HEALTHCARE **DESERTS**

Severe healthcare deprivation among children in developing countries

Summary

Around 40 million children under five in 25 developing countries live in 'healthcare deserts' where they are deprived even of the most basic health services. They make up one child in seven in those countries.

Severe healthcare deprivation is defined here as the situation of children who do not receive routine immunisations or treatment for diarrhoea. The large majority of children who suffer from severe healthcare deprivation are from very poor households. India, Nigeria and Ethiopia account for the highest number of severely healthcare-deprived children. A previous study found that one child in seven in developing countries was severely healthcare deprived, and our review of more recent Demographic and Health Surveys (DHS) data shows that this proportion has remained largely the same in 25 countries with high under-five mortality burdens[1] as a group.

In Nigeria and Ethiopia the proportion of children experiencing severe healthcare deprivation increased significantly, between 2003 and 2008, and between 2000 and 2005 respectively. This deterioration coincided with significant improvements in child mortality in both countries. Two factors emerge. Firstly, gains in child survival were unequal, with mortality rates falling more slowly among poorer quintiles that were also least likely to have access to healthcare. Secondly, factors other than healthcare – such as nutrition, water and sanitation, and maternal education – are likely to have made a significant contribution towards falling mortality. These areas merit further investigation.

This policy brief outlines the research methodology used to arrive at estimates of children living in healthcare deserts. It then presents the findings on severe deprivation of healthcare among children – in particular, how different income groups are affected in different countries. It then describes the experience in some countries that have achieved significant reductions in the number of children in healthcare deserts, as well as in child mortality (Ghana, Egypt, Nepal and Bangladesh), and contrasts these reductions with the experience of Ethiopia and Nigeria, where healthcare deprivation increased in the survey period, while child mortality came down.

The paper concludes by looking at some of the policy challenges involved in extending health services to the 40 million children living in healthcare deserts.

Save the Children

Introduction

There has been significant progress towards the global target, set out in the United Nation's Millennium Development Goals (MDGs), of a two-thirds reduction in child mortality by 2015. The global under-five mortality rate declined from 89 deaths per 1,000 live births in 1990 to 60 deaths per 1,000 live births in 2009.[2]

However, progress remains insufficient. Less than one-third of the 68 'Countdown' countries, which have high burdens of child mortality, are on track to achieve the fourth MDG.[3] In 2009, more than 8 million children died before reaching their fifth birthday, approximately half of them in sub-Saharan Africa.[4] India and Nigeria account for a third of all child deaths worldwide.

Achieving the child mortality MDG by 2015 will require a fourfold acceleration in the current rate of progress. In most countries with a high burden of child mortality, progress will need to accelerate at a significantly faster rate among the poorest fifth of the population, where gains in child survival have tended to lag behind those for better-off groups.[5]

Diarrhoea, pneumonia and malaria – diseases that are largely preventable and treatable – cause 40% of under-five deaths. A further 36% of deaths are caused by neonatal complications and infections.[6] At the same time, there are deeper causes of under-five mortality, including poverty, inequality, and lack of access to basic services such as education and health. Our estimates show that around 40 million children in 25 developing countries live in healthcare deserts, where they are deprived of even the most basic healthcare services. Most of these children are from poor households where a lack of access to the most basic healthcare leaves them vulnerable to disease and, when they fall ill, without medical treatment.

Within countries, there are huge disparities in child survival between different groups of households. Socio-economic characteristics such as wealth, geographic location, level of educational attainment, caste and ethnicity are some of the determinants of these inequalities in child survival rates. For example, children from the poorest fifth of households – or lowest wealth quintile – in Nigeria and Pakistan are twice as likely to die before reaching the age of five than those from the richest fifth of households, or highest wealth quintile (see Annex A). In India, the under-five mortality rate in the poorest households is three times that in the richest households.

The patterns of inequalities in under-five mortality based on household wealth differ between countries (see chart 1).[7] Some empirical analyses show that in developing countries with relatively lower under-five mortality rates, these deaths tend to be most highly concentrated in the poorer households.[8] This tendency of excluding the poorest households seems to be the case in, for example, the Philippines and Peru, suggesting that interventions to improve child survival reached better-off households first, leaving poor children behind. By contrast, a number of countries, such as Nigeria, experience mass deprivation, where the under-five mortality rate is high for most of the population except for the richest 20% of households. This implies that while child survival is improving for the richest group, effective interventions have yet to reach the majority of the population.

Our analysis shows that access to healthcare is also highly unequal. In almost all of the countries we looked at, those from the lowest wealth quintile are several times more likely to suffer from severe healthcare deprivation than those from the top wealth quintile. The poorest children, who are more likely to be exposed to diseases, are the ones who do not have access to immunisation or medical treatment. While our analysis does not show causation between living in healthcare deserts and under-five mortality, it is worth noting a strong correlation, with children from the poorest households more likely to experience severe healthcare deprivation and to face a greater chance of dying before their fifth birthday than children from the richest households.

Chart 1: Patterns of inequality in child mortality

Source: DHS

What is healthcare deprivation?

The different forms of severe deprivation experienced by children in developing countries were measured in a paper produced by the University of Bristol and the London School of Economics and Political Science (LSE) in 2003.[9] These include deprivation in adequate nutrition, safe drinking water, decent sanitation facilities, health, shelter, education and information. Severe healthcare deprivation among children was defined as the situation where a child had not received any of the six routine immunisations or had experienced diarrhroea but had not received any treatment or medical advice.[10]

Immunisation with routine vaccines is relatively inexpensive and has expanded dramatically in the past 20 years, including in most low-income countries, with over 70% coverage for measles and DPT (diphtheria, whooping cough and tetanus) in sub-Saharan Africa.[11] While diarrhoeal treatment has not reached the same coverage level as vaccines, almost 40% of children receive the recommended treatment for diarrhoea in developing countries.[12]

Missing out on both these critical healthcare interventions – one preventive and one curative – is increasingly unusual, even in the poorest countries.

The authors of the original study measured severe healthcare deprivation in 46 countries using data from the Demographic and Health Surveys (DHS); in China, the China Health and Nutrition Surveys were used. The DHS surveys used – we assume, based on comparisons with our work – were those produced between 1995 and 2000.[13] The results of the study were subsequently used in UNICEF's State of the World's Children 2005 report, which stated that one in seven children lacked access to health services.[14]

Their estimates show that around 14% of children in the developing world did not receive any of the required routine immunisation, or suffered from diarrhoea without receiving any treatment or medical advice. Severe healthcare deprivation was worse in sub-Saharan Africa than in any other region, with about one in four children lacking access to even the most basic healthcare.

What's new in our analysis?

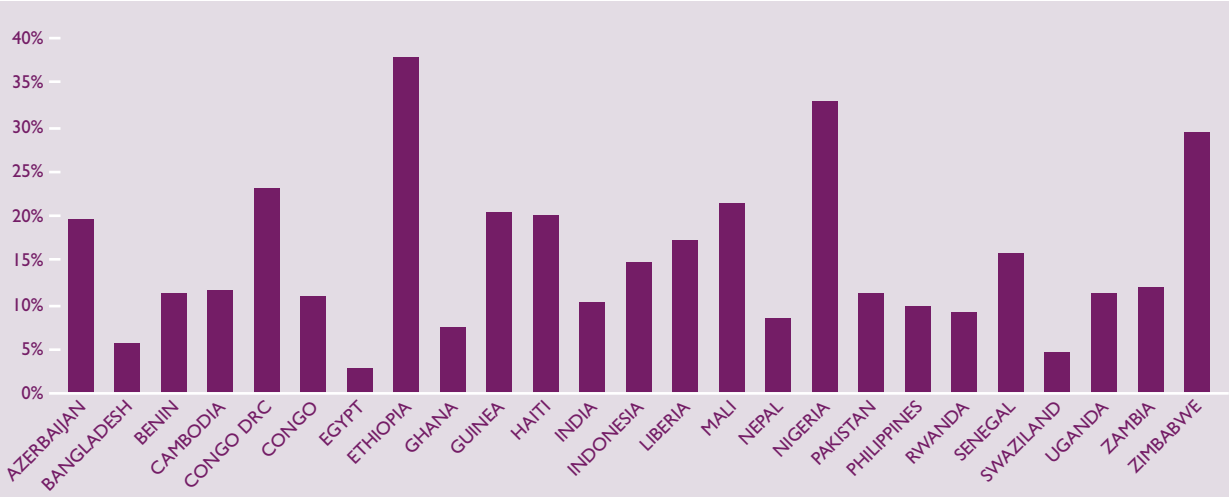
Our analysis follows the methodology employed in the Bristol and LSE paper and uses data from the DHS as well. The DHS collects health and health service utilisation data on all children born to women respondents within three or five years of the survey (the majority of surveys collect this information for all children born within five years). A child was considered to have not received any vaccine if the health card for the child was marked that no vaccine had been given, or if the respondent did not have a health card and the mother reported that the child had not received any immunisations. A child was considered not to have received treatment for diarrhoea if the mother reported that the child had had a bout of diarrhoea within two weeks of the survey but that no treatment, including home treatment, had been administered. Children were classified as severely healthcare deprived if they had not received any vaccine or had not received any treatment for diarrhoea.

Sample weighted national averages of rates of immunisations, bouts of diarrhoea and lack of treatment were calculated. To arrive at an estimate of severe healthcare deprivation, the number of children receiving or not receiving adequate care was calculated by applying the national averages to population estimates for children under the age of five.[15] The latter was done for countries with DHS data for 2005 and beyond to update the figures in the original paper. Some of the countries in the sample, such as Nigeria, have data collected as recently as 2008, while others, like Ethiopia, have data from 2005 and a new survey just underway (see box 1).[16] We were able to compute for the number of severely healthcare-deprived children in 25 countries, all of which have high under-five mortality burdens.

Living in healthcare deserts

Based on our estimates, roughly 40 million children in 25 countries with high child-mortality burdens lived in healthcare deserts during the period of analysis (see Annex B for country-level results). This means that 14% of children under five in these countries did not have access to the most basic healthcare services. This figure is based on those children who had not received any of the routine immunisations or any medical treatment or advice when they suffered from diarrhoea (see chart 2). While our updated analysis includes fewer countries than in the original Bristol–LSE study, the proportion of children in these countries experiencing healthcare deprivation was almost the same as

Chart 2: Proportion of children who are healthcare deprived



Notes: Estimates from Save the Children's analysis based on basic data from DHS, see Annex B for specific country survey year

Box 1: Severe healthcare deprivation in Ethiopia

Ethiopia's child mortality rate has halved from the MDG baseline year of 1990 to 2009, from about 20% to about 10%.[1] Yet more than 300,000 young children still die in Ethiopia each year.[2] Although healthcare is only one factor shaping children's life chances in Ethiopia, further gains in child survival will hinge, in part, on expanded access to health services.

The data for the first five years after the MDGs were adopted was not encouraging. Based on the last two DHS rounds, the proportion of severely healthcare-deprived children in Ethiopia rose by 14% between 2000 and 2005. The proportion of children who had not received any of the six routine immunisations increased from 24% in 2000 to 32% in 2005, while the proportion of children who suffered from diarrhoea and did not receive medical advice or treatment slightly rose from 50% to 51%. However, this 'point-in-time' analysis does not capture the recent developments in the country's healthcare.

In 2003 the government of Ethiopia launched the "Accelerated Expansion of Primary Healthcare Coverage" through a comprehensive Health Extension Program (HEP). A key aim of the programme is to provide good-quality healthcare to all segments of the population, especially to mothers and children. The HEP also aims to train health extension workers (HEWs) – the target was to train 30,000 HEWs by 2009 – to be deployed in rural areas. By the end of 2007, the HEP had reached more than 50% of the country's villages. A recent evaluation shows that children are 10% more likely to be fully immunised in those villages covered by the HEP.[3]

The results of the 2010 round of DHS in Ethiopia will show more conclusively whether access to healthcare has improved since 2005. What is clear is that under-five mortality has continued to fall since 2005, from 164 per 1,000 live births in 2005 to 104 per 1,000 live births in 2009.[4] This improvement could be attributable to a number of factors other than healthcare access, such as water and sanitation or maternal education, which need further investigation. Ethiopia needs to reduce its under-five mortality rate to 70 per 1,000 live births by 2015 in order to meet its MDG 4 target.

References

[1] Under-five mortality rate from the statistical tables of the State of the World's Children Report 2011, UNICEF, New York

[2] Ibid.

[3] Admassie et al (2010), *Tackling Poor Healthcare: An evaluation of Ethiopia's Health Services Extension programme*, Global Development Network, www.gdnet.org/CMS/getFile.php?id=health_ethiopia_program

[4] Under-five mortality rate for 2005 from the statistical tables of the State of the World's Children Report 2007 and for 2009 from statistical tables of the State of the World's Children Report 2011

what was produced with the earlier data. This suggests that the pattern of healthcare deprivation in these high-burden countries has not improved as much as we had expected, given improvements in child survival in those countries.

Using the data available, Ethiopia and Nigeria had the highest proportion of severely healthcare-deprived children at 38% and 33% respectively, implying that about one in three children in these countries was deprived of even the most basic health services during the survey period. However, India had the largest absolute burden of children living in healthcare deserts. An estimated 13 million Indian children under five years had not received any immunisations or treatment for bouts of diarrhoea.

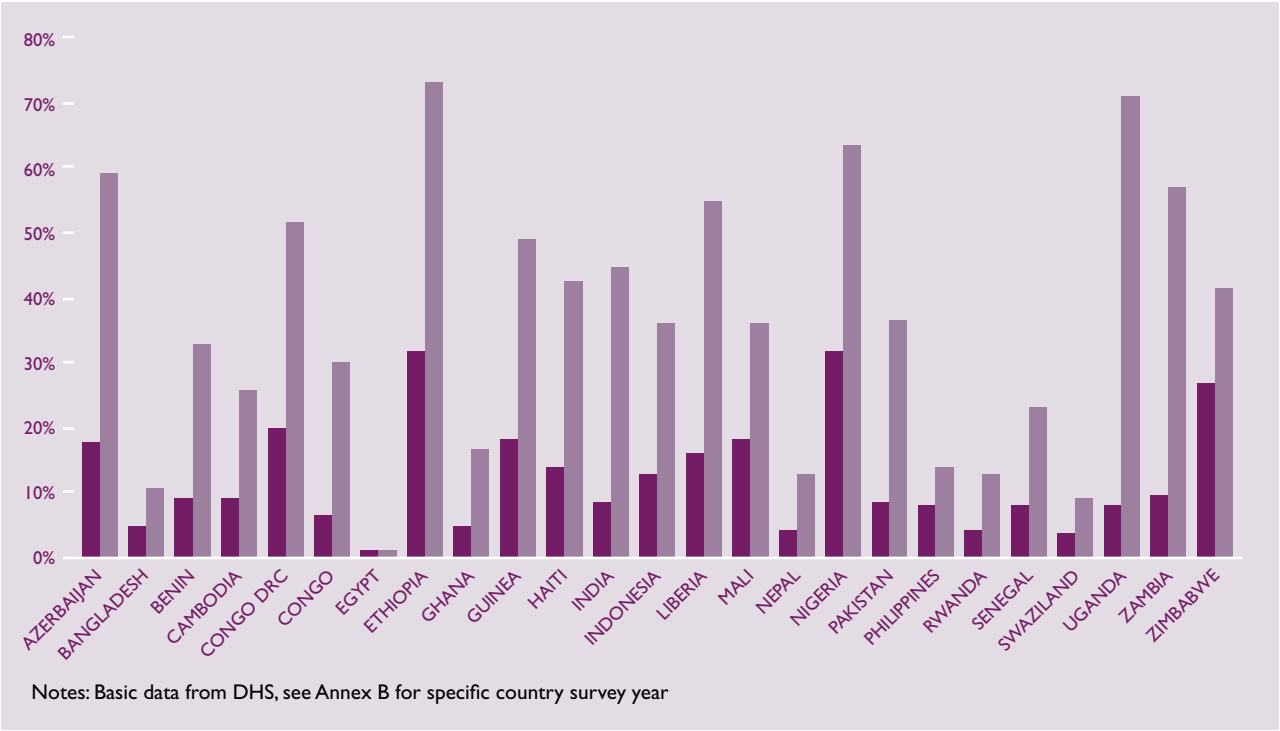
Nigeria and Ethiopia follow with 7.8 million and 4.7 million under-fives severely deprived of healthcare, respectively.

There is a general trend of increasing vaccination coverage in developing countries. However, in the 25 countries in the sample, about 12% of children had not received any of the required routine immunisations (see chart 3). About one-third of children under five in Ethiopia and Nigeria had not been immunised against any of the common, vaccine-preventable diseases, as reflected in chart 3.[17] On average, about 36% of children in our sample countries had not received the three doses of vaccine against diptheria, pertussis and tetanus (DPT3). In Uganda more than two-thirds of children went without DPT3. DPT3 is an important indicator of access to health system outreach services, given that it requires three doses over a period of time, involving repeated contact with a health worker.

The poorest children were more likely to experience severe healthcare deprivation than their better-off counterparts. On average, children from the lowest wealth quintile were three times more likely to be severely healthcare deprived than those from the highest wealth quintile. The degree of inequality in access to basic healthcare varied from country to country (see chart 4). In Ethiopia and Mali the poorest children were twice as likely to be deprived of basic healthcare services than children in the top quintile. Those born into the poorest households in India were more than four times more likely to be living in healthcare deserts than those born into the richest households. This ratio rises to six times in Nigeria and seven times in the Philippines.

Wealth is not the sole driver of unequal access to healthcare. In the majority of the 25 countries, children in rural areas were much more likely to be severely deprived of healthcare services than children in urban areas (see chart 5). In Guinea and

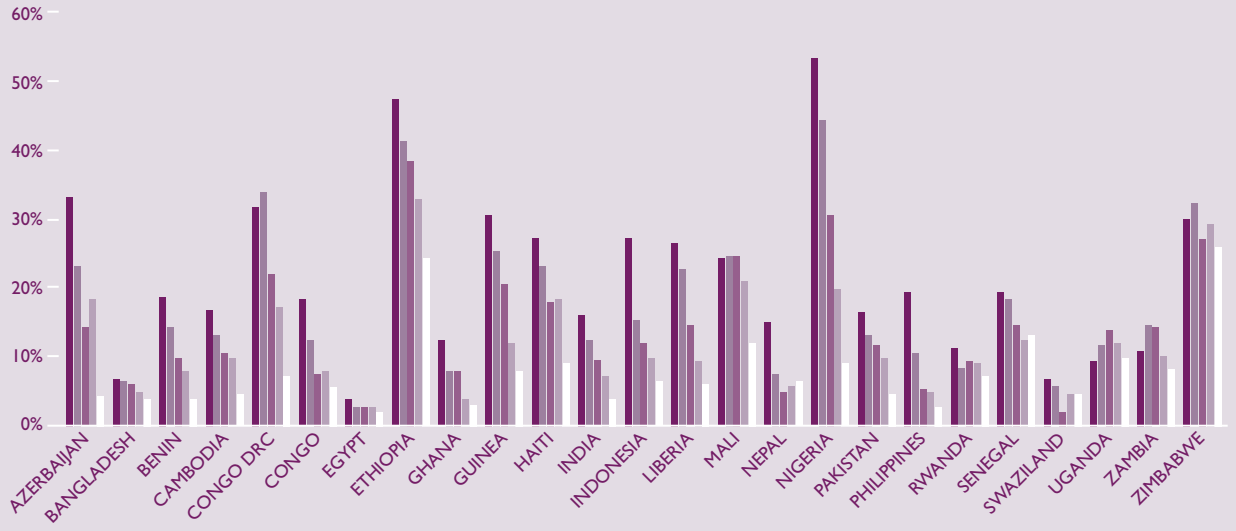
Chart 3: Proportion of children (<5) who have not received any vaccine or DPT3



Notes: Basic data from DHS, see Annex B for specific country survey year

NO VACCINE
NO DPT3

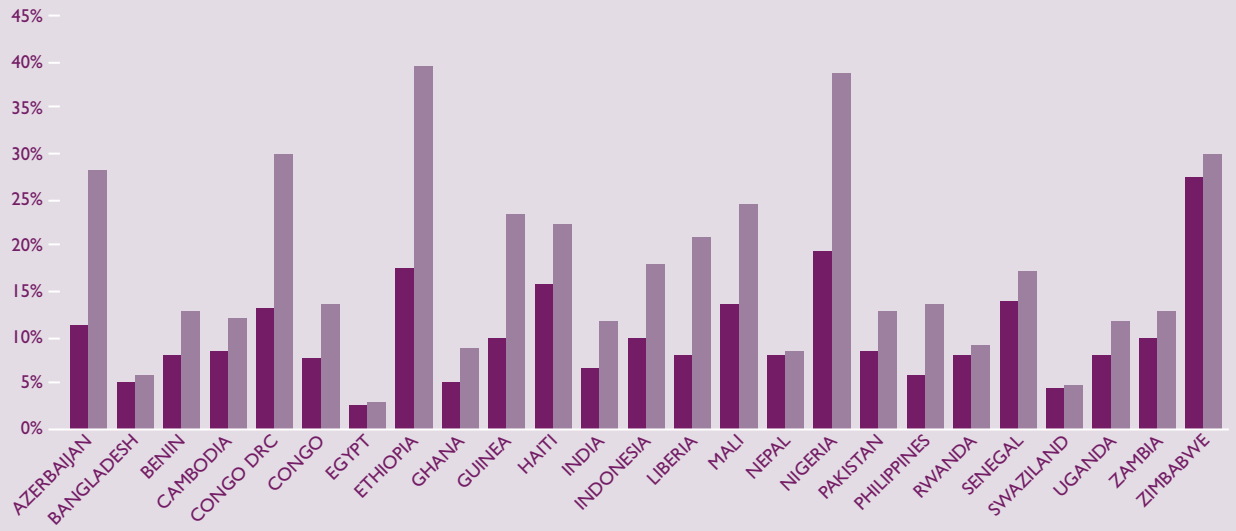
Chart 4: Proportion of children (<5) who are healthcare deprived by wealth quintile



Notes: Estimates from Save the Children's analysis based on basic data from DHS, see Annex B for specific country survey year

LOWEST
SECOND
MIDDLE
FOURTH
HIGHEST

Chart 5: Proportion of children (<5) who are healthcare deprived by residency



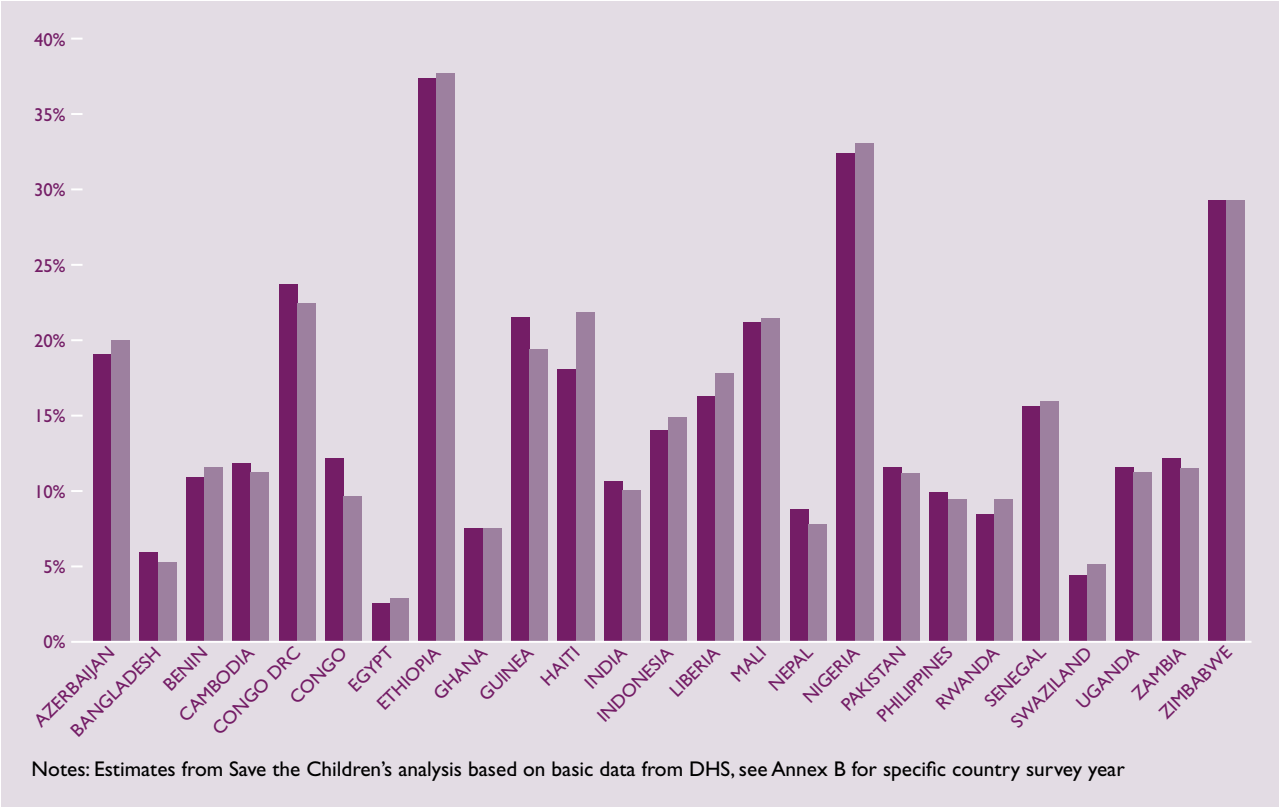
Notes: Estimates from Save the Children's analysis based on basic data from DHS, see Annex B for specific country survey year

URBAN
RURAL

Liberia, children in rural locations were about 2.5 times more likely than their urban counterparts to be living in healthcare deserts. It is worth noting, however, that children's health outcomes in urban areas also tend to be unequal. For example, in Chennai (capital of Tamil Nadu in India) the average under-five mortality rate is 35 per 1,000 live births, but this rises to 46 per 1,000 live births in slum areas (and falls to 32 per 1,000 live births in non-slum areas).[18] The differences in severe healthcare deprivation between boys and girls are small (see chart 6). There appeared to be no pattern based on gender, except that in all the south Asian countries more girls were severely healthcare deprived than boys, albeit by a small margin.

The figures show that inequalities around healthcare deprivation, such as the disparities across wealth and geographic location, are similar to the inequalities around child survival. The poorest children often live in circumstances that make them vulnerable to diseases, such as crowded housing, lack of safe drinking water and inadequate nutrition.[19] Without immunisation or access to medical advice or treatment, the survival chances of children in the bottom quintile are almost always bleaker than those in better-off households. Severe healthcare deprivation among the poorest children could be linked to higher under-five mortality rates in the bottom wealth quintile compared to the highest quintile and the national average.

Chart 6: Proportion of children (<5) who are healthcare deprived by sex



Notes: Estimates from Save the Children's analysis based on basic data from DHS, see Annex B for specific country survey year

GIRLS
BOYS

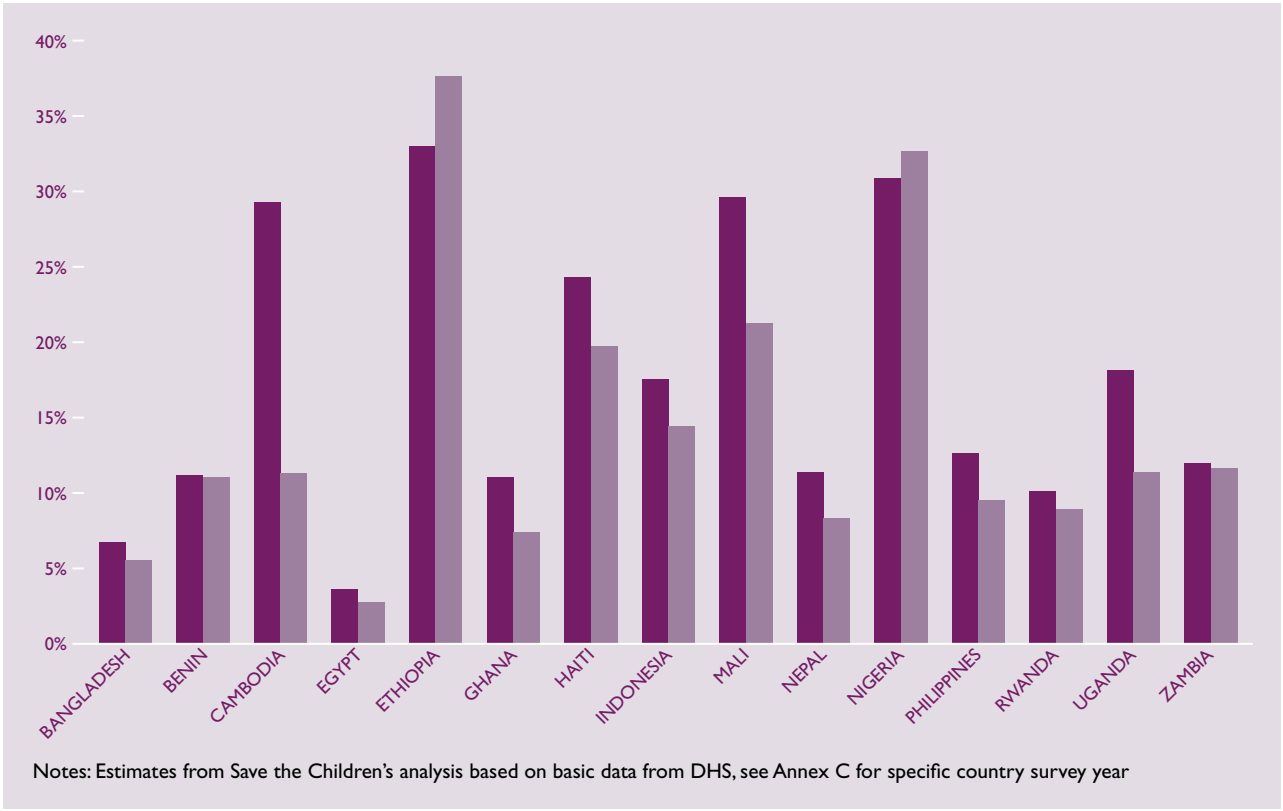
Changes in severe healthcare deprivation in different countries

There have been changes in the country-level proportion of children living in healthcare deserts over the survey period. We were able to calculate severe healthcare deprivation in a sub-set of 15 countries that have one DHS round between 2000 and 2004, and another between 2005 and 2008 (see Annex C for details). Almost all countries in this sub-set saw declines in their proportion of severely healthcare-deprived children, suggesting that progress is possible even in poor countries (see chart 7). The largest drops were in Cambodia, Uganda, Mali, Nepal and Egypt.

Reductions in severe healthcare deprivation and in under-five mortality are on a similar scale in some countries. Ghana saw a one-third reduction in the proportion of children living in healthcare deserts between these periods. Egypt and Nepal cut the proportion of severely healthcare-deprived children by approximately a quarter and Bangladesh by a fifth. All four countries have seen significant declines in their under-five mortality rates in the past decade and are on track to achieve MDG 4 by 2015.

Reducing the proportion of severely deprived children requires measures that improve healthcare access for the hard-to-reach segments of society. In recent years, Bangladesh has implemented expanded health programmes to tackle common childhood diseases, and has experienced falling inequalities in basic healthcare such as immunisation and diarrhoeal treatment (see box 2).[20]

Chart 7: Proportion of children (<5) who are healthcare deprived over two periods



Notes: Estimates from Save the Children's analysis based on basic data from DHS, see Annex C for specific country survey year

Box 2: Severe healthcare deprivation in Bangladesh

Bangladesh, one of the few low-income countries on track to meet MDG 4 by 2015, has shown that it is possible to roll out basic effective health interventions widely. The under-five mortality rate has fallen from 148 per 1,000 live births in 1990 to 52 per 1,000 live births in 2009.

Over a decade between 1996 and 2006–07, national measles vaccination coverage increased from 70% to 83%. For the poorest households, it went up from 62% in 1996 to 80% in 2007, bringing it almost on par with the national average. Bangladesh has also been able to increase the use of oral rehydration salts (ORS) packets to treat diarrhoea, which is one of the most common causes of under-five mortality in the country. Coverage in the bottom fifth of households increased from about 50% in 1996 to 70% in 2007.[1]

Several programmes – in particular the Integrated Management of Child Illnesses (IMCI) programme – have helped improved children's access to healthcare. Under the IMCI, the use of health facilities increased significantly in several areas, while community health workers who were trained under the scheme helped reduce gender disparities in immunisation coverage.[2]

While major gains have been made, there is a large unfinished agenda on children's health in Bangladesh. Neonatal mortality – death within the first 28 days of life – accounts for 62% of under-five mortality, highlighting the need to improve healthcare during pregnancy and childbirth. Socio-economic inequalities persist in access to healthcare and for child survival rates, both between urban and rural areas and within urban settings.

References

[1] Data from the paragraph are from Bangladesh DHS rounds in 1996 and 2006–07

[2] Save the Children (2010), see note 5 and Countdown to 2015 Decade Report (2000–2010): Taking stock of maternal, newborn and child survival, see note 3

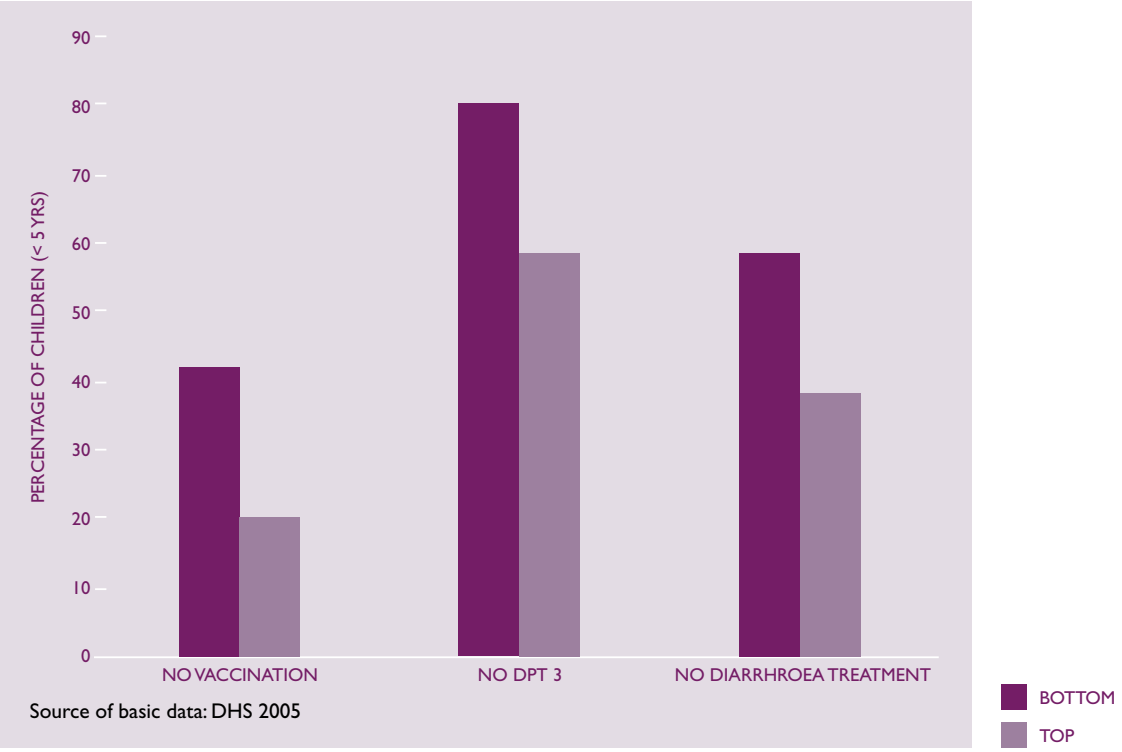
Nigeria and Ethiopia: Rising healthcare deprivation but falling under-five mortality rates?

Using the data available, Ethiopia and Nigeria saw increases in the proportion of children experiencing severe healthcare deprivation during the survey period of 14% and 6% respectively. The DHS rounds used for Ethiopia were conducted in 2000 and 2005, and in Nigeria in 2003 and 2008.[21]

The rising incidence of severe healthcare deprivation in these two countries seems counter-intuitive, given that both have experienced falling under-five mortality rates. Although under-five mortality rates remain high in Ethiopia and Nigeria, and their current rates of progress are insufficient to meet the MDG 4 target, between 2000 and 2008 under-five deaths fell by 3.8% annually on average in Ethiopia, and by 1.3% in Nigeria.[22]

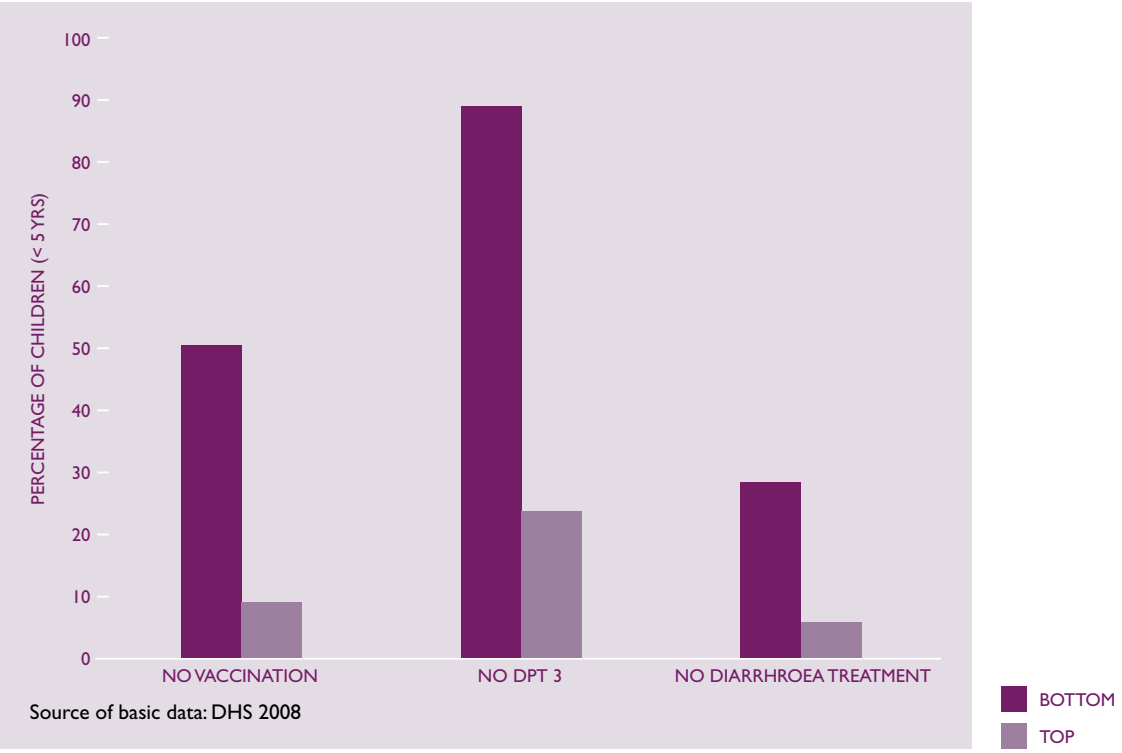
A closer look at the rates of healthcare deprivation in these two countries reveals large inequalities between the top and bottom wealth quintiles (see charts 8 and 9). Children from the poorest households in Ethiopia were twice as likely not to have received any vaccines, and 1.5 times more likely not to have received any treatment or medical advice for diarrhoea, compared to children from the richest households. In Nigeria, under-fives from the

Chart 8: Ethiopia: healthcare deprivation by wealth quintile



Source of basic data: DHS 2005

Chart 9: Nigeria: healthcare deprivation by wealth quintile



Source of basic data: DHS 2008

bottom quintile were six times more likely to be unvaccinated for any diseases and five times more likely to experience diarrhoea without treatment than those from the highest wealth quintile (see box 3). Both countries exhibit a pattern of mass deprivation in access to healthcare, with severe healthcare deprivation concentrated in the bottom 80% of the population in Ethiopia, and the bottom 60% in Nigeria (see chart 10).

Inequalities in healthcare coverage are mirrored by inequalities in child survival. Those born in the bottom quintile in Nigeria are 2.5 times more likely to die before their fifth birthday than those born in the highest quintile. This ratio is about 1.5 times in Ethiopia. Moreover, reductions in child mortality in Ethiopia and Nigeria were heavily skewed in favour of better-off wealth quintiles during the period covered by the surveys. In the case of Ethiopia, the reduction in child mortality for the top wealth quintile from 2000–05 was double the rate for the bottom quintile. In Nigeria, gains in child survival in the top quintile were three times those for the bottom quintile.[23] This pattern of unequal progress towards MDG 4 was found in two-thirds of developing countries for which data is available, in two recent separate studies by Save the Children and UNICEF.[24]

Box 3: Severe healthcare deprivation in Nigeria

In 2009, around 800,000 children died before their fifth birthday in Nigeria. Nearly a third of these deaths occurred during the first 28 days of life. Together with India, Nigeria accounts for nearly a third of all under-five deaths worldwide. Malaria and diarrhoea are among the most common causes of under-five mortality in the country.

Child healthcare remains an enormous challenge in Nigeria. The DHS 2008 indicates that of children below five years, only 41% have been immunised against measles and 35% have received three doses of the DPT vaccine. Diarrhoeal disease treatment only covered a quarter of under-five children in 2008 according to the same survey, down from 28% in 2003. Access to healthcare in Nigeria varies greatly by state and socio-economic characteristics. In the Federal Capital of Abuja and in Lagos, more than half of children received all of the six routine immunisations, but coverage fell to as low as 1% in Bauchi and Katsina states. About 38% of children in urban areas are fully immunised, compared with only 16% for those in rural areas.

Nigeria is making efforts to improve maternal and child health. In 2007, the Federal Ministry of Health launched the Integrated Maternal Newborn and Child Health strategy and, to date, this has been rolled-out in 23 of the 36 states. The strategy focuses on interventions from pre-pregnancy to post-birth that are critical to saving the lives of mothers and children.[1] The DHS 2008 shows that coverage for these interventions remains low, suggesting that more needs to be done to increase reach and reduce disparities in coverage between states and households. Improving newborn and child health in Nigeria is crucial to meeting MDG 4, not only for the country but for sub-Saharan Africa as a whole.

Note

[1] These are the interventions found along the continuum of care, including contraception, antenatal visits, skilled birth attendance, post-natal care within two days of birth, exclusive breastfeeding of infants below six months, and measles immunisation.

Chart 10: Proportion of severely healthcare deprived children by wealth

These analyses suggest that it is possible to see declines in under-five mortality rates for an overall population without improving healthcare access for the poorest households. It is likely that in the case of both Nigeria and Ethiopia, during the period covered by this study, interventions to improve child health reached better-off households, but access actually worsened for the lower wealth quintiles. It is also likely that factors other than access to healthcare, such as nutrition, access to clean water and sanitation, and maternal education – which are also characterised by wide inequalities – have contributed to gains in child survival. The interplay of unequal access to healthcare, and other inequalities, in generating unequal progress towards MDG 4 warrants further investigation.

Conclusion

While most developing countries are continuing to make progress towards MDG 4, the pattern of reductions in under-five deaths suggests that effective interventions may have reached better-off groups first, leaving behind the poorest and most vulnerable children. The experience of, for example, Bangladesh suggests that extending healthcare to the poorest households has an important role to play in making equitable gains for children. Access to healthcare is only one factor in child survival. However, unless services are extended to the 40 million children living in healthcare deserts, MDG 4 is likely to elude many of the poorest countries with a high burden of child mortality.

Extending healthcare to millions of children in the poorest countries will require both supply-side interventions by service providers, and demand-side interventions that increase the use of existing health services. In some contexts, healthcare deserts describe a geographical context, where health services are too physically remote to be reached. But in many more cases, the term describes a situation in which services are unaffordable, or of such poor quality that healthcare is not sought, or is sought and not available. Stronger commitments from governments, donors and other duty bearers are needed to tackle the underlying causes of healthcare deserts, and to achieve faster and more equitable progress towards MDG 4.

Annex A: Under-five mortality rate by country and wealth quintile

Country	Under-five mortality rate disaggregated by wealth quintile, from latest DHS round				National under-five mortality rate 1990 and 2009, from *State of the World's Children 2011*	
	Survey year	Under-five mortality rate (poorest 20%)	Under-five mortality rate (richest 20%)	Ratio of the U5MR between the richest 20% and poorest 20% (relative gap)	1990	2009
Azerbaijan	2006	62.9	40.6	1.5	98	34
Bangladesh	2007	86.3	43.3	2.0	148	52
Benin	2001	198.2	93.1	2.1	184	118
Cambodia	2005	127.1	43	3.0	117	88
Congo	2005	135.4	84.6	1.6	104	128
Congo DRC	2007	183.5	96.6	1.9	199	199
Egypt	2008	49	18.9	2.6	90	21
Ethiopia	2005	130	92	1.4	210	104
Ghana	2008	103.1	59.9	1.7	120	69
Guinea	2005	216.7	112.8	1.9	231	142
Haiti	2005	125	54.9	2.3	152	87
India	2005	117.6	39.4	3.0	118	66
Indonesia	2007	77.3	31.8	2.4	86	39

Note: The under-five mortality rate is expressed as the number of deaths per thousand live births.

Annex A *continued*

Country	Under-five mortality rate disaggregated by wealth quintile, from latest DHS round				National under-five mortality rate 1990 and 2009, from *State of the World's Children 2011*	
	Survey year	Under-five mortality rate (poorest 20%)	Under-five mortality rate (richest 20%)	Ratio of the U5MR between the richest 20% and poorest 20% (relative gap)	1990	2009
Liberia	2007	138.4	117.1	1.2	247	112
Mali	2006	233.3	123.6	1.9	250	191
Nepal	2006	98.1	46.7	2.1	142	48
Nigeria	2008	218.5	87.4	2.5	212	138
Pakistan	2006	120.8	60	2.0	130	87
Philippines	2008	58.5	17.1	3.4	59	33
Rwanda	2005	211.1	121.7	1.7	171	111
Senegal	2008	142.5	56	2.5	151	93
Swaziland	2006	118	101.1	1.2	92	73
Uganda	2006	164.8	110	1.5	184	128
Zambia	2007	123.8	110.2	1.1	179	141
Zimbabwe	2005	71.9	56.7	1.3	81	90

Source: DHS, various years and *State of the World's Children 2011*

Annex B: Healthcare deprivation by country

Country	Country code	Survey year	Proportion of children (<5) with no vaccination	Proportion of children (<5) with no DPT3 vaccine	Proportion of children (<5) with no treatment for diarrhoea	Proportion of severely healthcare deprived children (<5 years)	Number of severely healthcare deprived children (<5 years), in thousands
Azerbaijan	AZE	2006	0.18	0.59	0.20	0.20	131
Bangladesh	BAN	2007	0.05	0.10	0.08	0.06	979
Benin	BEN	2006	0.09	0.33	0.27	0.11	149
Cambodia	CAM	2005	0.09	0.26	0.15	0.12	182
Congo	COG	2005	0.07	0.30	0.33	0.11	58
Congo DRC	COD	2007	0.20	0.51	0.24	0.23	2,613
Egypt	EGY	2008	0.01	0.01	0.20	0.03	248
Ethiopia	ETH	2005	0.32	0.73	0.51	0.38	4,749
Ghana	GHA	2008	0.05	0.16	0.14	0.07	237
Guinea	GIN	2005	0.18	0.49	0.17	0.20	316
Haiti	HAI	2005	0.14	0.42	0.31	0.20	247
India	IND	2005	0.09	0.45	0.22	0.10	13,204
Indonesia	INS	2007	0.13	0.36	0.17	0.15	3,080

Annex B *continued*

Country	Country code	Survey year	Proportion of children (<5) with no vaccination	Proportion of children (<5) with no DPT3 vaccine	Proportion of children (<5) with no treatment for diarrhoea	Proportion of severely healthcare deprived children (<5 years)	Number of severely healthcare deprived children (<5 years), in thousands
Liberia	LBR	2007	0.16	0.55	0.07	0.17	95
Mali	MLI	2006	0.18	0.36	0.27	0.21	437
Nepal	NEP	2006	0.04	0.13	0.37	0.08	302
Nigeria	NGA	2008	0.32	0.63	0.20	0.33	7,772
Pakistan	PAK	2006	0.09	0.37	0.14	0.11	2,596
Philippines	PHI	2008	0.08	0.14	0.18	0.10	1,012
Rwanda	RWA	2005	0.04	0.13	0.35	0.09	136
Senegal	SEN	2005	0.08	0.23	0.38	0.16	300
Swaziland	SWZ	2006	0.04	0.09	0.05	0.05	7
Uganda	UGA	2006	0.08	0.71	0.13	0.11	639
Zambia	ZAM	2007	0.10	0.57	0.16	0.12	254
Zimbabwe	ZWE	2005	0.27	0.41	0.25	0.29	499

Source: Estimates from Save the Children's analysis based on basic data from DHS

Annex C: Healthcare deprivation comparison over time

Country	Country code	Proportion of severely healthcare deprived children (<5 years)	
Bangladesh	BAN	2004 6.9%	2005 5.6%
Benin	BEN	2001 11.1%	2006 11.2%
Cambodia	CAM	2000 29.4%	2005 11.6%
Egypt	EGY	2000 3.8%	2008 2.7%
Ethiopia	ETH	2000 33.1%	2005 37.7%
Ghana	GHA	2003 11.3%	2008 7.5%
Haiti	HAI	2000 24.6%	2005 20.0%
Indonesia	INS	2002 17.6%	2007 14.6%
Mali	MLI	2001 29.6%	2006 21.4%
Nepal	NEP	2001 11.6%	2006 8.3%
Nigeria	NGA	2003 31.0%	2008 32.9%
Philippines	PHI	2003 12.8%	2008 9.7%
Rwanda	RWA	2000 10.3%	2005 9.0%
Uganda	UGA	2000 18.2%	2006 11.3%
Zambia	ZAM	2001 12.1%	2007 11.9%

Source: Estimates from Save the Children's analysis based on basic data from DHS

Endnotes

[1] All 25 are *Countdown* countries where at least 95% of all maternal and child deaths worldwide occur, see http://www.countdown2015mnch.org/

[2] Data from the UN Inter-agency group on child mortality estimation, at http://www.childinfo.org/mortality.html

[3] For individual country progress towards MDG 4, see Countdown to 2015 decade report (2000–2010): taking stock of maternal, newborn and child survival, at http://www.countdown2015mnch.org/reports-publications/2010-report

[4] Overseas Development Unit (2010) Millennium development goals report card: learning from progress, at http://www.odi.org.uk/resources/details.asp?id=4908&title=mdgs-progress

[5] Save the Children (2010) *A Fair Chance at Life: Why equity matters for child mortality*; UNICEF (2010) *Progress for children*

[6] Black, R, (2010) 'Global, regional, and national causes of child mortality in 2008: a systematic analysis', *The Lancet*, at http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(10)60549-1/abstract; Countdown to 2015 Progress report

[7] World Health Organisation (2005) *World Health Report 2005: Making every mother and child count*, World Health Organisation: Geneva and Save the Children (2010), *A fair chance at life: why equity matters for child mortality*, at http://www.savethechildren.org.uk/en/54_12454.htm

[8] See for example Garde, M and Sabina, N, (2010) *Inequalities in child survival: looking at wealth and other socio-economic disparities in developing countries*, at http://www.savethechildren.org.uk/en/54_12286.htm and Wang, L (2003) "Determinants of child mortality in LDCs: empirical findings from demographic and health survey", *Health Policy*, 65 (3), 277–299

[9] Gordon, D et al. (2003) *Child Poverty in the Developing World*, at http://www.nscb.gov.ph/poverty/TCPovStat/reading_materials/rioXG/Social%20Exclusion/ChildPov_PP.pdf

[10] Routine immunisation includes vaccinations against measles, polio, diphtheria, tetanus, pertussis, and tuberculosis. Immunisation coverage data WHO, UNICEF 2010

[11] Kerber, K et al (2007) 'Continuum of care for maternal, newborn, and child health: from slogan to service delivery', *The Lancet*, at http://www.who.int/pmnch/media/mnchnews/2007/lancet-COC.pdf

[12] The recommended treatment consists of oral rehydration (ORS packets or recommended home-made fluid or increased fluids) with continued feeding. Coverage ranges from 35% in sub-Saharan Africa to 56% in East Asia and the Pacific. See http://www.childinfo.org/diarrhoea_progress.html

[13] When we compared our calculations with the numbers in the Bristol-LSE paper our estimates for 1995–2000 closely matched the original authors' estimates for those years.

[14] UNICEF (2005) *The State of the World's Children 2005: Childhood under threat*, UNICEF, at http://www.unicef.org/publications/index_24432.html

[15] Population data was taken from *World Population Prospects: The 2008 revision*, at http://esa.un.org/UNPP/ , and *World Urbanization Prospects: The 2009 revision*, at http://esa.un.org/unpd/wup/index.htm

[16] Fieldwork for the new DHS round in Ethiopia is scheduled for December 2010 to April 2011, see http://www.measuredhs.com/countries/country_main.cfm?ctry_id=65

[17] More recent data from the *State of the World's Children 2011* by UNICEF shows that in Ethiopia in 2009, 75% of children under one year old were vaccinated for measles while 79% received the DPT3 vaccine. The same report indicates that about 40% of children under one year old were immunised against measles and DPT3 in Nigeria in 2009.

[18] See Tamil Nadu chapter of *The national family and health survey 3*, India, International Institute for Population Sciences, at http://www.nfhsindia.org/

[19] Victora, C (2003) 'Applying an equity lens to child health and mortality: more of the same is not enough', *The Lancet*, at http://www.who.int/child_adolescent_health/documents/pdfs/lancet_child_survival_equity_lens.pdf

[20] Garde and Sabina (2010), see note 8

[21] Fieldwork for the new DHS round in Ethiopia is scheduled for December 2010 to April 2011, see http://www.measuredhs.com/countries/country_main.cfm?ctry_id=65

[22] *Countdown to 2015 Decade Report (2000–2010): Taking stock of maternal, newborn and child survival*, see note 3

[23] During the period between 2000 and 2005 in Ethiopia, and between 1990 and 2008 in the case of Nigeria. See Save the Children (2010), *A Fair Chance at Life: Why equity matters for child mortality*

[24] Ibid. UNICEF (2010) *Progress for Children*

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