

# Setting the stage for equity-sensitive monitoring of the maternal and child health Millennium Development Goals

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**Objective** This analysis seeks to set the stage for equity-sensitive monitoring of the health-related Millennium Development Goals (MDGs).

**Methods** We use data from international household-level surveys (Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS)) to demonstrate that establishing an equity baseline is necessary and feasible, even in low-income and data-poor countries. We assess data from six countries using 11 health indicators and six social stratifiers. Simple bivariate stratification is complemented by simultaneous stratification to expose the compound effect of multiple forms of vulnerability.

**Findings** The data reveal that inequities are complex and interactive: inferences cannot be drawn about the nature or extent of inequities in health outcomes from a single stratifier or indicator.

**Conclusion** The MDGs and other development initiatives must become more comprehensive and explicit in their analysis and tracking of inequities. The design of policies to narrow health gaps must take into account country-specific inequities.

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## Introduction

Inequities in health are pervasive within countries, rich and poor alike. Even in countries where aggregate health indicators are improving, some health gaps between population groups are widening or remaining stagnant. The size and dynamics of these gaps vary considerably, depending not only on the indicator and country studied, but also the means of stratifying the population into social groups. And yet, health equity analyses too often remain simplistic or nonexistent, even in key development initiatives like the Millennium Development Goals (MDGs) and Poverty Reduction Strategy Papers (PRSPs).

From an ethical and human rights perspective, narrowing avoidable disparities in health is imperative.<sup>1</sup> An explicit and systematic commitment to equity must be made to ensure that poor, marginalized and vulnerable groups are given access to health services and opportunities for healthy lives.<sup>2,3</sup>

Many recent studies have focused either on single health outcomes or on one or two stratifiers: results have demonstrated that inequities in health outcomes differ between and within countries and confirmed the conventional wisdom that ill-health is more prevalent in poor populations than in better-off groups.<sup>4-15</sup> Other research has shown the extent to which spending on health and social services disproportionately favours privileged groups,<sup>16,17</sup> quantifying the differences between populations with respect to access to health care and health outcomes. Other work has drawn attention to the wider set of social determinants that stratify health.<sup>18-20</sup>

Here, we use population-based surveys to analyse several indicators and stratifiers, and aim to show that equity analyses in country-level adaptations of the MDGs and PRSPs should be more comprehensive. We also aim to show that: multiple health indicators give a more complete picture of inequalities

in health; social disadvantage must be examined holistically to reflect its complexity beyond wealth; the measurement of inequalities is feasible with use of current data even in very poor countries; and the health MDGs should be framed in equity-sensitive terms.

## Methods

### Data sources

We used data from recent Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS). Countries that lack vital registration systems currently rely on information from population-based surveys to monitor progress towards MDGs. This approach is generalizable to most resource-poor countries that have at least one population-based household survey per country containing information on health and social characteristics. We examine data from six countries across 11 health indicators and six social stratifiers.

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Table 1. Definition of indicators used

Indicator	Closest related Millennium Development Goal		Indicator	Indicator definition
	Goal	Target		
Under-five mortality rate	4	5	13	Mortality rate for children under 5 years, per 1000 live births
Infant mortality rate	4	5	14	Mortality rate for children under 1 year, per 1000 live births
Neonatal mortality rate				Mortality rate for children under 30 days, per 1000 live births
Underweight	1	2	4	% of children under age 5 years moderately or severely underweight
Knowledge of AIDS <sup>a</sup>	6	7	19b	% of population aged 15–24 years with comprehensive correct knowledge of HIV/AIDS (UNICEF-WHO)  % of women aged 15–24 years who know that a healthy-looking person can transmit HIV (UNICEF-UNAIDS-WHO)  % of women aged 15–24 years who know that a person can protect herself from HIV infection by consistent condom use, % (UNICEF-UNAIDS-WHO)
Contraceptive prevalence	6	7	19c	Contraceptive prevalence (UN Population Division)  Percentage of currently married women aged 15–49 years who used a modern method of contraception (UN Population Division). (DHS definition of modern method: pill, intrauterine device, injections, condom, female sterilization, male sterilization, implants, lactational amenorrhea, foam or jelly, emergency contraception; does not include withdrawal or periodic abstinence or folk methods; MICS <sup>b</sup> definition is similar.)
Measles vaccination	4	5	15	Proportion of 1-year-old children immunized against measles (UNICEF-WHO)
Diphtheria, pertussis and tetanus vaccination (three doses)				Proportion of 1-year-old children immunized against diphtheria, pertussis and tetanus (three doses)
Skilled birth attendant	5	6	17	Proportion of births attended by skilled health personnel (UNICEF-WHO). (Refers exclusively to people with midwifery skills (for example, doctors, midwives, nurses) who have been trained to proficiency in the skills necessary to manage normal deliveries and diagnose or refer obstetric complications.)
Age at first marriage				Mean age at first union

<sup>a</sup> AIDS = acquired immunodeficiency syndrome.

<sup>b</sup> MICS = multiple indicator cluster surveys.

Countries were selected to correspond with UN Millennium Project case studies. Data sources used were the DHS surveys for Cambodia (2000), the Dominican Republic (2002), Ethiopia (2000), Ghana (1998), and Kenya (1998), and the Tajikistan 2000 MICS.<sup>21–26</sup> The Tajikistan data come from aggregate tables distributed by UNICEF. All measures are calculated using DHS data at the individual level or derived from the DHS reports and web site. Where possible, indicator definitions were harmonized across the five DHS countries. Some indicators reported differ from those in DHS reports:<sup>27</sup> for example, values of “don’t know” or “missing” were excluded from our analysis, whereas in DHS reports these categories are sometimes explicitly reported, or considered equivalent to “no”. Similarly, DHS report contraceptive prevalences for women currently in union, whereas we report rates for all women. We report mean age at marriage instead of median age.

We recoded ethnicities into dominant, not dominant, and secondary dominant categories to create larger classes of stratifiers.<sup>28,29</sup> A “wealth by poverty line” variable was created with use of existing wealth indices<sup>30,31</sup> to complement the stratification by wealth quintile with a simple policy-relevant distinction between just two groups: “poor” and “not poor”. Data on the percentage of population living below the poverty line were applied to the wealth index data to create this variable.<sup>32,33</sup>

### Health indicators

We selected health indicators that would match the MDG child health and maternal health indicators, with a few exceptions (Table 1). The nature of the indicators varies, ranging from outcomes (underweight, child mortality), to access to care or preventative interventions (skilled attendant at birth, measles and diphtheria–pertussis–tetanus (DPT) vaccination and contraceptive prevalence), to knowledge (about acquired immuno-

deficiency syndrome (AIDS)), to fertility-related or women’s status indicators, such as age at first marriage.

### Social stratifiers

An equity analysis requires division of a population into groups according to underlying social advantage. The social stratifier most frequently associated with inequity is wealth measured by the set of assets the family has, rather than by monetary income or expenditure. However, stratification by wealth alone is not the most appropriate way to measure inequities in health; in countries with extreme poverty, the wealthiest quintile often resides only in the capital. Furthermore, measurements of wealth at a household level do not capture intra-household inequalities, such as those conferred by gender, age or position within the household family structure.

Multiple dimensions of inequality exist within countries — such as age, residence (urban or rural), gender, ethnicity, occupation, geographic survey region, and education level. The health

Table 2. Definition of stratifiers used

Stratifier	Definition	Adjustments
Sex	Sex of child	
Education	Mother's highest level of education	Grouped into none, primary and secondary. Non-formal curricula and strictly religious education excluded
Residence	Urban or rural	
Ethnicity	Country-specific	Uses standard DHS <sup>a</sup> recodes (not available in MICS <sup>b</sup> )
Ethnicity recoded	Country-specific	Divided into dominant, non-dominant, and secondary dominant (where available)
Wealth by quintile	Country-specific	1 = poorest; 5 = richest
Wealth by poverty line	Above or below national poverty line	Poverty data from UNDP <sup>c</sup> 32,33 applied to the wealth index data to create two groups: poor and not poor
Region	Country-specific	

<sup>a</sup> DHS = demographic health surveys.

<sup>b</sup> MICS = multiple indicator cluster surveys.

<sup>c</sup> UNDP = United Nations Development Programme.

gaps between these groups may be as significant as the gaps between rich and poor. Choice of stratifiers (and health measures) for official monitoring purposes must be based on health and human rights challenges and policy needs and opportunities in each country.<sup>34,35</sup> Here we use six key stratifiers to illustrate our overarching point about the need for more nuanced equity analysis: sex, education status, urban or rural residence, ethnicity, wealth, and geographic region of residence (Table 2). The full dataset with 20 indicators for six countries is available elsewhere.<sup>36</sup>

Our selection of variables is not exhaustive and is constrained by the availability of data in the study countries. However, the stratifiers we have chosen may serve as proxies for other factors

of interest. For example, the education stratifier is an imperfect proxy of women's empowerment.

The number of regions per survey varies with the size of the sample and other factors. Especially when used in combination with another stratifier, sample sizes in individual regions can become too small to yield meaningful results. Examination of interaction effects between stratifiers allows for the quantification of cumulative disadvantages of multiple risks. Thus, although simultaneous stratification is important, we note that when the sample sizes are low results should be interpreted with caution.

### Statistical analysis

Cross-classification of indicators captures

the complexity of health disadvantage. We did simple stratification (bivariate analysis) for 11 health indicators and wherever possible, we calculated the values for health indicators for all stratifiers (Table 3). To assess their effect both independently and interactively, simultaneous stratification (trivariate analysis) was then performed for pairs of stratifiers. For example, ethnic group health-outcomes were classified by sex, region, residence, wealth, etc., to determine the compounded effect of variables. Some pairings were not generated in the simultaneously stratified analysis because the resulting subgroup was too small or non-existent (e.g. ethnicity with regions). Likewise, mortality indicators were not included in the simultaneous stratification, because the number of events (deaths) was too small to construct robust rates.

Multivariate analysis was not undertaken so as to preserve a simple study design and ensure that the methods could be easily replicated. Finally, we assessed statistical significance of the inequities in health status to identify where gaps result from random variation rather than the statistically valid considerations sought for evidence-based policy-making.

We did a between-means comparison for every stratification class (e.g. education) to test the null hypothesis that there is no statistically significant difference between values of an indicator for all classes defined by the stratifier (e.g. none, primary, secondary or more). Similar tests were carried out for selected portions of the simultaneously stratified data. We interpret differences

Table 3. Data available for stratifiers in the six countries included in analysis<sup>a,b</sup>

Stratifier	Cambodia	Dominican Republic	Ethiopia	Ghana	Kenya	Tajikistan
Maternal education	X	X	X	X	X	X
Ethnicity			X	X	X	
Ethnicity recode	X		X	X	X	
Sex	X	X	X	X	X	X
Region	X	X	X	X	X	X
Residence (urban/rural)	X	X	X	X	X	X
Wealth by quintile			X		X	X
Wealth by poverty line			X		X	

<sup>a</sup> National averages are available for all indicators in all countries.

<sup>b</sup> Some data, while available, were not calculated for mortality rates because of the difficulty of calculating a rate rather than a percentage (this is especially true for stratification by ethnicity).

where  $P < 0.05$ . Tests of significance were not performed on the mortality rate indicators, because they are rates rather than proportions. National-level standard errors from DHS reports can be used as a general indication of likely significance between groups for national mortality rates.

## Results

Previous published work suggests that most indicators are differentiated by wealth quintile, with less differentiation where interventions tend towards being universal. In general, we expected rural health outcomes to be worse than those in urban areas, that poor people would have worse outcomes than those categorized as not poor and we expected a certain degree of heterogeneity between regions and across ethnic groups. We expected that education status of the mother would have an important effect on all health indicators.

### Underweight children

#### Expected results

In Cambodia, Ethiopia, Ghana, and Kenya, there was a significant correlation between education, ethnicity, region and residence and underweight. In Ethiopia and Kenya underweight was also significantly related to wealth and whether a child lives above or below the poverty line. Ethnicity and region — and not wealth — were found to have the widest range of values for underweight in Ghana. In Ethiopia, the pattern is slightly different with region and education of the mother showing the widest range of values — ethnicity seems to be less important here. In Kenya, the pattern differs again, with maternal education, ethnicity, region and wealth quintile all

Table 4. Immunization rates in Kenya by ethnicity grouping and sex

Ethnicity grouping	Diphtheria–pertussis–tetanus (third dose)			Measles		
	Male	Female	$P^a$	Male	Female	$P^a$
Dominant – primary	91	96	0.25	97	99	0.31
Dominant – secondary	78	91	0.02	83	83	0.99
Not dominant	80	72	0.02	76	75	0.59
$P^b$	0.18	<0.01		<0.01	<0.01	

Source: Ref. 22.

<sup>a</sup> The null hypothesis is male and female are the same in each row.

<sup>b</sup> The null hypothesis is that within this stratifier and each column, all ethnicity groups are the same.

showing roughly equivalent ranges of values. In the simultaneous stratification for Kenya, for women with primary or with secondary or more education levels, the proportion of underweight children is 2–4 times as great for the children in the poorest households compared with those in the wealthiest households. Rural children are more likely to be underweight, especially in families where the mother has no education or only primary education.

#### Unexpected results

Somewhat unexpectedly, in Ethiopia, wealth does not seem to prevent children from being underweight. Even in the highest wealth quintile, education is a more important factor: children of mothers with no education are twice as likely to be underweight and six times as likely to be severely underweight. In Cambodia, the urban bias is concentrated in mothers who completed schooling ( $P = 0.0228$  for primary education,  $P = 0.0173$  for secondary education, but  $P = 0.8210$  for no schooling). Among those with no formal education in Cambodia, there is no difference

between rural and urban levels of underweight children. There was no significant correlation between sex and underweight status in any country studied.

### Immunization

#### Expected results

For most countries studied, diphtheria–pertussis–tetanus (DPT) and measles immunization are significantly stratified by not only wealth quintile but also by maternal education status, ethnicity and region. Urban versus rural residence also stratified all immunization indicators for Ethiopia and Ghana, and this disparity improves significantly with maternal education status in Cambodia. Immunization rates in Tajikistan varied between regions from just above 60% to over 90%.

#### Unexpected results

Surprisingly, for all countries studied, sex was not a significant factor in immunization rates at the bivariate level, with the exception of DPT3 in the Dominican Republic. Rural versus urban residence was not a strong factor in immunization disparities in Cambodia and Kenya. In Tajikistan, there is no stepwise correlation between wealth and immunization status. In Kenya, simultaneous stratification shows that ethnicity is correlated with immunization, with less dominant ethnic groups falling well behind dominant groups. Boys and girls were immunized at about the same rates for measles, but DPT3 rates differed by sex, especially in the non-dominant ethnic group (Table 4). Simultaneous stratification for Ethiopia also reveals gender inequity in measles immunization:

Table 5. Immunization in Ethiopia stratified by maternal education and sex

Maternal education	Diphtheria–pertussis–tetanus (third dose)			Measles		
	Male	Female	$P^a$	Male	Female	$P^a$
None	19	13	0.02	25	20	0.06
Primary	37	34	0.75	39	39	0.98
Secondary	53	59	0.67	48	76	0.03
$P^b$	<0.01	<0.01		<0.01	<0.01	

Source: Ref. 24.

<sup>a</sup> The null hypothesis is that male and female are the same in each row.

<sup>b</sup> The null hypothesis is that within this stratifier and each column, all educational groups are the same.

daughters of women with secondary or more schooling have higher rates than do sons ( $P = 0.03$ ) (Table 5). Sex-based differences are also evident in Kenya, with 98% of urban boys vaccinated against measles compared with 90% of urban girls ( $P = 0.07$ ). Thus in several countries it seems that basic immunization is inequitably distributed, suggesting significant challenges for implementation of vertical programmes.

### Child mortality rates

#### Expected results

In Cambodia, Ethiopia, Ghana and Kenya educational level of the mother, region and residence stratify under-five mortality rates (U5MR). In Kenya, ethnicity dramatically stratifies U5MR, with a range 31–253 across groups. Additionally, the expected stepwise decrease in U5MR with increasing wealth quintile is observed. The capital of Cambodia, Phnom Penh, consistently shows the lowest mortality, with mortality rates in the next best region almost twice as high. In Ghana, inequality in childhood mortality is closely aligned with differences in education and place of residence: more highly educated women and urban dwellers have much lower child mortality. And in Ethiopia, educational level of the mother significantly stratifies mortality in neonates, infants and children under 5 years.

#### Unexpected results

By contrast, in Ethiopia, wealth quintile and urban/rural distinctions are not particularly strong stratifiers of health outcomes. In fact, the richest quintile differs little from the poorest. In Kenya, it seems that the difference between no maternal education and primary education does not yield large disparities in U5MR. Likewise in Ghana, primary education actually yields a higher neonatal and infant mortality than does no education.

### Usage of skilled birth attendants

#### Expected results

Maternal education, ethnicity, region, residence and wealth quintile are all significantly correlated with usage of skilled birth attendants in Ethiopia, Ghana and Kenya. For instance, in Ethiopia, major differences are evident when the indica-

tor is stratified by educational level with only 3% of those with no education using skilled birth attendants, 10% of those with primary education and 45% of women with secondary education or more. In Kenya, the Mijikenda/Swahili ethnic groups were at a low of 27% usage and the Kikuyu at a high of 71%. Likewise, in Ghana, ethnicity seems to have an important effect on use of skilled birth attendants, with a near twofold, statistically significant difference between the primary dominant (63%) and the not dominant groups (34%) ( $P < 0.00005$ ). The non-poor are almost twice as likely as the poor to have a skilled birth attendant in Kenya. In Cambodia, almost 90% of the births in Phnom Penh are assisted by skilled attendants, in stark contrast with a national average of only one-third. Education and rural/urban residence also stratify skilled birth attendant use in Cambodia ( $P < 0.00005$ ). In Tajikistan, 55% of the lowest wealth quintile and 87% of the highest quintile use skilled birth attendants, and the rural/urban differential is 68% versus 84%.

#### Unexpected results

In Kenya, simultaneous stratification

reveals dramatic inequities by maternal education, region and urban versus rural residence even among the non-poor (Table 6). In the Dominican Republic, where national rates of skilled birth attendant coverage are relatively high, there exists relative equity with respect to maternal education and urban versus rural residence.

### AIDS knowledge

#### Expected results

In Ethiopia, Ghana and Kenya, both indicators for AIDS knowledge are stratified significantly by maternal education, ethnicity, region and residence, suggesting a rather unequal spread and uptake of critical information and education about HIV/AIDS. In Cambodia, knowledge that a healthy-looking person may have AIDS and that using a condom during sex can help prevent HIV infection is significantly stratified by maternal education status, despite high overall knowledge (the national average is above 80% for both indicators). In Tajikistan, rural populations have much lower levels of AIDS knowledge. Wealth differentiates only the richest group — 20% of the top quintile know that condoms help prevent infection, compared with less

Table 6. Skilled birth attendant coverage in Kenya: poverty status simultaneously stratified by education, region and urban versus rural residence

		Poverty status <sup>a</sup>		
		Not poor	Poor	$P^b$
<b>Education</b>	None	40	19	<0.01
	Primary	45	24	<0.01
	Secondary or more	77	43	<0.01
	$P^c$	<0.01	<0.01	
<b>Region</b>	Central	70	N/A	N/A
	Coast	49	14	<0.01
	Eastern	56	31	<0.01
	Nairobi	78	N/A	N/A
	Nyanza	52	24	<0.01
	Rift Valley	50	24	<0.01
	Western	39	26	<0.01
	$P^c$	<0.01	<0.01	
<b>Residence</b>	Rural	49	25	<0.01
	Urban	72	40	0.01
	$P^c$	<0.01	0.01	

Source: Ref. 14

<sup>a</sup> N/A indicates that data were reported for fewer than 25 cases.

<sup>b</sup> The null hypothesis is that there is no difference in rates between poor and not poor.

<sup>c</sup> The null hypothesis is that there is no difference in rates between classes of each stratifier.

than 5% for the rest of the population — and large differences exist between regions. In the Dominican Republic, knowledge varies by region, with a range 78–96% for the indicator on “a healthy-looking person may have AIDS”.

### Unexpected results

There was strong regional variation in most of the countries studied and ethnic variation was especially pronounced in Ethiopia and Ghana.

### Contraceptive prevalence

#### Expected results

In Ethiopia, Ghana and Kenya, contraceptive prevalence (using a modern method) is correlated significantly by all stratifiers. In Tajikistan, there is a clear educational gradient, with those with no education at 16%, 26% for secondary education and 41% for tertiary. By wealth quintile, there is relatively more equitable distribution of contraceptive use, although the richer groups have greater prevalence.

#### Unexpected results

Surprisingly, in the Dominican Republic the percentage of women using a modern method of contraception declines as education increases, and the differences are statistically significant. Among women with no education, the rate of contraceptive use is significantly higher in urban areas ( $P = 0.0143$ ), but in women with primary education, use rates are significantly higher in rural areas ( $P = 0.0299$ ). Contraceptive use decreases significantly with education at all levels in urban areas, and from primary to secondary in rural areas. Region and residence are the main stratifiers in Cambodia, with no significant correlation between formal education and contraceptive use. In Ethiopia, the expected education effect applied only in the capital.

### Age at first marriage

#### Expected results

For all of the countries with information for this indicator, the data revealed statistically significant educational gradients — those with secondary education married at least a year and in some cases 4 years later than did those with no education. Rural women married earlier than did urban women. In most countries, regional variations were observed — this was particularly striking, with nearly a 5-year difference found, amongst regions of Ethiopia.

### Unexpected results

Ethnicity was not found to be a significant stratifier in most countries, Ethiopia being one exception with large differentials similar to those found by region. Wealth quintile had a greater effect on age at first marriage in Kenya (2.6 years' difference from lowest to highest quintile) than did education. In Cambodia, the difference between urban and rural dwellers is not statistically significant in those with no education or those with secondary education but it is larger and significant for those with primary education.

### Discussion

Inequities in health exist even in the poorest countries. Our results highlight the wide variation that different indicators and social stratifiers exhibit within countries. This variation — coupled with the robust findings of disparity — suggest that the MDGs should be monitored in an equity-sensitive manner, starting with a baseline description of inequities across a range of health indicators. Population-based surveys can be used to establish such an equity baseline even in data-poor countries. Tracking of progress in reducing disparities should complement overall monitoring of the health MDGs.

Several limitations of our analysis deserve mention here. Despite the richness of the data, this brief snapshot of health inequalities is not intended to form the complete baseline in the countries considered. Data sources other than DHS and MICS may be more appropriate to track all health indicators in a manner explicitly tailored to national circumstances. Subsampling from the vital registration system, demographic surveillance system (DSS) data and facility-based surveys are important complementary sources of information when available.<sup>37,38</sup> Shortcomings in sampling frames often result in vulnerable groups such as refugee populations, urban slum dwellers, orphans and linguistic minorities being excluded from survey analyses.

### Conclusion

Our results confirm that the current focus on pro-poor health policies is an oversimplification that omits other core sources of health inequities.<sup>39</sup> Stratification by wealth, ethnicity, maternal education status, sex, region and urban/rural residence yielded statistically significant

differences across a wide range of health indicators in six countries. In many cases, the ethnic, educational and regional variations were more pronounced than were the disparities attributable to differences in wealth. Furthermore, analysis of dual forms of marginalization reveals the complexity of health gaps within countries.

The region of residence stratifier is often coterminous with those of ethnic divisions or poverty profiles, although this association is only revealed by simultaneous stratification. For example, measles vaccination rates seem to vary considerably by wealth, but when regions are added as substrata it becomes clear that some districts represent the bottom quintiles of the population. While wealth is an important focus, the geographic elements of poverty would have been overlooked without disaggregation of the data. An understanding of the correlates of poverty will be an important element in reducing deprivation. The results of our analysis suggest that in many countries, reducing inequality in health will require policies to be tailored by geographic area. Thus, geographic identifiers should be added to all surveys, including MICS and DHS, to allow countries to georeference survey information.

Educational status of mothers is a critical social determinant of most health indicators. Investments in education must be seen as having a dual positive effect in both the education and health sectors. Simultaneously, health messages and programmes should be designed to reach mothers with low education status and their children. And ethnicity, a core form of marginalization, remains understudied in the health and development literature.

Importantly, different health indicators yielded different patterns of inequity. For example, AIDS knowledge may be high and only somewhat evenly distributed between groups, but rates of delivery by a skilled birth attendant and U5MR within the same country may be grossly inequitable (as in Cambodia). Inferences about the nature or extent of inequities in health cannot be drawn from a single indicator. Nor can we assume that groups disadvantaged in one indicator are necessarily disadvantaged in another. Our analysis strongly suggests that reliance on single indicators alone — and certainly national averages — would lead to limited, misguided recommendations for policy.

Countries should start with a clear health (in)equality baseline based on the MDGs but tailored to their unique sociocultural dynamics. Once the (in)equality baseline has been established, the difficult work begins. What are the policies and programmes that will address these critical issues? Standard behavioural and social science methods must also be used to explain and augment the data and analysis described here. Multivariate quantitative analysis and qualitative studies are required to clarify causal pathways that lead certain groups to be disadvantaged relative to others.

And the health MDGs — indeed all relevant MDGs — must be reframed to prioritize marginalized groups. Equitable progress towards the MDG targets would mean that the health outcomes of the disadvantaged improve at the same or faster rates as the better-off groups.<sup>2,39</sup> Poverty reduction strategies, a key instrument of current development

policy, must be synchronized with the MDGs.<sup>40</sup> Then, policy changes aligned with PRSP and MDG priorities ought to be designed and tracked so as to measure progress from the (in)equality baseline.

Health exclusion results from multiple and overlapping forms of social exclusion, in addition to differences in health systems. The full array of underlying social determinants of health must be addressed in both health research and development policy.<sup>19</sup> And rather than a patchwork of “pro-poor” interventions and ad hoc targeted programmes, universal health systems dedicated to the inclusion of all population groups are needed to build more efficient, equitable and healthier societies. Analysis of the type presented here is a feasible first step towards these goals and towards equitable achievement of the MDGs. ■

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## Résumé

### Mise en place des conditions nécessaires à un suivi favorable à l'équité des progrès en direction des Objectifs du Millénaire pour le développement relatifs à la santé maternelle et infantile

**Objectif** La présente analyse s'attache à définir les conditions nécessaires à un suivi favorable à l'équité des progrès en direction des Objectifs du Millénaire pour le développement (OMD) relatifs à la santé maternelle et infantile.

**Méthodes** Des données tirées d'enquêtes internationales auprès des ménages (Enquêtes démographiques et de santé, DHS) et d'enquêtes en grappes à indicateurs multiples (MICS) ont servi à démontrer la nécessité et la faisabilité de l'établissement d'un point de comparaison pour l'équité, même pour les pays à faible revenu et pour lesquels les éléments disponibles sont rares. Les données provenant de six pays ont été soumises à une évaluation utilisant onze indicateurs sanitaires et considérant six couches sociales. En plus de la stratification bivariable simple, il a été procédé

à une stratification simultanée, destinée à mettre en évidence l'effet multifactoriel des formes multiples de vulnérabilité.

**Résultats** Les données font apparaître la complexité des inégalités et l'existence d'interactions entre elles : il est impossible de formuler des déductions quant à la nature et à l'ampleur de ces inégalités à partir d'un paramètre de stratification ou d'un indicateur unique.

**Conclusion** Les OMD et autres initiatives en faveur du développement devront intégrer une analyse et un suivi plus complets et plus explicites des inégalités. Dans la conception des politiques visant à réduire les disparités en matière d'accès à la santé, il convient de prendre en compte les inégalités spécifiques à chaque pays.

## Resumen

### Creación de un marco para que la monitorización de los Objetivos de Desarrollo del Milenio relacionados con la salud materna e infantil sea sensible a la equidad

**Objetivo** Este análisis trata de crear el marco para lograr que la monitorización de los Objetivos de Desarrollo del Milenio (ODM) relacionados con la salud sea sensible a la equidad.

**Métodos** Hemos utilizado los datos de encuestas domiciliarias internacionales (encuestas sobre demografía y salud, y encuestas de conglomerados con múltiples indicadores) para demostrar que es necesario y posible efectuar una descripción basal de las inequidades, incluso en los países de bajos ingresos que disponen de escasos datos. Hemos analizado en seis países 11 indicadores sanitarios estratificados en función de seis variables sociales. La estratificación bivariada simple se complementó con

la estratificación simultánea para poner de manifiesto el efecto compuesto de múltiples formas de vulnerabilidad.

**Resultados** Los datos revelan que las inequidades son complejas e interactivas y que no es posible hacer inferencias acerca de la naturaleza o la magnitud de las inequidades de los resultados sanitarios a partir de un único indicador o factor estratificador.

**Conclusión** Tanto en los ODM como en otras iniciativas de desarrollo debe realizarse un análisis y seguimiento más integral y explícito de las inequidades. La formulación de políticas para reducir las diferencias en materia de salud deben tener en cuenta las inequidades específicas de cada país.

## ملخص

## الإعداد للبرصد الذي يراعي العدالة في المرامي الإنمائية للألفية المتعلقة بصحة الأطفال والأمهات

الهدف: يهدف هذا التحليل إلى الإعداد للبرصد الذي يراعي العدالة في المرامي الإنمائية للألفية. الطريقة: استخدمنا المعطيات المستمدة من المسوحات الدولية للسكان (المسوحات الصحية والديموغرافية ومسوحات مجموعة من المؤشرات المتعددة) لتوضيح أن إنشاء خط أساس للعدالة أمر ضروري ويمكن التحقيق، حتى في البلدان المنخفضة الدخل والفقيرة بالمعطيات. قيمنا المعطيات المستمدة من ستة بلدان مستخدمين 11 مؤشراً صحياً وست طبقات اجتماعية، واستكمل التقسيم إلى طبقات ثنائية المتغيرات بتقسيم مزامن له

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