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Improving access to birth attention of marginalized populations in Peru

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Executive summary

To reduce maternal mortality in Peru, economic, access and cultural barriers to institutional deliveries will have to be overcome. Despite significant improvements to maternal health over the past 15 years, Peru remains well behind developed countries and is still faced with major inequalities across different groups and areas, especially for poor women living in the Selva region and in rural areas.

In Peru, maternal mortality rates decreased from 31.6 per 100,000 women in 1996 to 8.5 in 2009. Institutional delivery of births has increased significantly in the last decade—from less than 50 per cent in 2000 to 80 per cent in 2009—but great inequalities still marginalize different groups in the country. Women living in rural areas and in the Selva region, as well as poor and uneducated women, have lower institutional delivery rates than the rest of the population.

While the government has recently implemented a strategic program to address maternal and neonatal health with the main objective of reducing deaths, evaluations suggest further improvements to maternal health care could be made. This policy paper analyzes barriers to institutional deliveries, this variable being a good predictor of maternal mortality. The most important policy recommendations are the following:

- 1.** Economic gap: The existing conditional cash transfer program could be extended to promote institutional deliveries. Wealth is an important variable determining institutional delivery, and international experiences suggest that such a program can reduce economic barriers to birth attention for women.
- 2.** Access gap: It would be crucial to invest in increasing the childbirth complication-solving capacity of low-level health establishments that most commonly offer services in poor, rural areas to pave the way for more institutional deliveries.
- 3.** Cultural gap: Cultural adequacy of the birth delivery—facilitating stand-up delivery, burial of the placenta, presence of relatives during delivery, among others—could be improved to encourage different cultural and ethnic groups to attend health facilities for delivery.

Introduction

According to the 2008 United Nations *Millennium Development Goals Report* more than 500,000 women in the developing world died during their pregnancy, delivery or within six weeks after the delivery, in the course of that year.¹ Experts state that most maternal deaths occur at home and highlight the importance of skilled health assistance to reduce maternal mortality rates.²

Accordingly, broadening coverage of institutional deliveries (ID)³ is one of the targets for the Millennium Development Goal of Improving Maternal Health. Indeed, proper care during birth delivery makes a difference in overall maternal and neonatal health, as complications are an important cause of deaths. In 2009 more than 70 per cent of maternal deaths in Peru happened during delivery. According to the Peruvian Ministry of Economy and Finance (MEF),⁴ in 2003 hemorrhage was the leading cause of maternal death (43 per cent) followed by hypertensive diseases linked to pregnancy (14 per cent), sepsis (eight per cent) and unsafe abortion (eight per cent). These types of complications are more likely to be solved if the delivery occurs in an adequate place in the presence of skilled health staff. Experts find that between 16 and 33 per cent of all maternal deaths in developing countries could be avoided by preventing principal complications through the presence of skilled attendants at delivery.⁵

The maternal mortality rate (MMR) and proportions of professionally attended deliveries are widely accepted indicators for maternal health. In Peru, the maternal mortality rate in 2009 was 103 per 100,000 live births⁶ and the proportion of deliveries attended by specialized health staff was 59.3 per cent. Both of these indicators are worse than in developed countries where in 2008 the average MMR was 14 per 100,000 live births and the proportion of deliveries attended by skilled health personnel was 99 per cent. They are also worse than the Latin American and Caribbean 2008 MMR average of 85 per 100,000 live births.

Recently, the Peruvian government decided to prioritize institutional delivery as a way to reduce the MMR. It took specific actions to improve institutional birth ratios attended by health professionals. For instance, the government created the Strategic Program of Maternal and Neonatal Health (PSMN in its Spanish acronym) with a budget of US\$138 million in 2008 and US\$170 million in 2009.

Government efforts have led to decreases in the MMR. Estimations for 2009 show a rate of 8.5 maternal deaths per 100,000 women, roughly half the 2000 rate of 18.3 per 100,000 women. However, efforts are still needed to continue reducing the MMR. Moreover, it is essential to decrease the MMR gap for marginalized groups, especially for rural populations and the poor.

This policy paper presents a brief overview of government interventions on maternal health in Peru. Thereafter it describes the relationship between maternal mortality rates and institutional deliveries, and analyzes how women's area of residence, socioeconomic status and ethnicity affect the country's institutional delivery ratios. Finally, it presents statistical evidence on the probability of institutional deliveries in the country, and from this evidence draws conclusions and policy recommendations.

Government programs on maternal health

Maternal and infant health have been national priorities for the last two decades in Peru. One of the first significant policies on the matter was implemented in the 1990s and introduced a maternal and infant health insurance (*Seguro Materno Infantil, SMI*) that focused on the poor.

The SMI evolved into a more complete insurance that now aims to cover all poor people and is called *Seguro Integral de Salud (SIS)*. This publicly subsidized health insurance accounted for 31 per cent of the insured population and 63 per cent of the poorest population in 2008. Affiliations to SIS doubled in the 2005-2008 period, reflecting the success of the insurance program—at least in terms of population insured. On the other hand, the population coverage of social security in health (EsSalud)—which is paid for by all formal workers—is stagnating.

Moreover, a universal insurance bill went through the Peruvian legislative process and was approved by Congress in March 2009. According to this framework law, the goal of the universal insurance will be to cover all Peruvian residents for basic health services (including prevention, promotion, recovery and rehabilitation). The list of services covered by the insurance is determined by the Essential Health Insurance Plan (PEAS in its Spanish acronym). The PEAS is based on the disease burden and accounts for 185 benefits, which include obstetric, gynecologic, pediatric, oncologic, contagious and non-contagious conditions. The law will be progressively applied, starting in the country's poorer regions.

In light of improvements on maternal health, the Peruvian government decided to prioritize institutional delivery when it considered reducing maternal mortality as the first National Sanitary Objective in its National Co-ordinated Health Plan (2007-2020), with the specific goals of reducing teenage pregnancy; complications during pregnancy, delivery and post delivery; and broadening access to different birth control methods.⁷

Accordingly, in 2008 one of the five budgetary programs created was the PSMN, which seeks to reduce maternal and neonatal mortality rates. This strategic program's funding represents roughly 0.5 per cent of the Peruvian government's overall budget and four per cent of the Ministry of Health's budget. It was distributed among the Ministry of Health (34 per cent), the SIS (23 per cent) and the regional authorities (43 per cent) to perform specific activities: broadening the attention of deliveries in institutional establishments, improving hemotherapy, increasing of number of childbearing women affiliated to SIS and elaborating technical guides in maternal and neonatal attention.⁸

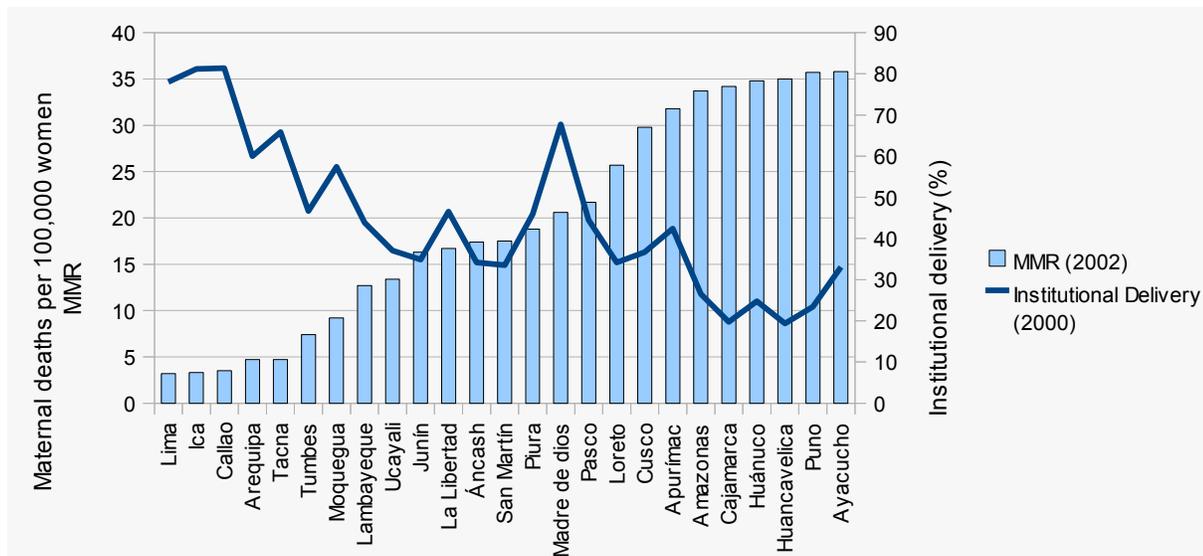
Recent governmental efforts have proved successful in reducing the MMR. In fact, Peru's 2009 Demographic and Family Health Survey (*Encuesta Demográfica y de Salud Familiar, ENDES*) suggests a MMR of 8.5 per 100,000 women, which represents a significant reduction from the 18.3 MMR of 2000. However, this policy paper will make the case for continued efforts to keep reducing the MMR and to reach out more effectively to marginalized groups.

Inequalities in maternal health

National average MMR information reveals a significant decrease in the last two decades, from 31.6 maternal deaths per 100,000 women in 1996 to 8.5 in 2009. More disaggregated information on MMR by age groups shows that there is a substantial improvement across all groups. Progress in the 40-44 and 15-19 age groups is especially impressive, with reductions greater than 45 and 20 per cent, respectively.

However, the reliability of the disaggregated information is in doubt.⁹ Thus, in order to analyze maternal health for socioeconomic and marginalized groups it is necessary to focus on ID ratios, institutional delivery being an important factor in preventing deaths. Indeed, there is a strong negative correlation between MMR and ID ratios. Figure 1 presents Ministry of Health (MINSA) estimations on MMR by political regions —previously known as departments— and ID ratios. Results show a very strong negative relationship with a correlation coefficient of -0.82. Thus, this policy paper analyzes and discusses ID ratios as a proxy to MMR and maternal health.

Figure 1
Maternal mortality rate and institutional delivery ratios by political regions



Source: ENDES 2000, MINSA 2002.

As seen in Figure 1, wealthier regions, usually located on the coast, present lower MMRs (less than five per cent) as well as higher levels of ID. Low income regions, located in the Sierra and Selva areas, show significantly higher MMRs with below average ID ratios. It is important to note that these poorer regions are mainly indigenous —Quechua and Aymara notably.

Area of residence gap in institutional deliveries

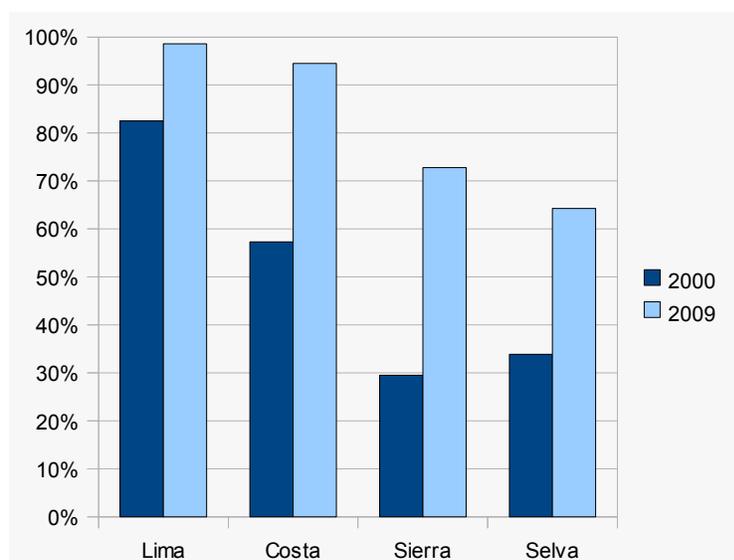
Although institutional deliveries have increased significantly in the last decade, great inequalities still marginalize different groups in the country. Data show that ID ratios have increased from nearly 50 to almost 80 per cent between 2000 and 2009. Nevertheless, in 2009 nearly one out of two women in rural areas did not access an ID, as compared to only 7.6 per cent in urban areas.

In addition, ID ratio differences between Peruvian regions are also significant. We consider four geographical regions: Costa, Selva, Sierra and the Lima Metropolitan Area. The Costa forms the west margin of the country and is home to roughly 23 per cent of the population. Metropolitan Lima, even if located in the Costa, is analyzed separately because it holds roughly 28 per cent of the population. The Sierra region is composed of the cities and villages of the Andes and is home to 35 per cent of Peruvians. Finally, the Selva region is located in the Amazon rainforest. It is the biggest of the four regions in terms of territory, but makes up only 14 per cent of the population.

Figure 2 shows that while the Lima Metropolitan Area and the Costa have ID ratios of 99 and 95 per cent respectively, the Selva and Sierra regional indicators stand at 64 and 73 per cent respectively. All regions have made progress over the last decade. The Sierra region has been the most gains, increasing its ID ratio from 30 per cent in 2000 to 73 per cent in 2009. The Selva region (excluding Lima) still has the lowest ID ratio but it has shown some progress, raising institutional delivery from 34 per cent in 2000 to 62 per cent in 2009.

Figure 2

Institutional delivery ratio, by regions, Peru 2000 and 2009



Source: ENDES 2000, 2009.

When wealth and region of residence data are analyzed together, it is evident how concentrated the ID deficit is: the lowest rates are found in the lowest wealth quintile for all three regions —Costa (77 per cent, excluding Lima), Sierra (50 per cent) and Selva (35 per cent). The worst situations are found in Sierra and Selva, where we find low ID rates for the second lowest wealth quintile as well.

Table 1

Institutional delivery ratio, by wealth quintile and region, Peru 2009 (%)

Region/wealth quintile	Lowest	Second	Third	Fourth	Highest
Lima	N.A.	98	96	98	97
Costa	77	86	96	96	97
Sierra	50	68	88	93	99
Selva	35	76	93	99	93

Source: ENDES 2009.

Moreover, ENDES 2009 data show rural areas in Sierra and Selva have lower ID rates than do urban areas in the same regions. For instance, in the Selva region institutional deliveries stand at 83 per cent in cities whereas they reach only 43 per cent in rural areas.

To further analyze the differences in ID by area of residence, it is useful to include two variables to proxy the quality of ID: caregiver capability to lead the delivery as well as the type of health establishment. In terms of caregivers, the left panel of Table 2 shows a relatively higher participation of doctors and obstetricians for institutional deliveries in urban areas: 76 per cent compared to 40 per cent in rural areas. Nurses, traditional health attendants and those in the “other” category are more common in rural areas, even though there is nothing certain about the level of skills in the “other” category.¹⁰

When one looks at the health establishment by area of residence, the right panel of Table 2 shows that roughly one out of two women delivers her baby in MINSA hospitals in urban areas, while roughly one out of four does so in rural areas. The most common place to give birth in rural areas is at home (41.5 per cent). This finding implies a high risk for women and their babies because of potential complications not tended to by professional staff in an adequate environment.

It must also be noted that 13.5 per cent of rural women give birth in MINSA’s health posts even though these posts are not considered fit to attend deliveries because of their low capacity to deal with complications. This is almost seven times higher than for urban women. Inequalities in access to health services between populations living in different areas are thus evident. Further, given that the best place to give birth is in a hospital, and the worst is at home or in an “other” establishment, it becomes clear that urban populations do not only have more access to delivery health services, but also receive also better quality services.

Table 2

Births by caregiver and area, Peru 2009 (%)

Caregiver	Urban	Rural
Doctor	63.1	24.4
Nurse	18.3	20.7
Obstetrician	12.9	15.9
Health Specialist	0.1	1.7
Traditional Birth Attendant	2.8	16.4
Other	2.7	20.3
None	0.1	0.6

Source: ENDES 2000, 2009.

Births by health establishment and area, Peru 2009 (%)

Establishment	Urban	Rural
At home	5.9	41.5
Midwife's home	0.2	0.3
MINSA Hospital	48.3	23.2
EsSalud Hospital	14.9	2.1
Armed forces and National Police Hospital	0.6	0.0
MINSA Health Centre	13.8	16.5
MINSA Health Post	2.0	13.5
EsSalud Post/Centre	1.7	0.1
Private Practice	11.5	1.3
Other	1.2	1.6

Source: ENDES 2000, 2009.

Socioeconomic and cultural gaps in institutional delivery

Other indicators that enable the identification of marginalized groups in ID are related to the mother and household characteristics. The mother's highest completed level of education, native language and her household's wealth quintile based on ENDES are considered in this policy paper.

Peru has seen ID growth for women of all educational levels, with the lowest levels experiencing the fastest growth in the last decade. Nevertheless, there are still important differences: while institutional delivery is 98 per cent for women with tertiary education and 91 per cent for women with secondary education, it is only at 63 per cent for those with primary education and at 50 per cent for those without education.

In terms of ID rates for women with different mother tongues —as a proxy to analyze ethnicity— there have been important increases for Spanish speakers who have seen their ID rates increase from 55 per cent in 2000 to 82 per cent in 2009. In comparison, Quechua speakers saw an increase from 13 per cent to 60 per cent and Aymara speakers improved their ID rates from 12 per cent to 51 per cent during the same period.¹¹ However, for other indigenous minorities living mostly in the Amazon areas, ID rates are terribly low: just one out of

nine women speaking other indigenous languages had an institutional delivery in 2009.

Access to ID has improved among the poorest since 2005. The lowest wealth quintile ID ratio increased from 27 to 49 per cent in 2009, while the two higher quintiles stagnated as they already had rates above 90 per cent. Statistics show that moving from the lowest to the second lowest quintile increases by more than 27 per cent the likelihood of having an institutional delivery; further, moving from the second lowest to the third quintile increases this probability in roughly 18 percentage points. The likelihood of having an ID continues to increase when moving up to higher wealth quintiles, but at a slower rate.

Weighing marginalization factors

At first glance, it is difficult to identify the relative importance of the different marginalization factors linked to access to institutional deliveries. To solve this problem, this policy paper offers a statistical study of the effects of these factors on the probability of having an ID.

It is assumed that a woman expects both benefits from giving birth in a health establishment (e.g. reduced probability of dying or better health for the infant) and costs (e.g. transportation or cultural impact of the delivery). The difference between the benefits and costs is the utility that a woman receives from institutional delivery (y_i^*). A woman will choose an institutional delivery if the utility is positive. The unobservable utility a woman gets from institutional delivery can be expressed as follows:

$$\begin{aligned} y_i^* = & \alpha + \beta_1 \text{Educational Level} + \beta_2 \text{Native Language} + \beta_3 \text{Natural Region} \\ & + \beta_4 \text{Rural Area} + \beta_5 \text{Wealth Quintile} + \beta_6 \text{Doctors} + \beta_7 \text{Nurses} \\ & + \beta_8 \text{Obstetricians} + \beta_9 \text{Hospitals} + \beta_{10} \text{Mid-level Establishments} \\ & + \beta_{11} \text{Low Level Establishments} + \mu \end{aligned}$$

and $\Pr(\text{institutional delivery}) = \Pr(y_i^* > 0)$

Where:

- “Educational level” is a discrete variable in which values range from one (no education) to four (tertiary education).
- “Native language” includes dichotomic¹² variables for each native language in the sample (Quechua, Aymara and other indigenous).
- “Natural Region” includes dichotomic variables for the region where the household is located.
- “Rural Area” takes the value of one if the household is located in a rural area and zero otherwise.
- “Wealth” is a discrete variable that ranges from one to five representing the wealth quintile of the family.
- “Doctors” shows the number of doctors available for every 1,000 residents in the district. The variables

- “Nurses” and “Obstetricians” work in the same way.
- “Hospitals” shows the number of hospitals available for every 1,000 residents in the district. The variables “Mid-level establishments” and “Low-level establishments” work in the same way.
 - μ is the estimation error.

Data come from the ENDES 2009 survey and from MINSA information on health establishments and professionals, including the ratios of doctors, nurses, obstetricians and hospitals per 1,000 habitants as well as the other categories of health facilities available in each district.

Table 3 shows the result of the estimation. The strongest negative effect on institutional deliveries is found in the native language: indigenous minorities and Aymara speakers have a significant disadvantage compared to Spanish speakers. The probability of Aymara speakers having an institutional delivery is 40 per cent lower than that of a Spanish speaker, and the probability for indigenous minorities is only 20 per cent of the rate for Spanish speakers. Generally speaking, ethnicity appears to be an important factor to consider when looking at ID; in this sense, cultural barriers are significant and need to be taken into account.

Another important negative effect is experienced by women living in the Sierra and Selva regions: the likelihood of women accessing an institutional delivery is roughly one-third of that of women in Costa and in Lima (no differences were found between Costa and Lima). Additionally, living in rural areas has a negative effect, reducing the estimated ID probability to roughly 60 per cent less than women in urban areas. Thus, geographic location —and the concomitant access barriers— negatively affects ID.

It is important to note that each increase of one wealth quintile of the woman giving birth increases the probability of institutional delivery by roughly 78 per cent. In this respect, this analysis shows economic barriers to be an important limitation to ID.

As for the effect of educational attainment, the model finds that each increment of one educational level —from primary to secondary or from secondary to tertiary— increases the probability of having an institutional delivery by 84 per cent.

On the supply side, we find that the presence of a hospital in the district greatly increases the probability of institutional delivery. Other kinds of health facilities show no significant effects on ID —even though those are the most common health establishments available in rural areas— probably due to their low capacity to deal with complications. This could reflect the need for capital investment: more than half of health establishments in Peru have the lowest complication-solving capacity. Finally, the numbers of nurses and obstetricians available at the district level present an important effect on institutional delivery.

Table 3

Probability of having an institutional delivery, Peru 2009, logistic estimation

Variable	Odds Ratio	Std. Err.	z	P>z
Sierra	0.33***	0.04	-9.25	0.000
Selva	0.30***	0.04	-10.17	0.000
Rural	0.43***	0.04	-9.19	0.000
Wealth Quintile (values from 1 to 5)	1.78***	0.10	10.37	0.000
Education Level	1.84***	0.12	9.68	0.000
Native Language: Quechua	1.58***	0.15	4.72	0.000
Native Language: Aymara	0.60**	0.15	-1.97	0.049
Native Language: Other indigenous	0.19***	0.04	-8.38	0.000
Native Language: Foreign	0.79	0.48	-0.39	0.697
Doctors x 1,000 res.	1.07	0.10	0.74	0.461
Nurses x 1,000 res.	1.21**	0.10	2.35	0.019
Obstetricians x 1,000 res.	1.43***	0.17	2.96	0.003
Hospitals x 1,000 res.	102,491***	274,066.90	4.31	0.000
Mid level health establishments x 1,000 res.	1.24	0.47	0.57	0.570
Low level health establishments x 1,000 res.	1.03	0.09	0.40	0.687
Observations	10,220			
Correct Predictions (percentage)	83.11			

* Statistically significant at 90 per cent confidence.

** Statistically significant at 95 per cent confidence.

*** Statistically significant at 99 per cent confidence.

Note: No differences were found between Costa and Lima.

Source: ENDES 2009.

Conclusions

The analysis presented in this policy paper supports four important conclusions. First, the positive effect that wealth and education have over the probability of having an ID suggests that some efforts should be made to improve household incomes. The already existent conditional cash transfer program goes in the right direction but it is not enough as the poorest people continue to display relatively low ID rates.

Second, the disadvantages faced by women living in the Sierra and Selva regions and by those in rural areas highlight the pervasive effects of some access barriers. Particularly, disperse population and difficult transportation call for the development of new models to deliver services, including contracting with churches and other NGOs that are already providing medical services to the population.

Third, the strong negative effect in ID rates associated with Aymara and other indigenous native languages (excluding Quechua) gives us evidence that specific cultural barriers could have prevented these groups from attending the appropriate establishments for the delivery.

Finally, the present analysis draws the conclusion that lower-level health establishments are not currently helping to increase the rate of institutional delivery. In light of this information, some changes could be made

to make current establishments more effective in improving the population's health.

Recommendations

Three important barriers to institutional delivery are found in Peru: economic, access and cultural. Although efforts have been made to address these, policies have primarily been geared toward economic barriers. Furthermore, due to their lack of cost-effectiveness, they have not yielded the expected results. Here are the main recommendations:

1. To keep reducing economic barriers, ID could be added as a condition for the conditional cash transfer (CCT) program *Juntos*, following the Indian and Bolivian examples.¹³ Thus all conditions —the already pre and post natal controls conditions as well as ID— would have to be met by the family to be eligible for CCT. Supply considerations will have to be taken into account. Pre and post natal evaluations would need to be offered to the population, and health facilities could make sure they are able to receive and treat increased numbers of patients.
2. To improve access to ID, low and mid-level health establishments could increase their complication-solving capacity to address a wider range of problems, particularly in rural areas. Moreover, the Ministry of Health as well as its regional directions need to implement new models to deliver services more effectively, by outsourcing services such as laboratories and blood banks, and by contracting different private or non-profit health institutions such as churches in the Selva region using floating hospitals (river boats with onboard medical equipment), for instance. All private and public resources already in place need to be used before considering the construction of new health establishments.

Access barriers are particularly high in the Amazon region, where geographic dispersion and high transportation costs reduce the possibility to access health establishments in order to receive adequate attention during delivery. This is a daunting challenge as improving the situation will require high levels of public investment. An important best practice example that could be expanded further is found in “waiting houses.” Pregnant women can go to these houses some weeks before giving birth and wait for the delivery time in closer proximity to a health establishment.

3. Cultural and language barriers to ID persist in Peru, as shown by the major disadvantage indigenous minorities face. To address these barriers, the government could expand culturally adequate deliveries. This adequacy is based on improving the comfort of the pregnant mother during delivery. These culturally sensitive practices include vertical delivery (a form of delivery in which the mother gives birth standing up, rather than lying down), burial of the placenta, the presence of relatives during delivery, and the adjustment of room temperature to the mother's convenience (rather than the doctor's), among others.

About the author

Janice Natalie Seinfeld has a PhD in Economics from Harvard University. She conducted her post-doctoral studies in Health Economics at the National Bureau of Economic Research (NBER) in Cambridge, Massachusetts. Since 2003 she has been a professor and researcher at the Universidad del Pacífico in Peru and has acted as a consultant for national and international organizations such as Peru's Ministry of Health, the Amares Project, the Peruvian Defensoría del Pueblo, the World Bank, the Ford Foundation, the United Nations Development Programme (UNDP) and the Global Development Network (GDN), among others, on issues relating to public policies in Peru. She published the book *Repensando la salud en el Perú* ("Rethinking Health in Peru") in 2007 and has authored many more articles on this theme.

Endnotes

- ¹ United Nations. *The Millennium Development Goals Report: 2008*. Geneva: UN, 2008.
- ² Costello, Anthony, David Osrin, and Dharma Manandhar. "Reducing Maternal and Neonatal Mortality in the Poorest Communities." *BMJ* 329, no. 7475 (2004): 1166-68. ENDES, the Peruvian official source for maternal and infant health information, does not include information on place of birth in its maternal mortality section. Therefore, no comparison can be made of maternal death when the delivery was at home versus maternal death if the delivery was institutional.
- ³ Institutional deliveries are those attended by doctors, nurses or midwives inside a health establishment.
- ⁴ Ministerio de Economía y Finanzas (MEF). *Programa Estratégico Salud Materno Neonatal*. Lima: MEF, 2008.
- ⁵ Graham, Wendy, Jacqueline Bell, and Colin Bullough. "Can Skilled Attendance at Delivery Reduce Maternal Mortality in Developing Countries?" *Studies in Health Services Organisation and Policy* 17 (2001): 97-130.
- ⁶ Maternal mortality rates in Peru are estimated both in relation to the number of live births and in relation to the number of women. Throughout the document, the rate is usually estimated per 100,000 women, but it is sometimes expressed per 100,000 live births to be comparable with international indicators.
- ⁷ Find specific indicators for goals set in the plan in: Ministry of Health. *Plan Nacional Concertado de Salud*. Lima: MINSa, 2007, 21.
- ⁸ According to a 2009 evaluation by the *Comisión de Seguimiento Concertado del PSMN*, budget was not assigned to health infrastructure and to the improvement of the problem-solving level of health facilities and blood banks. This evaluation also highlights an unevenly distributed budget among different regions. Finally, this evaluation also suggests improvements are needed in hemotherapy through investment in "access of pregnant women to safe blood" and "blood banks."
- ⁹ MMR in Peru is estimated using information about the death of siblings caused by pregnancy reported by women surveyed in the ENDES. An important limitation of ENDES is, however, the limited amount of observations. Replications of the estimates show that some disaggregations use as few as two observations (the national estimation for 2009 used a total of 218 observations).
- ¹⁰ The "other" category is constructed in this case considering deliveries attended by a "health worker" (not a specialist), a friend or relative or the "others" category of ENDES which is any uncoded person. The proportions of these differ by area of residence. In the aggregate data, the proportion of relatives or friends is higher than the rest of the categories, while in the urban zone the "others" are more important. For the rural area, the relatives or friends are the main component of the proportion shown in Table 1.
- ¹¹ Surprisingly, Quechua speakers are found to be better off than their Spanish counterparts. It is probably a consequence of the immigration of this ethnic group into bigger cities, compared with other non-Spanish-speaking groups.
- ¹² A dichotomic variable can only take the values of one and zero. For example, a dichotomic variable for

Native Language such as Quechua will be one for the women that speak that language and zero for the ones that do not.

- ¹³ Lim, Stephen, Dandona Lalit, Joseph A. Hoisington, Spencer L. James, Margaret C. Hogan and Emmanuela Gakidou. "India's Janani Suraksha Yojana, a Conditional Cash Transfer Programme to Increase Births in Health Facilities: An Impact Evaluation." *Lancet* 375 (2010): 2009–23. Moloney, Anastasia. "Difficulties Hit Bolivia's Programme for Pregnant Women." *Lancet* 375 (2010): 1609–23.

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ABOUT THIS PROGRAM:

FOCAL's Health program proposes to use analytical tools in order to produce fact-based evidence about the degree of inequalities and inequities in health and their main determinants among marginalized populations such as Indigenous Peoples and Afro-descendants in Bolivia, Colombia and Peru. This initiative will assist in the identification of policy gaps for the development, discussion and exchange of more accurate health policy ideas. Reform efforts that have been undertaken in Peru, and those that are underway today, are essentially linked with the implementation of publicly subsidized health insurances. Despite these efforts and the improvements in maternal health over the past years, Peru is still faced with major inequalities across different ethnic and socio-economic groups.

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