Huge poor–rich inequalities in maternity care: an international comparative study of maternity and child care in developing countries
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Objective Progress towards the Millennium Development Goals for maternal health has been slow, and accelerated progress in scaling up professional delivery care is needed. This paper describes poor–rich inequalities in the use of maternity care and seeks to understand these inequalities through comparisons with other types of health care.

Methods Demographic and Health Survey (DHS) data from 45 developing countries were used to describe poor–rich inequalities by wealth quintiles in maternity care (professional delivery care and antenatal care), full childhood immunization coverage and medical treatment for diarrhoea and acute respiratory infections (ARI).

Findings Poor–rich inequalities in maternity care in general, and professional delivery care in particular, are much greater than those in immunization coverage or treatment for childhood illnesses. Public-sector inequalities make up a major part of the poor–rich inequalities in professional delivery attendance. Even delivery care provided by nurses and midwives favours the rich in most countries. Although poor–rich inequalities within both rural and urban areas are large, most births without professional delivery care occur among the rural poor.

Conclusion Poor–rich inequalities in professional delivery care are much larger than those in the other forms of care. Reducing poor–rich inequalities in professional delivery care is essential to achieving the MDGs for maternal health. The greatest improvements in professional delivery care can be made by increasing coverage among the rural poor. Problems with availability, accessibility and affordability, as well as the nature of the services and demand factors, appear to contribute to the larger poor–rich inequalities in delivery care. A concerted effort of equity-oriented policy and research is needed to address the huge poor–rich inequalities in maternity care.

Introduction
Over half a million women die each year during pregnancy, delivery or shortly thereafter; the Millennium Development Goals (MDGs) call for reducing maternal mortality by 75% by 2015. Since maternal mortality is costly to measure and professional attendance at delivery is assumed to reduce maternal mortality, the proportion of deliveries with a professional or skilled attendant is used as a progress indicator. Slow progress towards the MDG for maternal health has led to calls for accelerated progress in scaling up professional delivery care.

Poorer groups within developing countries use less health care and poor–rich inequalities in maternity care and maternal mortality have been described. Within-country inequalities in maternity care have, however, not been described in detail for a broad range of dimensions using an international comparative perspective. Nor have they been systematically compared with inequalities in other forms of care. A better understanding of the magnitude and determinants of inequalities in maternity care may help contribute to tackling these disparities and to reaching the MDGs for maternal health. They may also contribute to the MDGs for child health, as skilled attendance at delivery is an important contributor to neonatal survival.

This paper describes poor–rich inequalities in use of professional delivery and antenatal care for 45 developing countries and compares these to inequalities in use of child health services. By presenting various aspects of inequalities in the use of maternity care, and by contrasting these to inequalities in the use of child health care, this paper seeks possible explanations for the inequalities observed in maternity care.

Data and methods
Data on health care use, stratified for five wealth groups, were obtained for 45 developing countries from World Bank Country Reports. All countries for which these reports were available at...
the time of analysis were included in our study (Table 1).

Data for these reports were derived from Demographic and Health Surveys (DHS) conducted between 1990 and 1998. These are nationally representative household surveys that usually cover between 5 000–10 000 women aged 15–49 years. They include information on health care use and household ownership of assets. All the types of health care use available in these reports were included in this paper. Table 1 defines the health care use indicators included in this study.

Household ownership of durable consumer goods, housing quality, and water and sanitation facilities were combined into a wealth index using principal components-derived weights. Wealth groups were constructed such that each consisted of 20% of the survey population unless otherwise indicated. Despite limitations, this index has been used fairly widely as a measure of economic status in developing countries.

The main inequality measures we used are the rate ratio (RR) and the rate difference (RD). The RR gives the ratio of health care use among the richest to the poorest group within a country, whereas the RD gives the absolute difference in health care use between these groups.

We estimated the distribution of the total number of births without a professional delivery attendant across the rural poor, rural rich, urban poor and urban rich. This was done by calculating the total number of deliveries without a professional delivery attendant in each of the groups as a proportion of the total number of deliveries without such an attendant in the total survey population. For this analysis, the poor were defined as the bottom 50% of the total survey population.

To assess the relationship between the magnitude of poor–rich inequalities in health care use and the overall level of such use, we plotted, for each of the five types of health care, the RR in health care use against the overall level of health care use for the 45 countries. We fitted exponential curves through each of the scatter plots. For reasons of readability, Fig. 8 only shows the exponential curves, and not the scatter plots themselves.

Results
Maternity care
Figs. 1 and 2 show the proportion of births for which professional antenatal care was received and the proportion of births attended by a professional for the five wealth groups, ranked by each country’s mean. Among the richest quintile, use of antenatal care and professional delivery care reaches levels of 80% or higher, irrespective of the average level in the country, with a few exceptions (Bangladesh, Chad, Nepal, Pakistan, Yemen). Use of these services is much lower among poorer women. Wealth and maternity care are linked across the entire wealth hierarchy within countries, with each progressively poorer group having progressively lower use. Importantly, poor–rich inequalities in professional delivery care are much larger than those in antenatal care. Whereas professional delivery care among the poor is below 30% in many countries, antenatal care is at least 30% in most countries. To further our understanding of these huge inequalities in professional delivery care, we characterize various aspects of these inequalities below.

The absolute poor–rich gap in deliveries in public and in private facilities respectively is described in Fig. 3. Use of both public and private facilities is lowest among the poorest. The Dominican Republic and Brazil are exceptions, with higher use of public facilities among the poor. The absolute poor–rich gap is largest in the public sector, in part because private facility use is low in all groups. Relative poor–rich inequalities are, however, larger in the private sector (results not shown), as also reported by others. Professional delivery care is nearly synonymous with facility-based care in most countries, with a few exceptions such as Haiti, Indonesia and Madagascar, where home delivery with a professional is relatively common (results not shown).
Fig. 1. **Percentage of births with a professional delivery attendant for five wealth groups, ranked by country average, for 45 developing countries**

Fig. 2. **Percentage of births for which two or more antenatal visits to a medical professional were received for five wealth groups, ranked by country average, for 45 developing countries**
Fig. 3. Absolute gap (rate difference, in percentage points) between the richest and poorest 20% wealth groups: deliveries in public facility compared with private facility

URT, United Republic of Tanzania. Negative bars indicate that the percentage of deliveries in the specified facility type is higher among the poor; y-axis was truncated at –25; the rate difference in percentage deliveries in a public facility was –47 for the Dominican Republic.

Fig. 4. Absolute gap (rate difference, in percentage points) between the richest and poorest 20% wealth groups: deliveries by doctor, nurse or trained midwife

CAR, Central African Republic. URT, United Republic of Tanzania. Negative bars indicate that the percentage of deliveries attended by the specified professional is higher among the poor.
Fig. 4 shows the absolute poor–rich gap in delivery care by a doctor and by a nurse/midwife respectively. In many countries, hardly any women are attended by a doctor and inequalities in professional delivery care therefore mainly consist of those in attendance by a nurse/midwife (e.g. Burkina Faso, Central African Republic, Chad, Mali, Niger). In countries where overall levels of professional delivery attendance are high, attendance by a nurse/midwife is higher among the poor (Brazil, Colombia, Dominican Republic, Kazakhstan, Kyrgyz Republic) while attendance by a doctor is much higher among the rich.

Levels of professional delivery attendance among the rural poor, rural rich, urban poor and urban rich are shown in Fig. 5. Professional delivery attendance is much higher in urban compared to rural areas. Within urban and rural areas, the poor–rich gap in professional delivery attendance is large, despite comparing very broad wealth groups (poorest and least poor 50%). The rural rich and the urban poor have relatively similar levels of professionally attended deliveries in most countries.

Fig. 6 describes the distribution of the total number of deliveries without a professional attendant by rural/urban wealth groups. This takes into account both the rate of under-coverage in the groups and the relative size of these groups within the total survey population. Most of the births without professional delivery care occur among the rural poor (65% on average), followed by the rural rich.

**Child health care**

The median levels of use of maternal and child health care among the poorest and richest quintile across the 45 countries are shown in Fig. 7. Among the poorest, antenatal care is high and professional delivery attendance low compared to childhood immunization and treatment for acute respiratory infections (ARI) or diarrhoea. Despite similar overall levels of professional delivery care and immunization coverage (47% and 49% respectively), poor–rich inequalities in professional delivery attendance are much larger. Non-use of antenatal and delivery care (indicated by the light green bars) is almost completely concentrated among the poor, underlining the extent to which maternity care is unequally distributed. In contrast, non-use of immunization and treatment of childhood illnesses is also high among the rich.

Fig. 8 shows the relationship between the size of relative inequalities in health care use and the overall levels of health care use for five types of health care. The fit of the curves was good ($R^2$ varying between 0.62 and 0.79) except for diarrhoea ($R^2 = 0.29$). Relative inequalities tend to be larger in countries with lower overall levels of health care use. At all overall levels, inequalities in professional delivery attendance and antenatal care are systematically larger than inequalities in the other types of care. Absolute poor–rich inequalities also are systematically larger for professional delivery attendance and antenatal care (results available upon request).

**Discussion**

This paper shows that inequalities in the use of professional delivery attendance are extremely large, and much greater than inequalities in immunization coverage and medical treatment for childhood illnesses, even when overall levels of health care use are taken into account. Very few of the poorest mothers get professional delivery care irrespective of where they live, although some get antenatal care.
The burden of under-coverage of professional delivery care is concentrated in rural areas, particularly among the rural poor. Whereas poor–rich inequalities within urban areas are large, the relatively small size of the urban population in general and the urban poor in particular explains the relatively small public health impact of these urban inequalities. As countries become progressively more urban, however, these inequalities will become progressively more important.

Public sector facilities rarely address the poor–rich inequalities in professional delivery care. In absolute terms, poor–rich inequalities in the use of public facilities usually are larger than private sector inequalities, suggesting that the public sector does not provide a safety net for the poor.

Our findings might stem from data artefacts. Differential reliability of morbidity data (with the poor underreporting mild forms of diarrhoea and ARI) might underestimate the poor–rich gap in medical treatment, but there is no reason to assume that poor women systematically under-report professional delivery attendance or over-report immunization coverage (explaining larger poor–rich inequalities in delivery care than in immunization coverage). Second, the wealth measure might partly capture rural/urban residence, as it includes assets that urbanites are more likely to own. Still, substantial poor–rich inequalities in health care use within urban and within rural areas can be demonstrated.

If the larger inequalities in maternity care are not artefacts, they might be explained by demand factors, supply factors, or the nature of the service needed and provided.

**Demand factors**

Pregnancy and childbirth are imbued with strong cultural meaning, and hence cultural factors may be more important determinants of uptake of maternity care than of other forms of care. Poorer women may prefer traditional birth attendants or family members, particularly if childbirth is seen as a non-illness event where modern medicine has little to contribute. Professional providers of maternity care may not be tolerant of cultural beliefs and practices. Sometimes, professional providers treat poor women with less consideration than richer or more educated women. Also, women may experience constraints on seeking care for themselves if relatives, particularly husbands or mothers-in-law, are heavily involved in the decision-making process. Members of these poorer households may favour home-based delivery care. In some societies, this is related to norms of female seclusion. There is also evidence that families may be less willing to spend money on women’s health, especially in south Asia.

Male doctors may be a barrier for seeking facility-based delivery care; such cultural barriers may be fewer regarding children’s health care. In contrast, richer, often better-educated, women and their families may have a more modern world view, greater identification with the modern health care system, greater confidence in dealing with officials, and greater ability and willingness to travel outside the community, all of which may facilitate use of professional maternity care.

The argument that poor women or their families have a lower demand for professional delivery attendants assumes that they actually have a choice. In some settings, rural uneducated women deliver at home without professional care despite living in close proximity to maternity care facilities. Yet evidence from other countries suggests that poorer women tend to stop using traditional maternity care before becoming available, although they may be slower to adopt such care than richer, more educated, women and their families.

**Supply factors**

**Availability and accessibility**

Lack of availability and accessibility may be greater for professional delivery care...
than for other forms of care. Whereas the logistical requirements to provide full childhood immunization coverage are high (e.g. cold chain), many countries have adopted mobile immunization strategies that are therefore better able to achieve wide geographical coverage than strategies requiring fixed sites. Although some maternity care programmes have attempted to reach out to women’s homes, most professional delivery care takes place in facilities. The physical infrastructure requirements are higher for facility-based delivery than for the provision of vaccinations or the treatment of ARI or diarrhoea. Moreover, providers of treatment for ARI and diarrhoea can include lower-level cadres, such as community health workers, who are more easily placed in remote or rural areas than doctors or nurses/midwives. Finally, more vaccinations or treatments of ARI/diarrhoea can be done per provider per day than deliveries. Human resources and infrastructure for delivery care are seriously insufficient, with three times the current number of professionals needed to achieve universal professional delivery attendance. Indeed, the human resources crisis in the health care sector is particularly affecting professional delivery care services. The scarce delivery care facilities that are available tend to be concentrated in urban areas, whereas the bulk of the poor live in rural areas. A preliminary analysis in Mwanza, United Republic of Tanzania, suggests that the mean distance to delivery services is 28 km, compared to 7–8 km for treatment for sexually transmitted diseases, family planning and antenatal care. However, even within rural and within urban areas poor–rich inequalities in professional delivery attendance are large.

**Affordability**

Lack of affordability might explain the large poor–rich inequalities in professional delivery attendance within urban and within rural areas. We are unaware of studies in which costs to households of maternity care and other forms of health care are systematically compared. Yet vaccinations and basic treatment for ARI and diarrhoea at the primary-care level tend to be inexpensive or free. In contrast, the cost of delivery care can be an important barrier. Even where this service is officially free, hidden costs may add up to a substantial part of monthly income, or even several times monthly income. Normal deliveries can cost households 3–26% of their annual per-capita income. Moreover, costs of facility-based delivery can be unpredictable and costs of severe complications can have a catastrophic impact on household budgets (up to 90–138% of annual per capita income), this may restrict demand. In countries in economic and political turmoil like Mongolia and Tajikistan, where levels of poverty have risen and health care systems have deteriorated, the use of professional delivery assistance has declined, and poor–rich inequalities in such care have increased. There are some indications that costs are less a barrier to seeking antenatal care compared to delivery care.

**Nature of services needed and provided**

The mode of delivery and timing of the various health care services might influence the magnitude of poor–rich inequalities in the use of these services, both directly and via their availability and accessibility.

Professional delivery attendance is highly dependent on individual-level care-seeking, whereas immunization is, at least in some settings, based on mass campaigns. There are indications that mass immunization campaigns can improve coverage, reach a high proportion of children that are difficult to reach through routine activities, and can reduce poor–rich disparities in a short period of time. Outreach activities have been suggested to reduce socioeconomic inequalities in immunization coverage.

Poor–rich inequalities might also be larger when services require action at a very specific point in time. Deliveries and treatment for ARI/diarrhoea are a short time-window in which care can be sought. This contrasts to antenatal care and immunization, for which there is more time to seek care. Moreover, the onset and timing of labour is less predictable.

**Conclusion**

We found substantial inequalities in professional delivery care that were greater than for other forms of care. A combination of the supply and demand factors and the nature of the service probably explains the much larger inequalities seen; the mixture of factors is likely to vary among countries. In some, accessibility/availability might be important. In the Central African Republic,
Malawi and Senegal, for example, professional delivery attendance among the urban poor was much higher than among the rural rich, suggesting that availability/accessibility in rural areas is a problem. In contrast, in Benin, Madagascar and Pakistan professional delivery attendance among the urban poor was as low as among the rural poor, suggesting that other factors, such as costs, play a more important role. In other countries, cultural constraints might be of greater consequence.

We noted with interest that the rural rich and the urban poor had similar levels of delivery attendance in many countries. It may be that money can overcome access difficulties in rural areas, or that the rural rich are innovators. Further in-depth analysis of these population groups could help us understand the determinants of poor–rich inequalities in maternity care use.

The huge inequalities in maternity care underline the need for effective provision of services. Over the last decades, countries have introduced various strategies to increase demand for and improve availability, accessibility and affordability of professional delivery attendants. Some, such as Indonesia, have focused on improving the availability of a narrow range of maternity care services (home-based midwifery in particular), whereas others, such as Cuba, Honduras, Sri Lanka and Kerala, have sought to improve the availability of a broader range of health services, including maternity care. Interventions have focused mostly on improving average levels of professional delivery care, and their differential effects often have not been adequately studied. Our paper provides detailed evidence on poor–rich inequalities in professional delivery care, and discusses these huge inequalities in terms of comparisons with other types of health care. Reducing the poor–rich inequalities in professional delivery care is essential for achieving the MDGs for maternal health. More evidence is needed on what works to reach lower socioeconomic groups, and on how effective interventions can be scaled up to entire national populations. Different contexts may require different interventions to reduce inequalities, and factors influencing the transferability of interventions between contexts should be mapped. A concerted effort of equity-oriented research, policy-making and monitoring is needed to reduce the huge poor–rich inequalities in delivery care described in this paper.

Competing interests: None declared.

Résumé
Giannes inégalités entre riches et pauvres dans le domaine des soins maternels : étude comparative internationale des soins délivrés à la mère et au nouveau-né dans les pays en développement

Objectif Les progrès en direction de l’objectif du Millénaire pour le développement relatif à la santé maternelle sont lents et il faut accélérer le processus d’élargissement de l’accès à des soins par un professionnel de la santé pendant l’accouchement. Le présent article décrit les inégalités entre riches et pauvres dans le recours aux soins de santé maternelles et s’efforce d’expliquer ces inégalités à travers des comparaisons avec d’autres types de soins de santé.

Méthodes Les données d’enquêtes démographiques et sanitaires (DHS) menées dans 45 pays en développement ont été utilisées pour décrire, par quintiles de richesse, les inégalités riches/pauvres en matière de soins maternels (soins avant et pendant l’accouchement délivrés par des professionnels de la santé), de complétude de la couverture vaccinale infantile et de traitement médical des diarrhées et des infections aiguës des voies respiratoires (IRA).

Résultats Les inégalités entre riches et pauvres en matière de soins maternels en général et de soins délivrés pendant l’accouchement par des professionnels de la santé en particulier sont beaucoup plus importantes que celles relatives à la couverture vaccinale ou au traitement des maladies de l’enfance. Les inégalités entre secteur public et secteur privé contribuent pour une large part aux inégalités riches/pauvres concernant la présence lors de l’accouchement d’un professionnel de santé. Dans la plupart des pays, même les soins délivrés lors de l’accouchement par des infirmières ou des sages femmes bénéficient davantage aux riches. Si de fortes inégalités riches/pauvres touchent aussi bien les zones urbaines que rurales, la plupart des naissances intervenues sans l’assistance d’un professionnel de la santé concernent des ruraux pauvres.

Conclusion Les inégalités riches/pauvres en matière de soins à l’accouchement délivrés par un professionnel de la santé sont...
Métodos Se utilizaron datos de las Encuestas de Demografía y Salud de 45 países en desarrollo para describir las desigualdades entre pobres y ricos por quintiles de riqueza en materia de atención de maternidad (atención prenatal y obstétrica por profesionales), completud de la cobertura de inmunización infantil y tratamiento médico de la diarrea y las infecciones respiratorias agudas.

Resultados Las desigualdades entre pobres y ricos en lo relativo a la atención de maternidad en general y la atención obstétrica profesional en particular son mucho mayores que las que afectan a la cobertura inmunitaria o el tratamiento de las enfermedades de la infancia. Las desigualdades en el sector público pueden ser una parte importante de las desigualdades entre ricos y pobres en materia de atención obstétrica profesional. Incluso la atención al parto proporcionada por enfermeras y parteras favorece a los ricos en la mayoría de los países. Aunque las desigualdades de ese tipo son considerables tanto en las zonas rurales como en las urbanas, la mayoría de los nacimientos sin atención obstétrica profesional se dan en la población rural.

Conclusión Las desigualdades entre pobres y ricos en atención obstétrica profesional son mucho mayores que las observadas en las otras formas de atención. La reducción de esas disparidades es fundamental para alcanzar los ODM relacionados con la salud materna. Aumentar la cobertura de la población rural pobre es la medida más idónea para mejorar la atención obstétrica profesional. Los problemas de disponibilidad, accesibilidad y asequibilidad, así como la naturaleza de los servicios y los determinantes de la demanda, parecen ser los factores que más contribuyen a las amplias desigualdades entre ricos y pobres en atención obstétrica. Se requiere un esfuerzo concertado para imprimir mayor equidad a las políticas y las investigaciones si se desea corregir las grandes desigualdades entre ricos y pobres en atención de maternidad.
References

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