation of women with preterm births who had reduced opportunity for prenatal care.

■ **Policy implications.** We found major variations in prenatal care quality by provider qualifications, clinical settings, income, and indigenous status. Here we discuss the policy implications of each of these findings.

Strengthening provider qualifications. MDs scored significantly higher than non-MDs across all clinical settings, with the exception of IMSS Oportunidades. If the level of professional training were similar across different qualifications, one might conclude that a medical degree is an important determinant of quality. However, in Mexico, the level of professionalism for physician training is far better on average than for other practitioners. Thus, we were unable to distinguish the type of training (for example, MD versus professional midwife) from its quality. International evidence has shown that professional midwives can effectively manage routine prenatal consultations when integrated into existing services.[19] Professional nurses and midwives in other Organization for Economic Cooperation and Development (OECD) countries take on a broad range of clinical and managerial tasks.[20] In Mexico, expanding the roles and responsibilities for midwives requires greatly increasing the small cadre of professional midwives or their equiva-

lent, in addition to implementing systems of certification and continuing education. Professional midwives could play an especially important role for rural populations given the difficulty of deploying public-sector physicians to these areas.

Incentives for minimum standards of care. The 2004 health reform bill created Seguro Popular, which aims to insure those not covered under social security. The fundamental change is the allocation of resources based on "democratic budgeting," whereby the amount of federal funds allocated to states depends on the number of families enrolled in health plans. Because participating facilities must be accredited, the reform provides much-needed incentives for local governments to enforce minimum standards. The per capita payments—combined with consumers' ability to opt in or out of the program—create incentives to ensure consumer satisfaction while providing minimum standards of care. In addition, the combination of quality incentives for public facilities and accreditation for both public and private facilities also could stimulate quality improvement in the private professional sector.

Informed purchasing. Some 16 percent of our sample received care from the social security system, which is funded by general tax revenues, employers, and employee contributions. Because information about technical quality is lacking, employers are not aware of the care their employees receive—despite the fact that quality deficiencies could have important effects on productivity. Regularly evaluating provider practice and making technical quality more transparent—in the form of a report card, for example—could be used by employers to demand value for their health spending. U.S. experience with quality reporting could provide a useful model.[21]

Mexican citizens have little choice of health systems or of providers within the public health system, because affiliation is determined by type of employment. Thus, although formal-sector employers could play an important role in demanding quality from public providers on behalf of their employees, this would not affect more than half of health spending that is out of pocket. This money is channeled into the private sector or the government system that provides care to those with informal employment.

Increasing transparency about technical quality remains important for empowering individual consumers as well as the civil-society organizations that act on their behalf. Unfortunately, although measurement of quality in public facilities can be implemented directly by government, a much broader effort is needed to reveal quality variations in the private sector. Addressing these variations will require a broader approach with interventions at different levels, including regulations at the national level, support to nonformal practitioners, and information for consumers.

Regulations. Regulations to ensure minimum standards remain important in protecting patients, who might not be able to judge technical standards and identify

suboptimal quality. In Mexico, private outpatient facilities are considered "entrepreneurial initiatives" that operate without restrictions on activities or quality.[22] Since 2001, however, a growing number of facilities are participating in voluntary certification programs.

Incentives for the private nonformal sector. Training for private practitioners has been demonstrated effective over the short term in improving case management for sick children.[23] A less common but innovative approach is franchising private health care providers. Mexico's experience in this area could be instructive. A franchising network for family planning services was established under Mexico's National Family Planning Association. The network targets underemployed or unemployed health workers who receive training and capital costs in exchange for a fee, supervision, use of the franchise brand, and national advertising. This strategy provides incentives for providers to maintain quality standards and to offer specific services under a system of training and supervision. Moreover, it brings nonformal providers into a communication network and functions in environments where regulations are weak or poorly implemented. Although this approach is promising, evidence of its impact on quality is lacking.[24]

Information for consumers. At the consumer level, the difficulty lies in the difference between technical quality standards and "responsiveness" as indicated by patient satisfaction and perceptions. Widespread dissatisfaction exists with the Mexican public health system. Many believe that public services are of poor quality and that private quality is very high relative to government services in terms of consumer responsiveness and wait times.[25] To the extent that patients cannot judge differences in technical quality, their choices are likely to be guided by responsiveness—consistent with our findings that women are paying more for care of lower technical quality in the private sector. This could explain the socioeconomic differences reported in this study, should more highly educated consumers have greater capacity to evaluate technical quality. Quality reporting could address this issue by promoting informed care-seeking choices.

Reducing disparities by wealth and indigenous status. The poorest sample quartile is associated with lower quality in MOH and other government facilities. This could be related to the additional out-of-pocket costs because of the referral systems for diagnostics and drugs. An objective of the national health reform is to overcome the constraints in accessing public health care based on ability to pay. Funded from general revenues and enrollee premiums, it replaces user fees for services and medicines with a heavily subsidized sliding prepayment scale and provides a 100 percent subsidy for the extremely poor. As the program expands, the wealth discrepancies in care received could disappear, given that it explicitly pays for diagnostics and prescriptions. However, these reforms should be monitored closely to ensure that the poor not only have access to services but also receive care that meets quality standards.

Indigenous women received significantly fewer procedures compared with

nonindigenous women in private settings. The reasons are almost certainly multifactorial, including language barriers, cultural differences in care-seeking behavior, and differential or discriminatory treatment. According to the MOH, some health care providers treat indigenous populations and the poor with little respect.[26] Important efforts have been made in Mexico to recognize and address indigenous issues in the public sector through Intercultural Hospitals and the National Program for the Health and Nutrition of Indigenous People. Indeed, we found no significant difference between indigenous and nonindigenous women seeking care in the public sector, which implies that the problem lies with providers and institutions.

Similar findings have been noted in the United States, where certain minority groups are less likely than others to receive routine medical procedures.[27] U.S. proposals to overcome quality differences by ethnicity recommend increasing awareness among health care providers and greater diversity in the health workforce.[28] More data collection efforts are required to gain greater understanding of this problem.

WE HAVE HIGHLIGHTED THE OPPORTUNITY to improve quality at different levels of Mexico's health care system: clinical skills and incentives for health care providers, information for purchasers and consumers, and regulation for ensuring minimum standards. Many organizational and financing strategies to improve quality, however, have not been fully evaluated. Testing of different approaches would provide evidence to inform decision making. The national health reforms should be monitored closely to determine their success in increasing not simply access but also access to high-quality care, particularly among the poor. Additional research about the factors that lead to low quality for the poor and indigenous populations could inform the government's goal of reducing health inequalities in Mexico.

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NOTES

1. Ministry of Health, *National Health Program 2001–2006: The Democratization of Health in Mexico* (in Spanish) (Mexico City: MOH, 2001); and J. Frenk et al., "Evidence-Based Health Policy: Three Generations of Reform in Mexico," *Lancet* 362, no. 9396 (2003): 1667–1671.
2. This body is the Comisión Federal para la Protección contra Riesgos Sanitarios (COFEPRIS).
3. Examples of studies that have done so are J.L. Bobadilla, *Quality of Perinatal Medical Care In Mexico City,* Perspective Series in Public Health (Cuernavaca: National Institute of Public Health, 1988); G.H. Reyes et al., "Urban-Rural Variations in Medical Care of Children with Diarrhea in Mexico" (in Spanish), *Salud Pública de México* 38, no. 3 (1996): 157–166; R. Bojalil el al., "The Quality of Private and Public Primary Health Care

Management of Children with Diarrhoea and Acute Respiratory Infections in Tlaxcala, Mexico," *Health Policy and Planning* 13, no. 3 (1998): 323–331; and E. Ruelas, "Health Care Quality Improvement in Mexico: Challenges, Opportunities, and Progress," *Proceedings (Baylor University Medical Center)* 15, no. 3 (2002): 319–322.

4. See Ministry of Social Development, "Oportunidades: External Evaluation" (in Spanish), 17 February 2006, http://evaluacion.oportunidades.gob.mx:8010/en/index.php (accessed 12 March 2007).
5. Data located in a search from the Population Reference Bureau Datafinder Web site, http://www.prb.org/datafind/datafinder7.htm.
6. World Bank, *Poverty in Mexico: An Assessment of Conditions, Trends, and Government Strategy* (Washington: World Bank, 2004).
7. World Health Organization, "Mexico: WHO Estimates for Country NHA Data (1996–2005)," http://www.who.int/nha/country/mex/en (accessed 6 March 2007).
8. MOH, *National Health Program 2001–2006.*
9. Ibid.
10. Pan American Health Organization, "Country Health Profile: Mexico," 2001, http://www.paho.org/english/sha/prflmex.htm (accessed 26 February 2007).
11. M. Barraza-Llorens et al., "Addressing Inequity in Health and Health Care in Mexico," *Health Affairs* 21, no. 3 (2002): 47–56.
12. MOH, *National Health Program 2001–2006.*
13. Ibid.
14. Secretary General, National Population Council, *Survey to Measure the Reproductive Health Impact of the Oportunidades Program 2003: Sampling Design* (in Spanish) (Mexico City: National Population Council, 2004).
15. MOH, *Official Mexican Standards (NOM) 007-SSA2-1993 for Care during Pregnancy, Delivery, Post-Partum, and for Newborns* (in Spanish) (Mexico City: MOH, 1993).
16. Oportunidades beneficiaries obtained prenatal care as a condition of program participation.
17. S. Barber, "Public and Private Prenatal Care Providers in Urban Mexico: How Does Their Quality Compare?" *International Journal of Quality in Health Care* 18, no. 4 (2006): 306–313.
18. M.D. Kogan et al., "Relation of the Content of Prenatal Care to the Risk of Low Birth Weight: Maternal Reports of Health Behavior Advice and Initial Prenatal Care Procedures," *Journal of the American Medical Association* 271, no. 17 (1994): 1340–1345.
19. D. Tumbull et al., "Randomised, Controlled Trial of Efficacy of Midwife-Managed Care," *Lancet* 348, no. 9022 (1996): 213–218.
20. Organization for Economic Cooperation and Development, *OECD Reviews of Health Systems, Mexico* (Paris: OECD, 2005).
21. E.K. Wicks and J.A. Meyer, "Making Report Cards Work," *Health Affairs* 18, no. 2 (1999): 152–155; and M.B. McClellan and D. Staiger, "Comparing the Quality of Healthcare Providers," in *Frontiers in Health Policy Research*, ed. A. Garber (Boston: MIT Press, 2000), 113–136.
22. OECD, *OECD Reviews of Health Systems, Mexico.*
23. Bojalil et al., "The Quality of Private and Public Health Care Management."
24. R. Stephenson et al., "Franchising Reproductive Health Services," *Health Services Research* 39, no. 6, Part 2 (2004): 2053–2080.
25. MOH, "The 2000 National Survey of Satisfaction with Health Services," in *National Health Program 2001–2006,* 52–56; A. Valencia-Mendoza, "The Conditional Demand for Formal Curative Ambulatory Services in Mexico" (in Spanish) (Thesis, Center for Economic Research and Teaching, Mexico City, 2004); and E. Bloom, *Health and Healthcare in Mexico* (Mexico City: Center for Economic Research and Teaching, 1995).
26. MOH, *National Health Program 2001–2006.*
27. B.D. Smedley, A.Y. Stith, and A.R. Nelson, eds., *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health* (Washington: National Academies Press, 2002).
28. R. Lavizzo-Mourey et al., "A Tale of Two Cities," *Health Affairs* 24, no. 2 (2005): 313–315.