Pneumonia and diarrhoea

Tackling the deadliest diseases for the world's poorest children

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Executive summary

This report makes a remarkable and compelling argument for tackling two of the leading killers of children under age 5: pneumonia and diarrhoea. By 2015 more than 2 million child deaths could be averted if national coverage of cost-effective interventions for pneumonia and diarrhoea were raised to the level of the richest 20 per cent in the highest mortality countries. This is an achievable goal for many countries as they work towards more ambitious targets such as universal coverage.

Pneumonia and diarrhoea are leading killers of the world's youngest children, accounting for 29 per cent of deaths among children under age 5 worldwide – or more than 2 million lives lost each year (figure 1). This toll is highly concentrated in the poorest regions and countries and among the most disadvantaged children within these societies. Nearly 90 per cent of deaths due to pneumonia and diarrhoea occur in sub-Saharan Africa and South Asia.

The concentration of deaths due to pneumonia and diarrhoea among the poorest children reflects a broader trend of uneven progress in reducing child mortality. Far fewer children are dying today than 20 years ago – compare 12 million child deaths in 1990 with 7.6 million in 2010, thanks mostly to rapid expansion of basic public health and nutrition interventions, such as immunization, breastfeeding and safe drinking water. But coverage of low-cost curative interventions against pneumonia and diarrhoea remains low, particularly among the most vulnerable.

There is a tremendous opportunity to narrow the child survival gap between the poorest and better-off children both across and within countries – and to accelerate progress towards the Millennium Development Goals – by increasing in a concerted way commitment to, attention on and funding for these leading causes of death that disproportionately affect the most vulnerable children.

We know what needs to be done

Pneumonia and diarrhoea have long been regarded as diseases of poverty and are closely associated with factors such as poor home environments, undernutrition and lack of access to essential services. Deaths due to these diseases are largely preventable through optimal breastfeeding practices and adequate nutrition, vaccinations, hand washing with soap, safe drinking water and basic sanitation, among other measures. Once a child gets sick, death is avoidable through cost-effective and life-saving treatment such as antibiotics for bacterial pneumonia and solutions made of oral rehydration salts for diarrhoea. An integrated approach to tackle these two killers is essential, as many interventions for pneumonia and diarrhoea are identical and could save countless children's lives when delivered in a coordinated manner (figure 2).

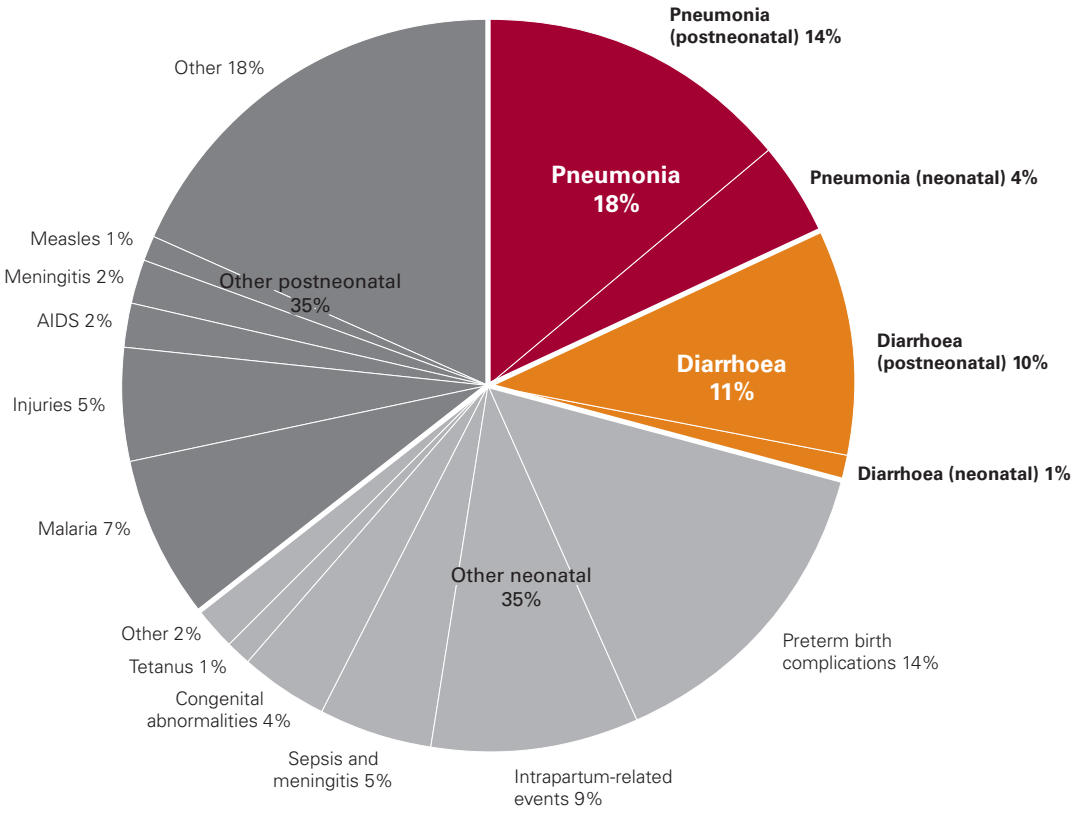
An equity approach could save more than 2 million children's lives by 2015

The potential for saving lives by more equitably scaling up the proper interventions is large. Modelled estimates suggest that by 2015 more than 2 million child deaths due to pneumonia and diarrhoea could be averted across the 75 countries with the highest mortality burden if national coverage of key pneumonia and diarrhoea interventions were raised to the level in the richest 20 per cent of households in each country. In this scenario child deaths due to pneumonia in these countries could fall 30 per cent, and child deaths due to diarrhoea could fall 60 per cent (figure 3). Indeed, all-cause child mortality could be reduced roughly 13 per cent across these 75 countries by 2015.

Bangladesh provides an important example of how targeting the poorest compared with better-off households with key pneumonia and diarrhoea interventions could result in far more lives saved. Nearly six times as many children's lives could be saved in the poorest households

FIGURE 1 **Pneumonia and diarrhoea are among the leading killers of children worldwide**

Global distribution of deaths among children under age 5, by cause, 2010



Note: Undernutrition contributes to more than a third of deaths among children under age 5. Values may not sum to 100 per cent because of rounding.
Source: Adapted from Liu and others 2012; Black and others 2008.

(roughly 15,400) compared with the richest ones (roughly 2,800) by scaling up key pneumonia and diarrhoea interventions to near universal levels (figure 4). This analysis attaches crude estimates to a well established understanding: target the poorest children with key pneumonia and diarrhoea interventions to achieve greater child survival impact.

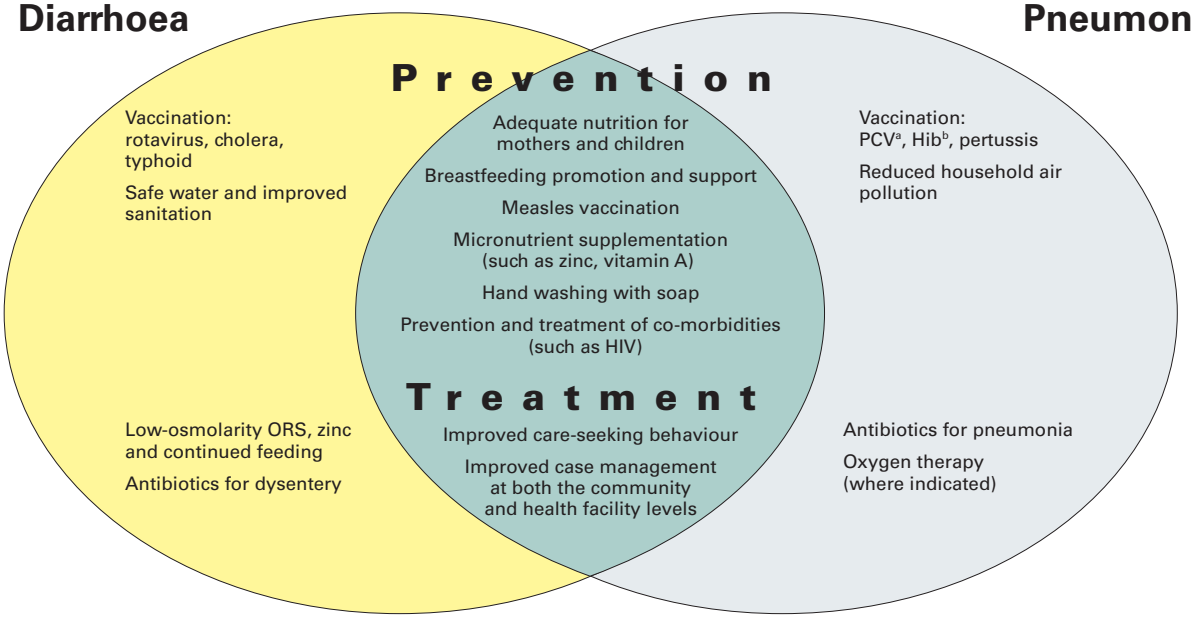
Are the children at the greatest risk of pneumonia or diarrhoea reached with key interventions?

This report is one of the most comprehensive assessments to date of whether children at the greatest risk of pneumonia and diarrhoea are reached with key interventions. And the results are a mix of impressive successes and lost opportunities.

Vaccination

New vaccines against major causes of pneumonia and diarrhoea are available. Many low-income countries have already introduced the *Haemophilus influenzae* type b vaccine, a clear success of efforts to close the 'rich-poor' gap in vaccine introduction – exemplifying the possibility of overcoming gross inequalities if there is a focused equity approach with funding, global and national leadership and demand creation. Pneumococcal conjugate vaccines are increasingly available, and there is promise of greater access to rotavirus vaccine as part of comprehensive diarrhoeal control strategies in the poorest countries in the near future. Nonetheless, disparities in access to vaccines exist within countries and could reduce vaccines' impact (figure 5). Reaching the most vulnerable children, who are

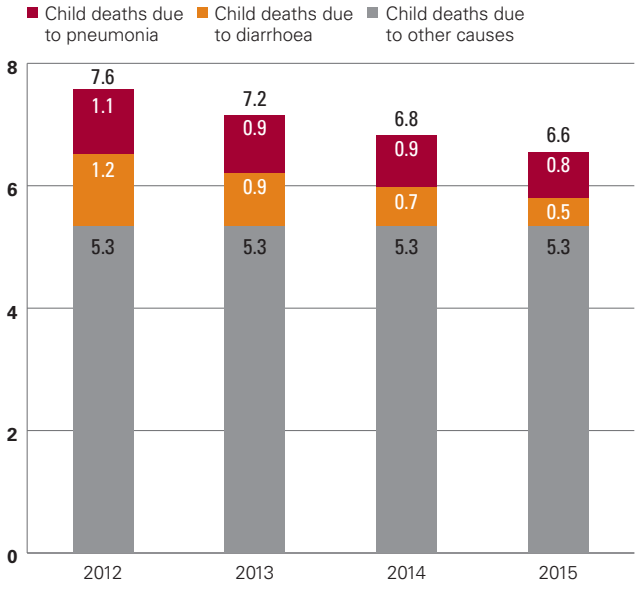
FIGURE 2 **Many prevention and treatment strategies for diarrhoea and pneumonia are identical**



Note: A complete list of Child Health Epidemiology Reference Group review papers on the effects of pneumonia and diarrhoea interventions on child survival is available at www.cherg.org/publications.html. Effectiveness of pneumonia interventions was also recently reviewed by Niessen and others (2009).
a. Pneumococcal conjugate.
b. *Haemophilus influenzae* type b.
Source: Adapted from the Global Action Plan for Prevention and Control of Pneumonia and presentations in WHO regional workshops in 2011.

FIGURE 3 **Potential declines in child deaths by scaling up national coverage to the levels in the richest households**

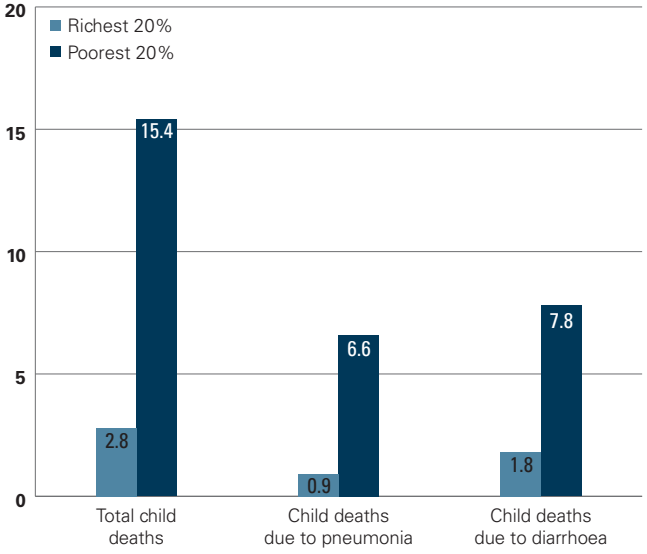
Predicted trends in the number of deaths among children under age 5 if national coverage of key pneumonia and diarrhoea interventions were raised to the levels among the richest 20 per cent across 75 countries, 2012–2015 (millions)



Source: Lives Saved Tool modelling by Johns Hopkins University Bloomberg School of Public Health (see annex 2).

FIGURE 4 **In Bangladesh more children's lives are saved by targeting the poorest households with key pneumonia and diarrhoea interventions**

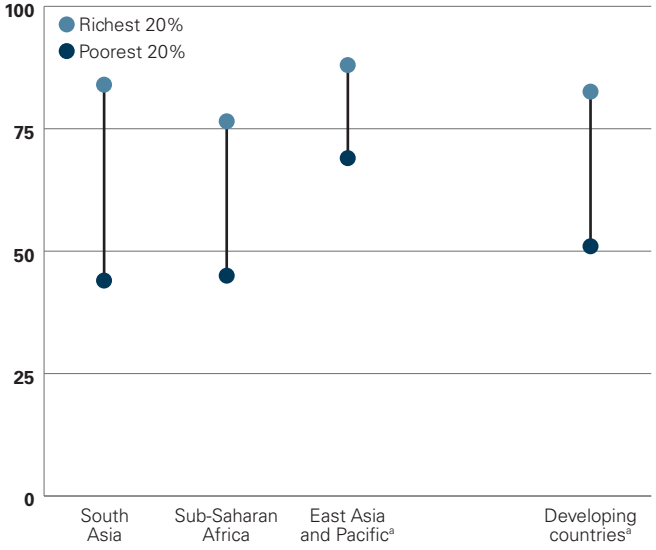
Predicted numbers of deaths averted among children under age 5 if near universal coverage (90 per cent) of key pneumonia and diarrhoea interventions were achieved among the poorest and richest 20 per cent in Bangladesh (thousands)



Note: Averted child deaths due to pneumonia and diarrhoea do not sum to total averted child deaths because pneumonia and diarrhoea interventions have an effect on other causes of child mortality.
Source: Lives Saved Tool modelling by Johns Hopkins University Bloomberg School of Public Health (see annex 2).

FIGURE 5 Substantial 'wealth gap' in measles vaccine coverage in every region

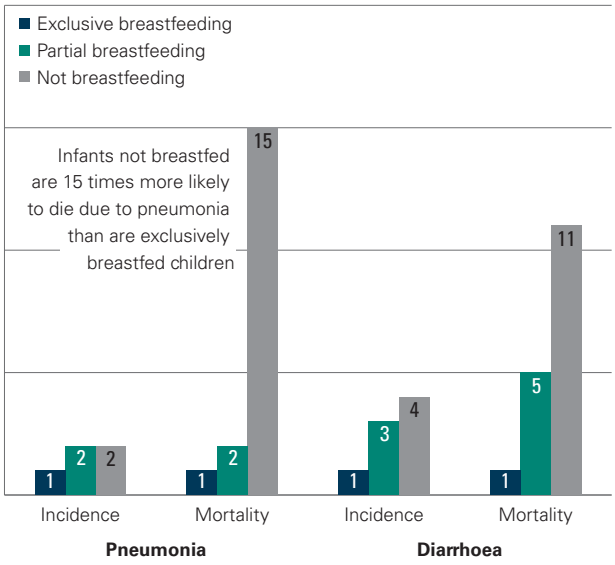
Share of children under one year of age who received a vaccine against measles, by household wealth quintile and region, 2000–2008 (per cent)



a. Excludes China.
Source: UNICEF 2010, based on 74 of the latest available Multiple Indicator Cluster Surveys and Demographic and Health Surveys conducted between 2000 and 2008.

FIGURE 6 Young infants who are not breastfed are at a greater risk of dying due to pneumonia or diarrhoea

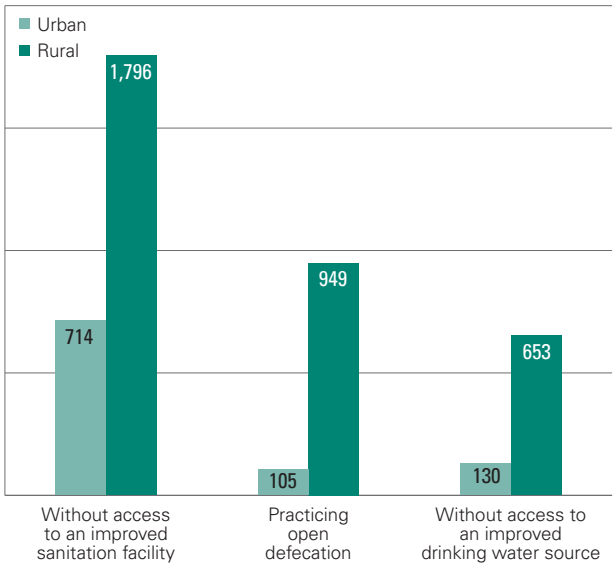
Relative risk of pneumonia and diarrhoea incidence and mortality for partial breastfeeding and not breastfeeding compared with that for exclusive breastfeeding among infants ages 0–5 months



Source: Black and others 2008.

FIGURE 7 Most people without an improved water source or sanitation facility live in rural areas

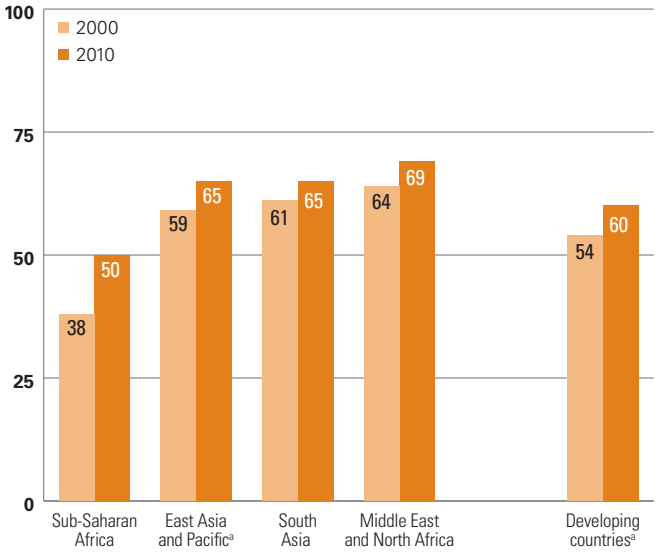
People without an improved sanitation facility, people practicing open defecation and people without an improved drinking water source, 2010 (millions)



Source: WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation 2012.

FIGURE 8 Every region has shown progress in appropriate careseeking for suspected childhood pneumonia over the past decade

Share of children under age 5 with suspected pneumonia taken to an appropriate healthcare provider or facility, by region, around 2000 and around 2010 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 63 countries with available data, covering 71 per cent of the under-five population in developing countries in 2000 and 73 per cent in 2010 (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

often at the greatest risk of pneumonia and diarrhoea, through routine immunization programmes remains a challenge but is essential to realize the full potential of both new and old vaccines alike.

Infant feeding

Exclusive breastfeeding during the first six months of life is one of the most cost-effective child survival interventions and greatly reduces the risk of a young infant dying due to pneumonia or diarrhoea (figure 6). Exclusive breastfeeding rates have increased markedly in many high-mortality countries since 1990. Despite this progress, fewer than 40 per cent of children under 6 months of age in developing countries are exclusively breastfed. Optimal breastfeeding practices are vital to reducing morbidity and mortality due to pneumonia and diarrhoea.

Water and sanitation

The Millennium Development Goal target on use of an improved drinking water source has been met globally as of 2010; a stunning success. Yet 783 million people still do not use an improved drinking water source, and 2.5 billion do not use an improved sanitation facility, mostly in the poorest households and rural areas; 90 per cent of people who practice open defecation, the riskiest sanitation practice, live in rural areas (figure 7). Nearly 90 per cent of deaths due to diarrhoea worldwide have been attributed to unsafe water, inadequate sanitation and poor hygiene. Hand washing with water and soap, in particular, is among the most cost-effective health interventions to reduce the incidence of both childhood pneumonia and diarrhoea.

Treatment for suspected pneumonia

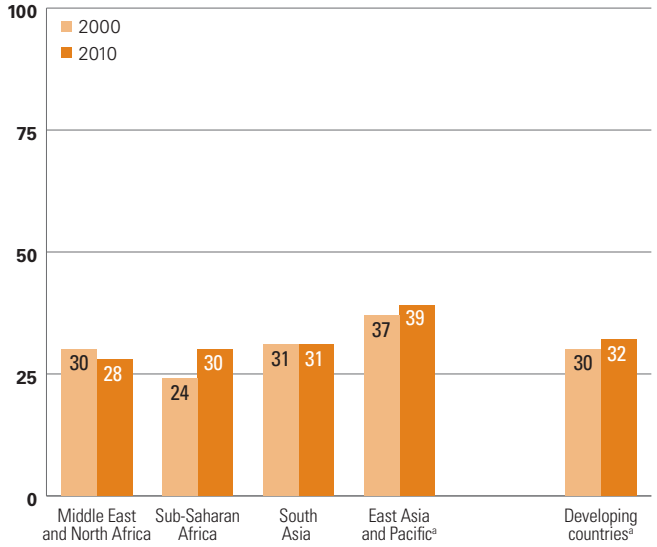
Timely recognition of key pneumonia symptoms by caregivers followed by seeking appropriate care and antibiotic treatment for bacterial pneumonia is lifesaving. Careseeking for children with symptoms of pneumonia has increased slightly in developing countries, from 54 per cent around 2000 to 60 per cent around 2010. Sub-Saharan Africa saw about a 30 per cent rise over this period, driven largely by gains among the rural population (figure 8). Yet appropriate careseeking for suspected childhood pneumonia remains too low across developing countries, and less than a third of children with suspected pneumonia receive antibiotics. The poorest children in the poorest countries are least likely to receive treatment when sick.

Treatment for diarrhoea

Children with diarrhoea are at risk of dying due to dehydration, and early and appropriate fluid replacement is a main intervention to prevent death. Yet few children with diarrhoea in developing countries receive appropriate treatment with oral rehydration therapy and continued feeding (39 per cent). Even fewer receive solutions made of oral rehydration salts (ORS) alone (one-third), and the past decade has seen no real progress in improving coverage across developing countries (figure 9). Moreover, the poorest children in the poorest countries are least likely to use ORS, and zinc treatment remains largely unavailable in high-mortality countries. The stagnant low ORS coverage over the past decade indicates a widespread failure to deliver one of the most cost-effective and life-saving child survival interventions and underscores the urgent need to refocus attention and funding on diarrhoea control.

FIGURE 9 **Use of solutions made of ORS to treat childhood diarrhoea has changed little since 2000**

Share of children under age 5 with diarrhoea receiving ORS (ORS packet or prepackaged ORS fluids), by region, around 2000 and around 2010 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 65 countries with available data, covering 74 per cent of the under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

Pneumonia and diarrhoea: accelerating child survival by tackling the deadliest diseases for the world's poorest children

This report once again shows what has long been known: coverage of key pneumonia and diarrhoea prevention and treatment interventions is much lower in the poorest countries and among the most-deprived children within these countries – children who often bear a larger share of child deaths. Child survival impact is thus reduced when key interventions miss these vulnerable children at greatest risk of dying from pneumonia or diarrhoea.

It is time to refocus our efforts on these two leading killers. This report is a call to action to reduce child deaths due to pneumonia and diarrhoea. Doing so would not only reduce the survival gap between poorest and better-off children, but would also accelerate progress towards eliminating preventable child deaths. This tremendous opportunity to narrow the child survival gap both across and within countries cannot be missed. Greater commitment, attention and concerted global action are needed now on behalf the most vulnerable children.

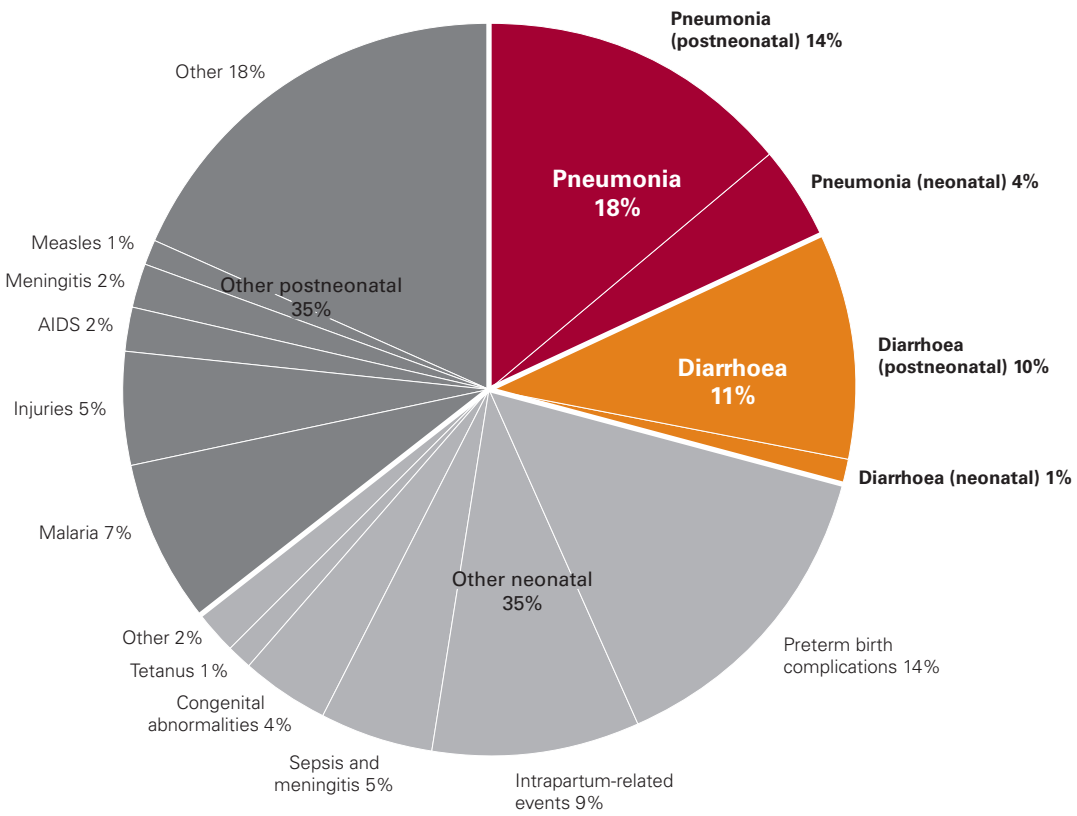
1 Pneumonia and diarrhoea disproportionately affect the poorest

The world has made substantial gains in child survival over the past two decades, but progress has been uneven both across and within countries.[1] Since 1990 child mortality has become increasingly concentrated in the world's poorest regions: sub-Saharan Africa and South Asia. Within most countries the poorest and most-deprived children are more likely to die before their fifth birthday. Limited data suggest that even in countries where the national child mortality rate has declined since 1990, the survival gap between the poorest and better-off children has widened in many cases.[2]

Pneumonia and diarrhoea are among the leading causes of child deaths globally (figure 1.1) – and are perhaps the starkest examples of the child survival gap. Together, these diseases cause 29 per cent of child deaths, more than 2 million a year. Nearly as many

FIGURE 1.1 **Pneumonia and diarrhoea are among the leading killers of children worldwide**

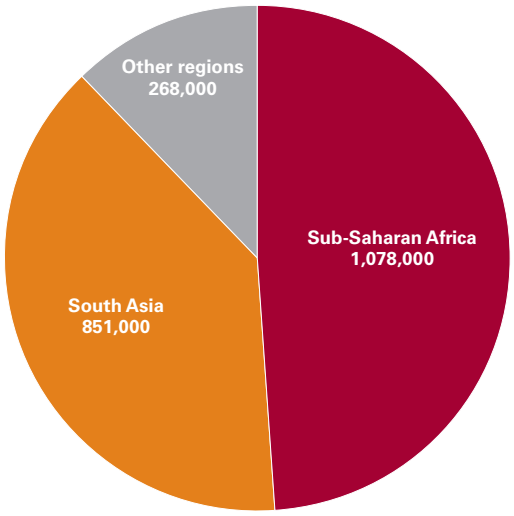
Global distribution of deaths among children under age 5, by cause, 2010



Note: Undernutrition contributes to more than a third of deaths among children under age 5. Values may not sum to 100 per cent because of rounding.
Source: Adapted from Liu and others 2012; Black and others 2008.

FIGURE 1.2 Nearly 90 per cent of child deaths due to pneumonia and diarrhoea occur in sub-Saharan Africa and South Asia

Deaths among children under age 5 due to pneumonia and diarrhoea, by region, 2010



Source: Adapted from Liu and others 2012.

children died from pneumonia and diarrhoea in 2010 as from all other causes after the newborn period – in other words, nearly as much as from malaria, injuries, AIDS, meningitis, measles and all other postneonatal conditions combined.

This staggering toll, however, is not evenly felt across the world but instead is highly concentrated in the poorest settings. The vast majority of deaths due to pneumonia and diarrhoea occur in the poorest regions – nearly 90 per cent of them in sub-Saharan Africa and South Asia (figure 1.2 and table 1.1). About half the world's deaths due to pneumonia and diarrhoea occur in just five mostly poor and populous countries: India, Nigeria, Democratic Republic of the Congo, Pakistan and Ethiopia (table 1.2). Cholera, too, is on the rise in many areas and disproportionately affects vulnerable groups living in fragile settings (box 1.1).

Within countries the child survival gap in deaths due to pneumonia and diarrhoea is likely substantial, but much less is known about the causes of child deaths within most high-mortality countries. It is known that the poorest and most vulnerable children within countries are more often exposed to pathogens that cause pneumonia and diarrhoea (for example, through poor sanitation or inadequate water supplies) and are more likely to develop severe illness (for example, from undernutrition or co-morbidities).[3] Coverage of key prevention measures should be higher among these children, but too often the opposite occurs. These sicker children are then in greater need of effective treatment (such as antibiotics for bacterial

TABLE 1.1 Child deaths due to pneumonia and diarrhoea are concentrated in the poorest regions . . .

UNICEF regions	Deaths among children under age 5 due to pneumonia and diarrhoea, 2010		Deaths among children under age 5 due to pneumonia, 2010		Deaths among children under age 5 due to diarrhoea, 2010	
	Number	Per cent of total	Number	Per cent of total	Number	Per cent of total
Sub-Saharan Africa	**1,078,000**	**49**	648,000	46	430,000	54
South Asia	**851,000**	**39**	550,000	39	300,000	37
East Asia and Pacific	**145,000**	**7**	111,000	8	34,000	4
Middle East and North Africa	**103,000**	**5**	68,000	5	36,000	4
Latin America and Caribbean	**38,000**	**2**	26,000	2	12,000	1
Central and Eastern Europe and the Commonwealth of Independent States	**25,000**	**1**	18,000	1	6,000	1
Least developed countries	**894,000**	**41**	545,000	39	350,000	44
Developing countries	**2,191,000**	**>99**	1,390,000	>99	801,000	>99
Industrialized countries	**2,000**	**<1**	2,000	<1	<1,000	<1
World	**2,197,000**	**100**	**1,396,000**	**100**	**801,000**	**100**

Note: Due to rounding, regional values may not sum to the world total, percentages may not sum to 100 and data in columns 3 and 5 may not sum to the values in column 1.
Source: Adapted from Liu and others 2012.

TABLE 1.2 . . . and in mostly poor and populous countries in these regions

Rank	Country	Deaths among children under age 5 due to pneumonia and diarrhoea, 2010
1	India	609,000
2	Nigeria	241,000
3	Democratic Republic of the Congo	147,000
4	Pakistan	126,000
5	Ethiopia	96,000
6	Afghanistan	79,000
7	China	64,000
8	Sudan[a]	44,000
9	Mali	42,000
10	Angola	39,000
11	Uganda	38,000
12	Burkina Faso	36,000
12	Niger	36,000
14	Kenya	32,000
15	United Republic of Tanzania	31,000
	Rest of the world	537,000
	Total	**2,197,000**

Half of all child deaths due to pneumonia and diarrhoea worldwide

Three-quarters of all child deaths due to pneumonia and diarrhoea worldwide

a. Estimates refer to pre-cession Sudan.
Source: Adapted from Liu and others 2012.

BOX 1.1 Cholera, on the rise, affects the most vulnerable people

An estimated 1.4 billion people are at risk of cholera in endemic countries, with approximately 3 million cases and about 100,000 deaths per year worldwide. Children under age 5 account for about half the cases and deaths.[1] Large, protracted outbreaks with high case-fatality ratios are becoming more frequent, reflecting a lack of adequate preparedness, early detection, prevention and timely access to healthcare. These explosive and deadly outbreaks affect the whole of society, can disrupt essential services and often require substantial resources, including emergency response operations.

Although large cholera outbreaks gain attention, endemic cholera routinely accounts for a substantial share of the global disease burden and is often underdetected and underreported. Cholera has become entrenched in more countries in Africa and has recently returned to the Americas, with ongoing transmission in the Dominican Republic and Haiti. And new, more virulent and drug-resistant strains of *Vibrio cholera* are emerging.[2] Cholera affects the most marginalized populations – those who have the lowest access to essential services such as adequate water, sanitation and healthcare and who already suffer from poor nutrition.

Cholera is a diarrhoeal disease that can lead to rapid death if not detected and treated early with solutions made of oral rehydration salts. Key interventions to prevent and treat cholera are similar to those for diarrhoea outlined in this report and should be scaled up. In addition, reducing transmission and death from outbreaks requires specific preparedness and response activities such as strong national multisector coordination and control structures, comprehensive risk assessments, enhanced surveillance and early warning systems, mobilization of communities and policymakers, and readily available resources and supplies.

Notes

1. Ali and others 2012.
2. Ad Hoc Cholera Vaccine Working Group 2009.

pneumonia and oral rehydration solutions for diarrhoea), but are generally less likely to receive it.[4]

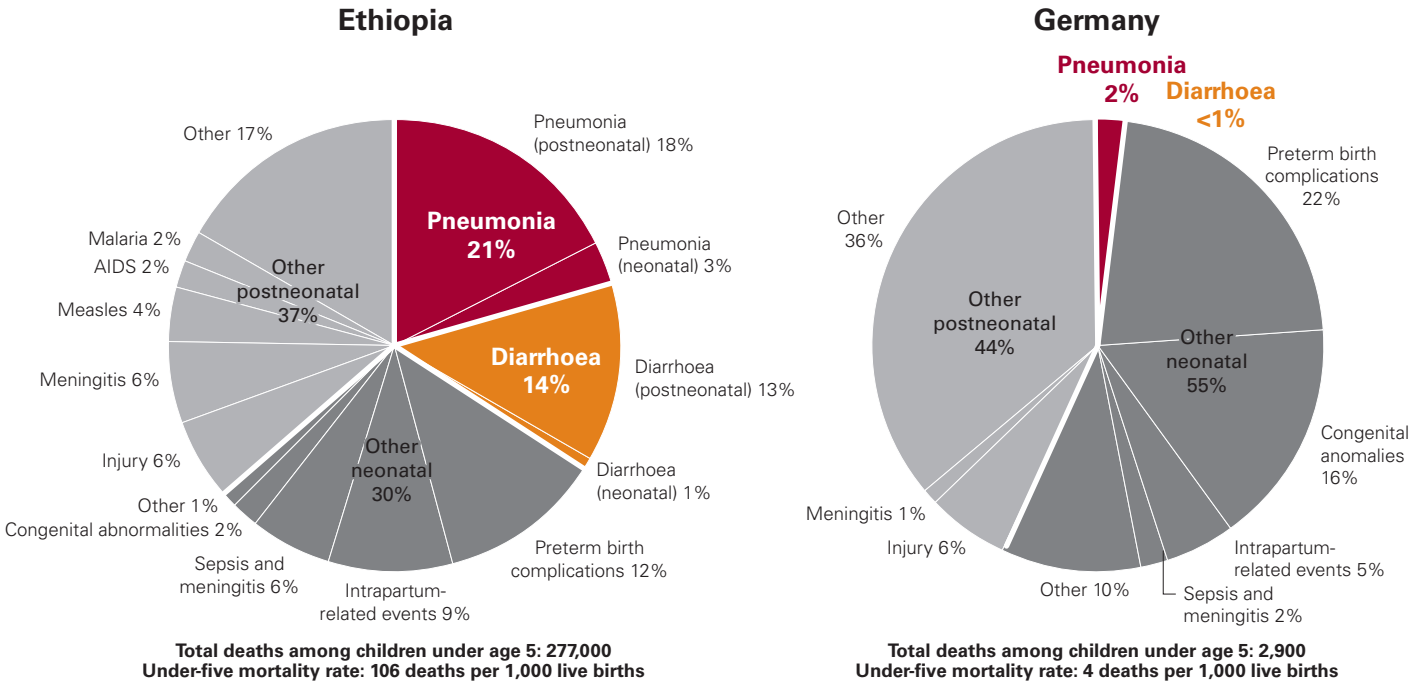
The child survival gap between the richest and poorest countries is due largely to a handful of infections, notably pneumonia and diarrhoea. Compare, for example, Ethiopia and Germany – two countries with among the highest and lowest child mortality rates in 2010. In Ethiopia 271,000 children under age 5 died in 2010 (106 deaths per 1,000 live births); pneumonia and diarrhoea caused more than a third of these deaths, and a large proportion of the remaining deaths were caused by other preventable and treatable infections (figure 1.3). In Germany approximately 3,000 children under age 5 died in 2010 (4 deaths per 1,000 live births), and the vast majority of these deaths were caused by noncommunicable diseases and conditions.

Childhood infections left untreated or not treated appropriately, particularly pneumonia and diarrhoea, are the main contributors to the child survival gap between Ethiopia and Germany and between the poorest and richest countries more generally. Narrowing this gap will take focused action on these 'diseases of poverty' – particularly pneumonia and diarrhoea – and on other infections that disproportionately afflict the most-deprived children.

The data presented in this chapter are based on modelled estimates of childhood pneumonia and diarrhoea mortality for all countries. Robust data on the distribution of cases and deaths within high-mortality countries are largely unavailable. There is an urgent need to strengthen health information and vital registration systems in order to identify the populations at greatest risk of suffering and dying from pneumonia and diarrhoea within countries. This information is critical for control programmes in their drive to better target high-impact interventions to the children most in need within countries.

FIGURE 1.3 Different patterns of child deaths in high- and low-mortality countries: Ethiopia and Germany

Distribution of deaths among children under age 5, by cause, 2010



Total deaths among children under age 5: 277,000
Under-five mortality rate: 106 deaths per 1,000 live births

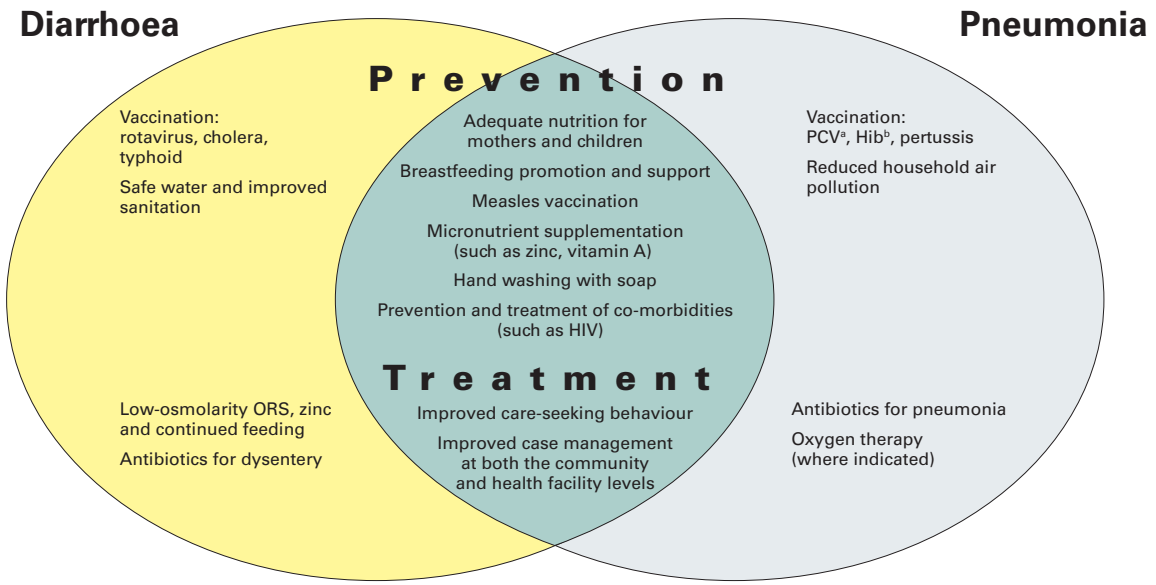
Total deaths among children under age 5: 2,900
Under-five mortality rate: 4 deaths per 1,000 live births

Note: Country selection was based on high- and low-mortality countries that are not in conflict and with a population greater than 40 million to improve data reliability and reduce uncertainty around the estimates. The distribution of deaths among children under age 5 by cause in these two countries is comparable to other high- and low-mortality countries.
Source: Adapted from Liu and others 2012.

2
We know what works

UNICEF, WHO and partners have published action plans for pneumonia and diarrhoea control (see annex 1). Many well known child survival interventions from across different sectors have a proven impact on reducing pneumonia and diarrhoea morbidity and mortality (figure 2.1). These interventions require communication strategies that inform and motivate healthy actions and create demand for services essential to pneumonia and diarrhoea control (box 2.1).

FIGURE 2.1 **Many prevention and treatment strategies for diarrhoea and pneumonia are identical**



Note: A complete list of Child Health Epidemiology Reference Group review papers on the effects of pneumonia and diarrhoea interventions on child survival is available at www.cherg.org/publications.html. Effectiveness of pneumonia interventions was also recently reviewed by Niessen and others (2009).
a. Pneumococcal conjugate.
b. *Haemophilus influenzae* type b.
Source: Adapted from the Global Action Plan for Prevention and Control of Pneumonia and presentations in WHO regional workshops in 2011.

BOX 2.1 The importance of evidence-based communication strategies for child survival

Communication strategies to inform and motivate individual, community and social change (behaviour change communication) are vital for child survival programmes. To this end, UNICEF and its partners recently developed the Communication Framework for New Vaccines and Child Survival to support the introduction of new vaccines for pneumonia and diarrhoea as part of a comprehensive package to also strengthen complementary 'healthy actions' for pneumonia and diarrhoea control, such as early and exclusive breastfeeding, hand washing with soap, vaccinations and appropriate care seeking for illness symptoms, among others (see figure 2.1 in the text). New vaccines prevent many but not all cases of pneumonia and diarrhoea and thus require new communication strategies not only to promote uptake of these vaccines, but also to prevent unrealistic community expectations that could damage immunization programmes.

This communication framework stresses a structured approach to guide the design, implementation and evaluation of a national communication plan for child survival. Communication is challenging, and there is more than one way to do it correctly. But it must be based on the information needs of the intended target audience, crafted to both inform and motivate, linked to programme goals, based on sound analysis and research, and structured to include rigorous monitoring and evaluation.

Source: UNICEF 2011a.

3 Prevention coverage

Key prevention measures include vaccinations, clean home environments (such as those with safe drinking water and improved sanitation) and adequate nutrition for mothers and children (such as through optimal breastfeeding practices and micronutrient supplementation).

Vaccination

Several vaccines – both new and old – could save countless children from dying due to pneumonia or diarrhoea every year. These include vaccines against leading pneumonia-causing pathogens (*Streptococcus pneumoniae* and *Haemophilus influenzae* type b [Hib]) and rotavirus vaccine for diarrhoea, as well as vaccines that prevent infections that lead to pneumonia or diarrhoea as a complication (such as pertussis for pneumonia and measles for both pneumonia and diarrhoea).

Pneumococcal conjugate vaccine (PCV)

Streptococcus pneumoniae (or pneumococcus) is a leading cause of bacterial pneumonia, meningitis and sepsis in children. In 2007 WHO recommended introducing PCV into all national immunization programmes, particularly in countries with high child mortality.

Progress is being made in introducing PCV globally, and use has been increasing in the poorest countries (figure 3.1). By 2011, 13 of 35 low-income countries with data had introduced PCV, covering 41 per cent of surviving infants (about 25 million) in low-income countries. More low-income countries, particularly those with high pneumonia burdens, urgently need to introduce PCV into routine immunization programmes. But introducing a vaccine does not necessarily translate into high and equitable coverage within countries, and inequities in uptake greatly reduce the impact of vaccines (box 3.1).

Hib vaccine

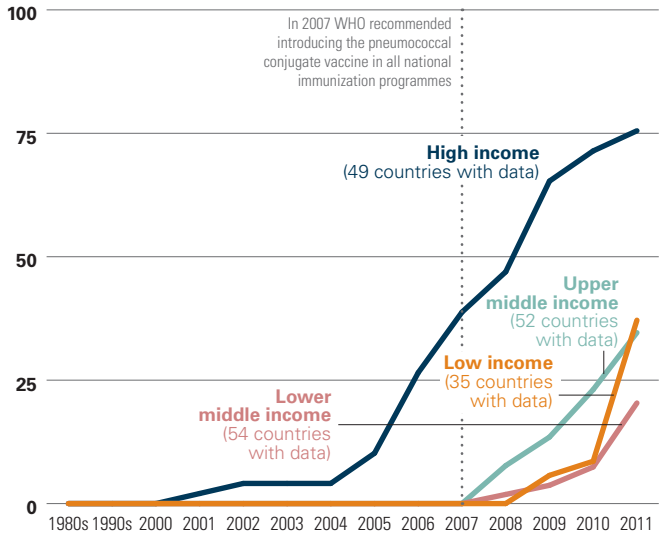
Hib is a leading cause of childhood meningitis and a major cause of bacterial pneumonia in children. Fortunately, Hib is preventable thanks to a highly effective vaccine. By the end of the 1990s around two-thirds of high-income countries with data had added the vaccine to their immunization schedule, but low-income countries, where the burden is often highest, have been slower to do so. In 2006 WHO recommended introducing the Hib vaccine into all national immunization programmes, and since then the gap in vaccine introduction between low- and high-income countries has nearly closed (figure 3.2).

Rotavirus vaccine

Rotavirus is the leading cause of severe childhood diarrhoea and is responsible for an estimated 40 per cent of all hospital admissions due to diarrhoea among children under age 5 worldwide.[1] Rotavirus caused some 420,000–494,000 child deaths in 2008, a large share of them in sub-Saharan Africa and South Asia, where the

FIGURE 3.1 Progress in introducing PCV globally, particularly in the poorest countries, but a 'rich-poor' gap remains

Share of countries that have introduced PCV into the entire country, by income group (per cent)



Note: Income groups are based on the World Bank July 2011 classification and are applied for the entire time series (see http://data.worldbank.org/about/country-classifications/country-and-lending-groups#Low_income).
Source: WHO Department of Immunization, Vaccines and Biologicals 2011.

BOX 3.1 Disparities in vulnerability and access reduce the impact of new vaccines

New vaccines, such as that for rotavirus, could substantially reduce child mortality. But to do so, they must reach the children most in need. In many low-income countries poor children have several risk factors for mortality due to pneumonia or diarrhoea, such as poor nutritional status and less access to timely treatment. These children are often much less likely to be reached by routine vaccination in high-mortality countries.

A study of 25 low-income countries using data from the most recent Demographic and Health Survey in each country found that the impact (deaths averted per 1,000 children vaccinated) of introducing rotavirus vaccination was up to five times greater for the poorest wealth quintile than for the richest, due to higher estimated risks of rotavirus mortality, and that cost effectiveness was most favourable for the poorest wealth quintile, due to its greater burden of rotavirus disease. However, while some countries have achieved fairly equitable vaccination coverage across wealth quintiles, many high-mortality countries have a substantial gap in coverage between the richest and poorest.

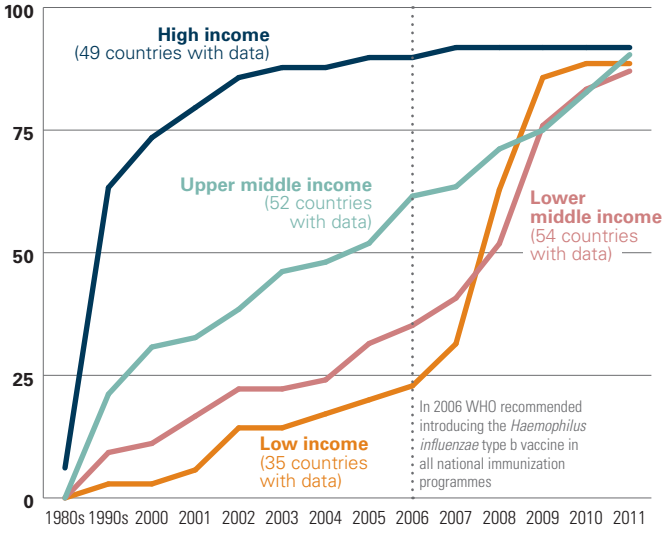
Achieving equitable coverage in these countries (defined here as all quintiles having the same coverage as the richest) resulted in an 89 per cent increase in benefits (reduced child mortality from rotavirus) in the poorest quintile and a 38 per cent increase in benefits overall. The pattern is particularly notable in the highest mortality countries of India and Nigeria. In India equitable coverage would double the benefits for the poorest children and increase the benefits 40 per cent at the national level. In Nigeria equitable coverage would increase health benefits 400 per cent for the poorest children and double them at the national level.

While new vaccines hold great promise for reducing child mortality, closing disparities in access within high-mortality countries is essential.

Source: Rheingans, Anderson and Atherly 2012.

FIGURE 3.2 Closing the 'rich-poor' gap in the introduction of Hib vaccine in recent years

Share of countries that have introduced the *Haemophilus influenzae* type b vaccine into the entire country, by income group (per cent)



Note: Income groups are based on the World Bank July 2011 classification and are applied for the entire time series (see http://data.worldbank.org/about/country-classifications/country-and-lending-groups#Low_income).
Source: WHO Department of Immunization, Vaccines and Biologicals 2011.

rotavirus vaccine remains largely unavailable.[2] In 2009 WHO recommended introducing rotavirus vaccine into all national immunization programmes, and in September 2011 the GAVI Alliance approved funding to support rollout of the rotavirus vaccine in 16 developing countries (figure 3.3). By 2015 the GAVI Alliance and its partners plan to support more than 40 of the world's poorest countries in rolling out the rotavirus vaccine.[3]

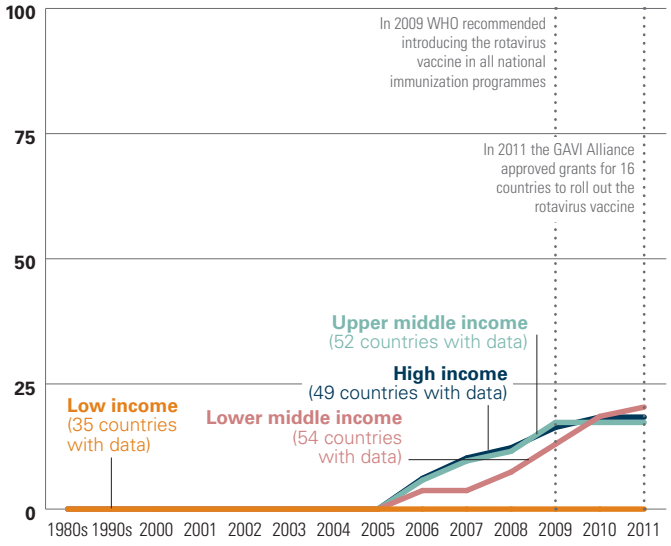
Measles and pertussis vaccines

Pneumonia is a serious complication of both measles and pertussis (or whooping cough) and is the most common cause of death associated with these illnesses. An effective vaccine against measles and pertussis (DTP3) has been available for decades and has been included in national immunization programmes worldwide since the 1980s.

There has been substantial progress in reducing mortality due to measles and pertussis over the past few decades. Worldwide mortality due to measles declined from an estimated 535,300 deaths in 2000 to 139,300 in 2010 – a reduction of 74 per cent.[4] Pertussis remains endemic

FIGURE 3.3 Few countries use the rotavirus vaccine, which is largely unavailable in the poorest countries

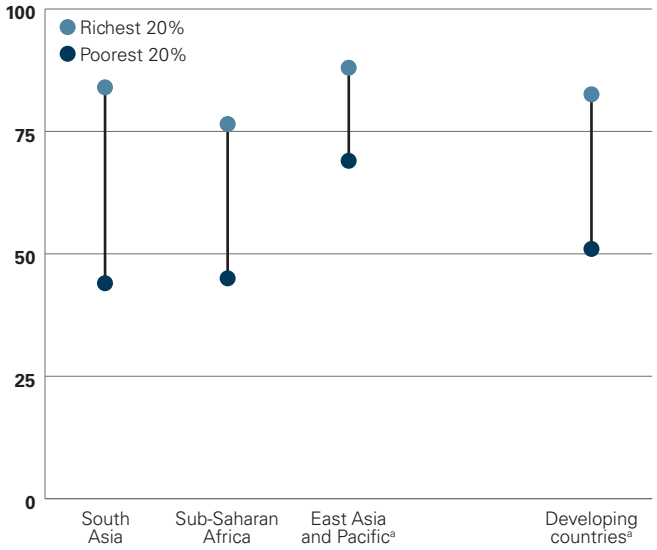
Share of countries that have introduced the rotavirus vaccine into the entire country, by income group (per cent)



Note: Income groups are based on the World Bank July 2011 classification and are applied for the entire time series (see http://data.worldbank.org/about/country-classifications/country-and-lending-groups#Low_income).
Source: WHO Department of Immunization, Vaccines and Biologicals 2011.

FIGURE 3.4 Substantial 'wealth gap' in measles vaccine coverage in every region

Share of children under one year of age who received a vaccine against measles, by household wealth quintile and region, 2000–2008 (per cent)



a. Excludes China.
Source: UNICEF 2010, based on 74 of the latest available Multiple Indicator Cluster Surveys and Demographic and Health Surveys conducted between 2000 and 2008.

worldwide. An estimated 50 million pertussis cases occur each year, most of them in developing countries. In 2008 pertussis caused approximately 200,000 deaths among children under age 5, mostly among infants.[5]

Although coverage of measles and DTP3 vaccines is high globally (85 per cent for both in 2010), it varies across and within countries – with the poorest and most vulnerable children most often left unvaccinated (figures 3.4 and 3.5).

Clean home environment: water, sanitation, hygiene and other home factors

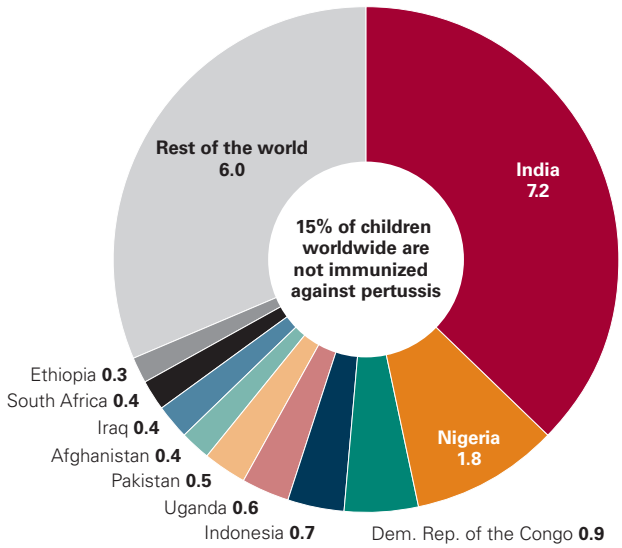
A clean home environment is critical for reducing transmission of pathogens that cause pneumonia or diarrhoea. Access to safe water and to adequate sanitation is necessary to prevent diarrhoea. Improving home and personal hygiene helps prevent both pneumonia and diarrhoea. Other home environment factors, such as household air pollution and overcrowding, also raise the risk of childhood pneumonia.

Water, sanitation and hygiene

Nearly 90 per cent of deaths due to diarrhoea worldwide have been attributed to unsafe water,

FIGURE 3.5 Most children not immunized against pertussis live in just 10 mostly poor and populous countries

Children not immunized against pertussis, by country, 2010 (millions)



Note: Data are based on children who receive three doses of diphtheria and tetanus toxoid with pertussis (DTP3) vaccine.
Source: WHO and UNICEF joint estimates of national immunization coverage (www.childinfo.org) as of 15 July 2011.

inadequate sanitation and poor hygiene.[6] Water, sanitation and hygiene programmes include several interventions: promoting safe disposal of human excreta, encouraging hand washing with soap, increasing access to safe water, improving water quality and advancing household water treatment and safe storage. All these interrelated elements are important for preventing diarrhoea (figure 3.6).

Safe water

A recent WHO and UNICEF report announced that, as of 2010, the Millennium Development Goal target on safe drinking water has been met, a stunning success.[7] Since 1990 more than 2 billion people have gained access to an improved drinking water source, but many rural households still lack these services. Some 783 million people do not have access to an improved drinking water source, 83 per cent of them in rural areas. In addition to the urban-rural gap, there are substantial differences between the richest and poorest households. For example, although access to an improved drinking water source is widespread, the poorest households often miss out (figure 3.7).

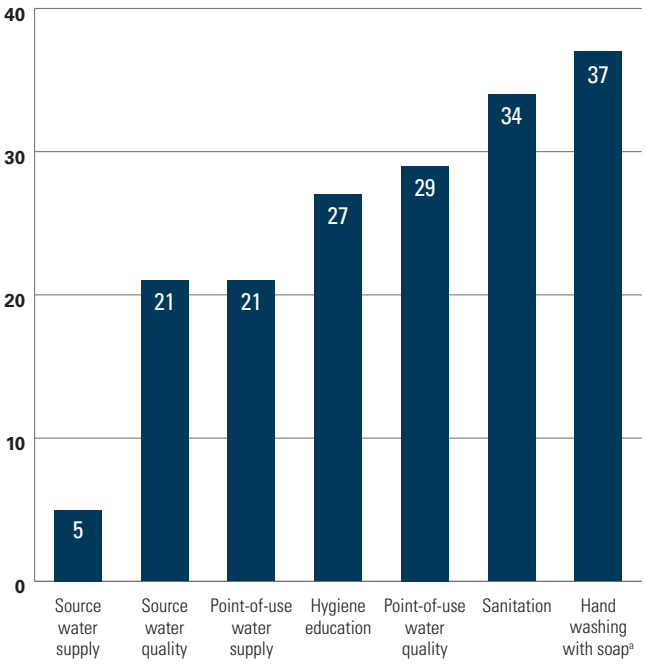
Basic sanitation

The problem is even greater for sanitation: 2.5 billion people (37 per cent of the world's population) do not have access to basic sanitation, almost three-quarters of them in rural areas. And 90 per cent of people who practice open defecation, the riskiest sanitation practice, live in rural areas (figure 3.8).

Among the 1.1 billion people who still practice open defecation, 83 per cent of them live in 10 mostly poor and populous countries (figure 3.9). South Asia is home to around 60 per cent of all people practicing open defecation. Despite the progress in reducing the practice among better-off households across South Asia, nearly all people in the poorest 20 per cent of households still practice open defecation (figure 3.10).

FIGURE 3.6 Water, sanitation and hygiene interventions are highly effective in reducing diarrhoea morbidity among children under age 5

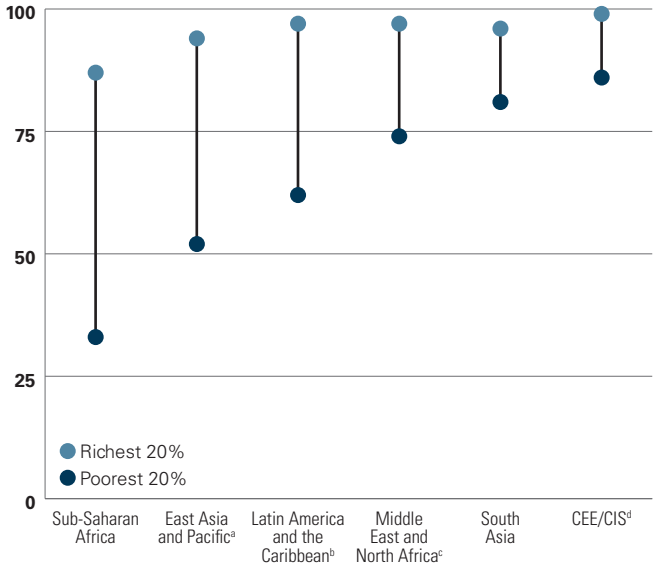
Per cent reduction in diarrhoea morbidity, by intervention



a. A more recent meta-analysis by the Child Health Epidemiology Reference Group in 2010 found a 42 per cent reduction in diarrhoea morbidity among children under age 5 who washed their hands with soap.
Source: Waddington and others 2009.

FIGURE 3.7 Use of an improved drinking water source is widespread, but the poorest households often miss out

Share of population using an improved drinking water source, by household wealth quintile and region, 2004–2009 (per cent)



a. Excludes China.
b. Unweighted average of 10 countries in the region with available data.
c. Available data cover 51 per cent of the region's population and exclude Algeria and Turkey.
d. Available data cover 59 per cent of the region's population and exclude the Russian Federation.
Note: The asset index used to classify households into wealth quintiles has not been adjusted for the drinking water variable that is part of the index.
Source: UNICEF global databases 2012, based on 80 Multiple Indicator Cluster Surveys and Demographic and Health Surveys conducted between 2004 and 2009.

Safe disposal of child faeces

Safe disposal of child faeces is critical to reducing faecal-oral contamination that facilitates transmission of diarrhoea pathogens. A child's using a toilet directly or rinsing a child's stools into a toilet or latrine is considered safe disposal. Across regions safe disposal is much higher among urban than rural populations and among richer than poorer households (figure 3.11).

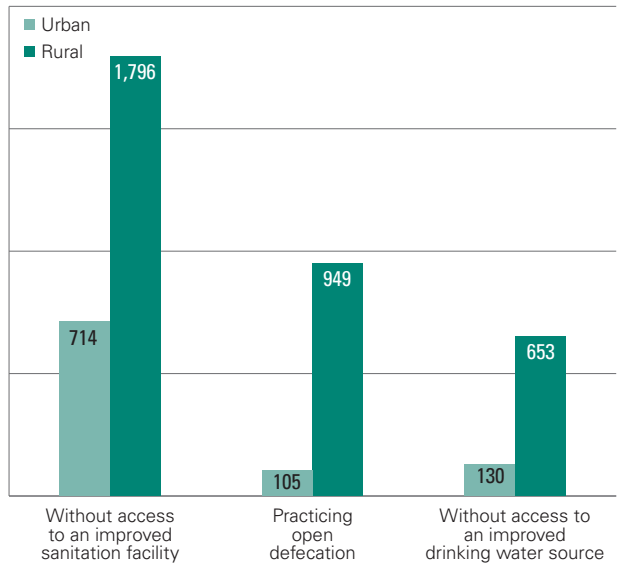
Hand washing with soap

Hand washing with water and soap is the most cost-effective health intervention for reducing the incidence of both pneumonia and diarrhoea in children under age 5.[8] There is consistent evidence that hand washing with soap at critical times – including before eating, preparing food and feeding a child and after using the toilet – can substantially reduce the risk of diarrhoea.[9]

Monitoring correct hand washing behaviour at these critical times is challenging, and comparable national data on hand washing are scarce, but Multiple Indicator Cluster Surveys and Demographic and Health Surveys are increasingly collecting information using proxy or reliable indicators on the likelihood of correct hand washing.

FIGURE 3.8 Most people without an improved water source or sanitation facility live in rural areas

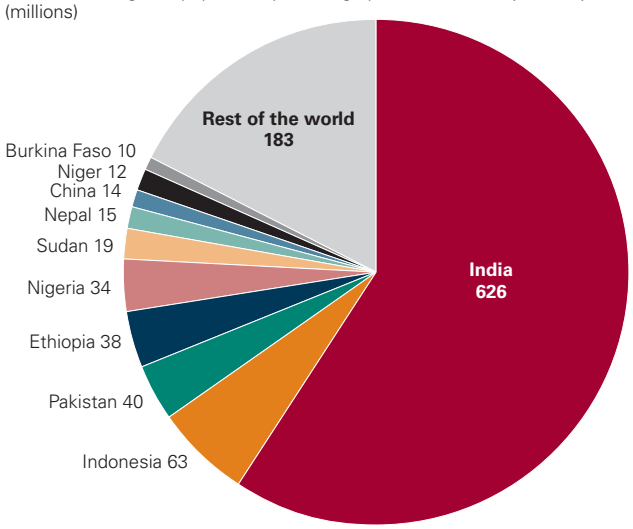
People without an improved sanitation facility, people practicing open defecation and people without an improved drinking water source, 2010 (millions)



Source: WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation 2012.

FIGURE 3.9 Worldwide, 1.1 billion people still practice open defecation—more than half live in India

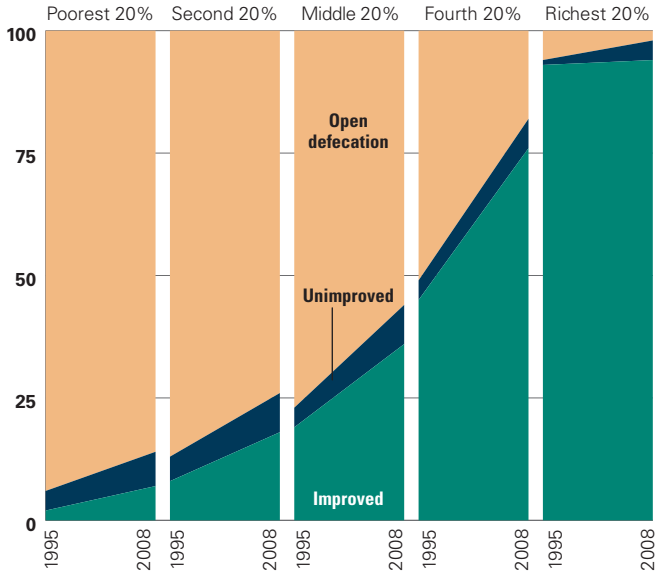
Distribution of global population practicing open defecation, by country, 2010 (millions)



Source: WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation 2012.

FIGURE 3.10 The poorest households in South Asia have barely benefited from improvements in sanitation

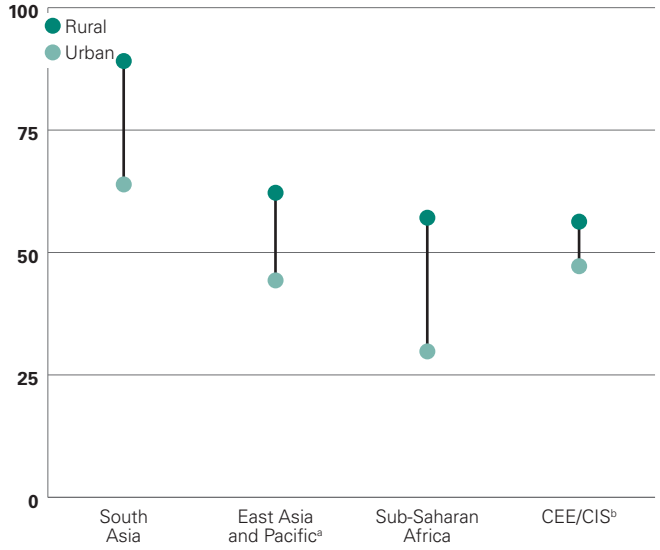
Share of population using improved and unimproved sanitation facilities and practicing open defecation in Bangladesh, India and Nepal, by household wealth quintile (per cent)



Note: The analysis is based on population-weighted averages. Patterns in individual countries may vary from the regional pattern. The asset index used to classify households into wealth quintiles has not been adjusted for the sanitation variable, which is part of the index.
Source: WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation, based on 1993, 1999 and 2006 National Family Health Surveys in India; 1993, 1997, 2000, 2004 and 2007 Demographic and Health Surveys in Bangladesh; and 1996, 2001 and 2006 Demographic Health Surveys in Nepal.

FIGURE 3.11 Child faeces are often disposed of in an unsafe manner, further increasing the risk of diarrhoea in rural areas

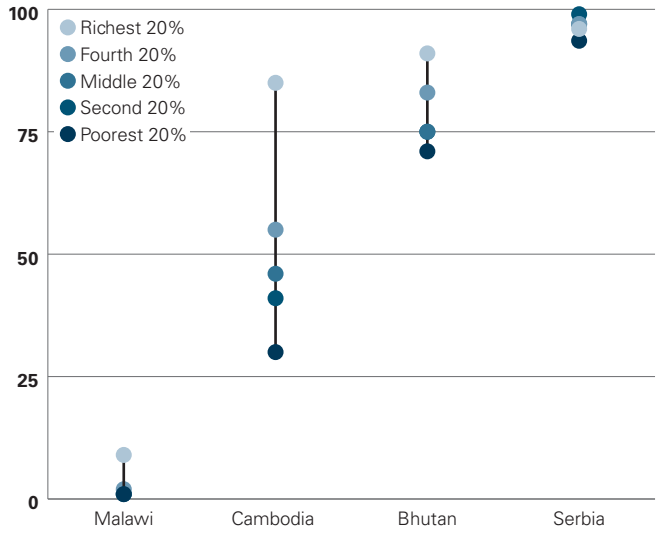
Share of caregivers with a young child who practice unsafe disposal of child faeces, by residence and region, 2004–2009 (per cent)



a. Excludes China.
b. Unweighted average of 10 countries in the region with available data.
Source: UNICEF global databases 2012, based on 55 Multiple Indicator Cluster Surveys and Demographic and Health Surveys conducted between 2004 and 2009.

FIGURE 3.12 New data available on households with designated place with soap and water to wash hands

Share of households that have a place with water and soap for hand washing, by household wealth quintile, countries with data, 2010 (per cent)



Source: UNICEF global databases 2012, based on Demographic and Health Surveys for Malawi and Cambodia and Multiple Indicator Cluster Surveys for Bhutan and Serbia.

Initial results show large disparities in hand washing both across and within countries. For example, in Serbia a specific place for hand washing was observed in most households, even in the poorest ones, but in Malawi coverage is very low, even in the richest households. Cambodia has large disparities between the richest (85 per cent) and poorest (30 per cent) households (figure 3.12).

Research has found that rates of observed hand washing with water and soap are low across developing countries. In a recent overview based on local studies just 17 per cent of observed caregivers washed their hands with soap and water after using the toilet. The data further suggest, however, that greater proportions of people wash their hands without soap (45 per cent), indicating that at least a culture of hand washing exists.[10]

Other home factors

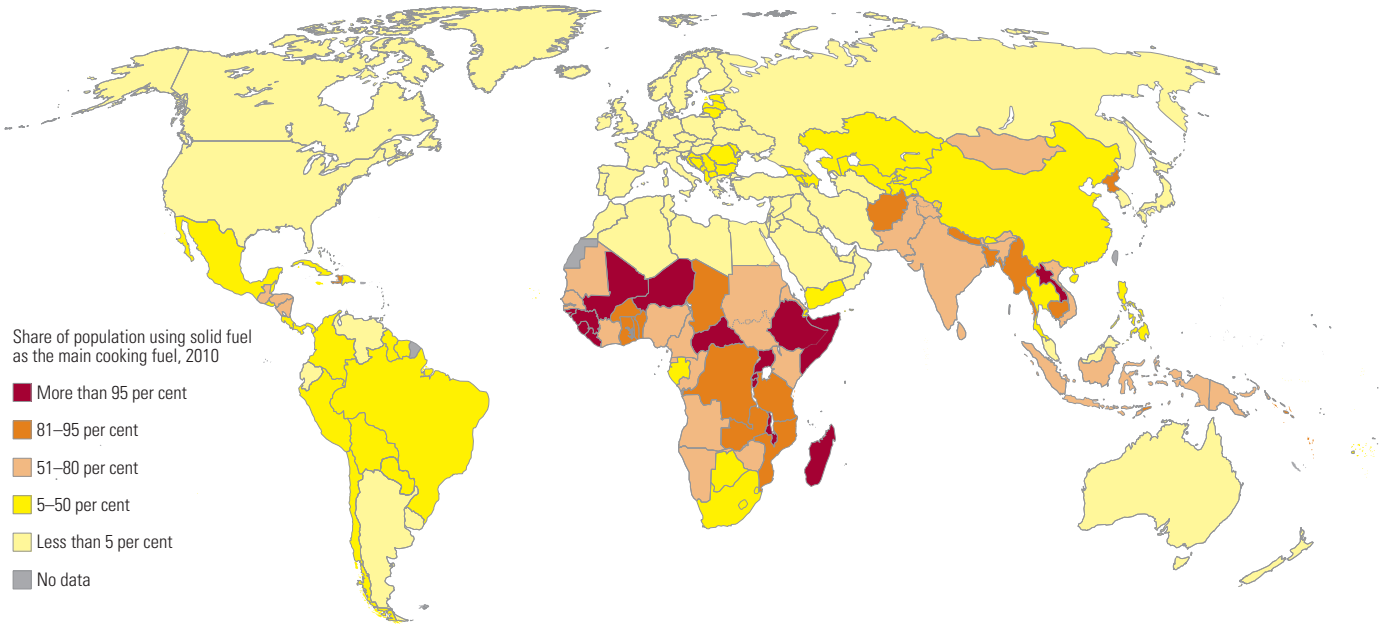
Household air pollution, a well known risk factor for childhood pneumonia, places children at particular risk for several reasons: their lungs and immune systems are not fully developed, they breathe more in proportion to their body size and they often spend more time inside the home.[11]

Household air pollution in low-income countries is due mainly to use of solid fuels (such as wood, crop waste, animal dung and coal) for cooking or heating in poorly ventilated open fires and stoves. Today, around 3 billion people worldwide use solid fuels as their main cooking fuel, and the most recent estimates show that solid fuel use contributed to nearly 2 million premature deaths in 2004, nearly half of them due to childhood pneumonia.[12]

People in the poorest countries – particularly South Asian and sub-Saharan African countries, which have the most deaths due to pneumonia – often use solid fuel (map 3.1). Within these countries it is likely that a larger share of people use solid fuels in the poorest households or in rural areas than in better-off households or urban areas.

Overcrowded homes are also associated with increased risk of childhood pneumonia[13] because disease-causing pathogens can spread to more people faster. Such is the case in slum environments, which typically have poor sanitation and

MAP 3.1 **Household air pollution from solid fuel use is concentrated in the poorest countries**



Note: This map is stylized and not to scale. It does not reflect a position by UNICEF on the legal status of any country or territory or the delimitation of any frontiers. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the Parties. The final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined. The final status of the Abyei area has not yet been determined. Data for Sudan refer to the country as it was constituted in 2010, before South Sudan seceded on 9 July 2011.
Source: WHO 2012b.

other home risk factors that aid transmission. Recent studies also suggest ambient particulate air pollution, often found in megacities, may increase the risk of acute lower respiratory infections.[14]

Nutrition

Maternal and child undernutrition is estimated to contribute to more than a third of child deaths.[15] While all undernourished children are at higher risk of death, severely underweight, wasted and stunted children are at greatest risk. The number of moderately or mildly undernourished children is much larger, and many deaths occur among these children, who may otherwise appear healthy.

Undernourished children are at far greater risk of death and severe illness due to pneumonia and diarrhoea than are well nourished children (table 3.1). Undernutrition weakens the overall immune system, which needs adequate protein, energy, vitamins and minerals to function properly. For pneumonia, undernutrition also weakens the respiratory muscles needed to clear secretions in the respiratory tract. For diarrhoea, undernutrition places children at higher risk of more severe, frequent and prolonged illness.

Undernutrition is also a consequence of repeated bouts of illness, diarrhoea in particular. This further worsens children's nutritional status at the same time that they have higher nutritional needs. Stunting is a serious complication of repeated diarrhoea episodes in young children. Diarrhoea control – particularly in the first months of life – has been shown to reduce stunting prevalence among children.[16]

Undernutrition and infection interact to create a potentially lethal cycle of worsening illness and deteriorating nutritional status. Critical nutrition interventions to break this cycle include promoting optimal breastfeeding practices (early initiation, exclusive breastfeeding for the first six months of life and continued breastfeeding through age 2 and older), encouraging micronutrient supplementation (such as zinc and vitamin A) and reducing the incidence of low-birthweight newborns (caused by preterm delivery and restricted foetal growth) through interventions to improve maternal health and nutrition.

Breastfeeding

Infants who are exclusively breastfed for the first six months of life and who receive continued breastfeeding through age 2 and older develop fewer infections and suffer less severe illness than

TABLE 3.1 Undernourished children are at higher risk of dying due to pneumonia or diarrhoea

Odds ratio of dying due to pneumonia and diarrhoea among undernourished children relative to well nourished children

	Level of undernutrition[a]			
	Severe	Moderate	Mild	None
Underweight[b]				
Diarrhoea	**9.5**	3.4	2.1	1.0
Pneumonia	6.4	1.3	1.2	1.0
Stunting[c]				
Diarrhoea	4.6	1.6	1.2	1.0
Pneumonia	3.2	1.3	1.0	1.0
Wasting[d]				
Diarrhoea	6.3	2.9	1.2	1.0
Pneumonia	8.7	4.2	1.6	1.0

A child who is severely underweight is 9.5 times more likely to die of diarrhoea than a child who is not underweight.

Note: Values are based on data for Bangladesh, Ghana, Guinea-Bissau, India, Nepal, Pakistan, the Philippines and Senegal.
a Severe refers to a level of undernutrition more than three standard deviations below the median WHO Child Growth Standard, moderate refers to a level of undernutirition two to three standard deviations below the median standard and mild refers to a level of undernutrition that is one to two standard deviations below the median standard.
b Measured as weight-for-age.
c Measured as height-for-age.
d Measured as weight-for-height.
Source: Black and others 2008.

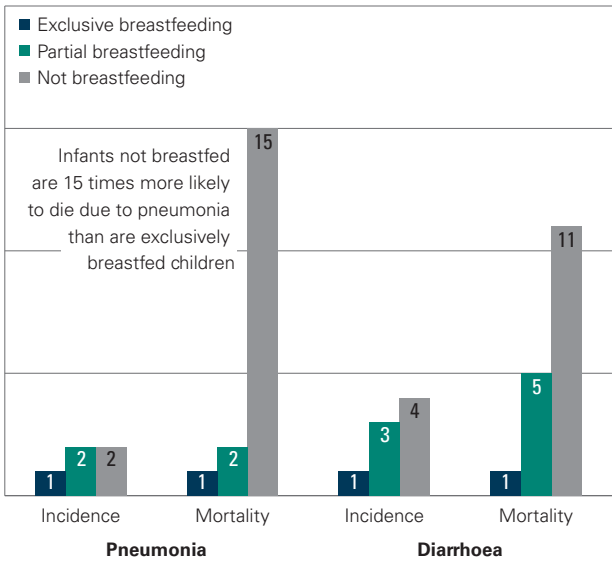
those not breastfed. This is particularly true for pneumonia and diarrhoea (box 3.2).

The risk of increased morbidity and mortality due to pneumonia and diarrhoea is higher for infants who are not exclusively breastfed (figure 3.13). This effect may be larger among children in poor settings, for example, where maternal literacy or access to improved sanitation is low.[17] However, nonbreastfed infants in industrialized countries also suffer more infectious illnesses than do breastfed infants.[18]

Only 37 per cent of infants less than six months of age are exclusively breastfed in developing countries (figure 3.14). Across countries patterns of exclusive breastfeeding, unlike those of many other interventions, may not vary consistently by household wealth or urban-rural residence. Fewer than half of newborns in developing countries receive the benefits of initiating breastfeeding within the first hour of birth. Growing evidence points to the impact of early initiation of breastfeeding on neonatal mortality.[19] To ensure appropriate breastfeeding practices among young children, it is necessary to start early.

FIGURE 3.13 Young infants who are not breastfed are at a greater risk of dying due to pneumonia or diarrhoea

Relative risk of pneumonia and diarrhoea incidence and mortality for partial breastfeeding and not breastfeeding compared with that for exclusive breastfeeding among infants ages 0–5 months



Source: Black and others 2008.

Low birthweight

In low-income countries low birthweight due to preterm delivery or restricted foetal growth results largely from poor maternal health and nutrition. Low birthweight places newborns at higher risk of dying during the early months and years of life, particularly due to infections such as diarrhoea and pneumonia.[20] More than three-quarters of the 19 million low-birthweight newborns in developing countries are born in the poorest regions, South Asia (55 per cent) and sub-Saharan Africa (22 per cent). India alone is home to 40 per cent of low-birthweight newborns (figure 3.15).

Micronutrient supplementation

Micronutrients, including zinc and vitamin A, are critical for normal growth and development

BOX 3.2 The importance of improved breastfeeding practices for child survival

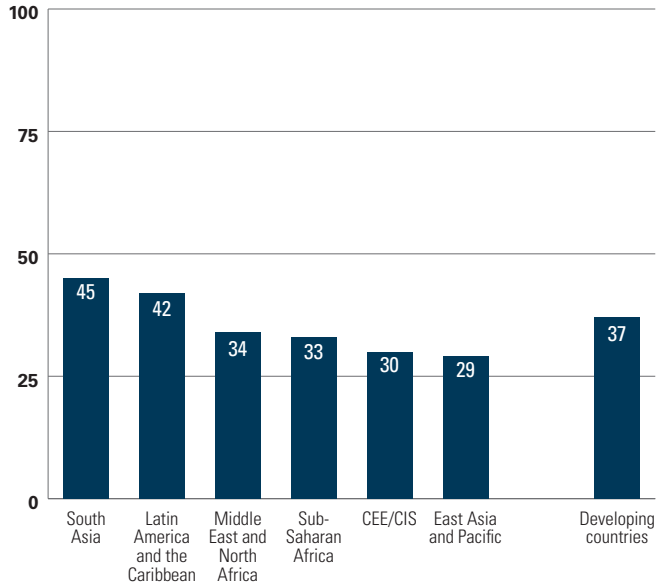
Given the compelling evidence of the impact of exclusive breastfeeding on pneumonia and diarrhoea in the first six months of life, greater commitment to large-scale implementation of a comprehensive package of evidence-based interventions to protect, promote and support improved breastfeeding practices is urgently needed. The package includes professional support by skilled health providers and counselors, improvement of maternity breastfeeding practices, lay and peer support, community-based counseling and promotion, communication through multiple channels, support for maternity care practices and enforcement of the Code of Marketing of Breastmilk Substitutes.

The growing number of countries that have recorded substantial increases in exclusive breastfeeding did so by implementing the full package of interventions at scale, tailored to the local context and the specific barriers to optimal breastfeeding. As the 2015 deadline for achieving the Millennium Development Goals nears, all countries must accelerate efforts to reach every infant with effective programmes to improve breastfeeding, in order to realize its full potential to reduce mortality due to pneumonia and diarrhoea and thereby overall child mortality.

Source: UNICEF 2012.

FIGURE 3.14 Too few infants in developing countries are exclusively breastfed

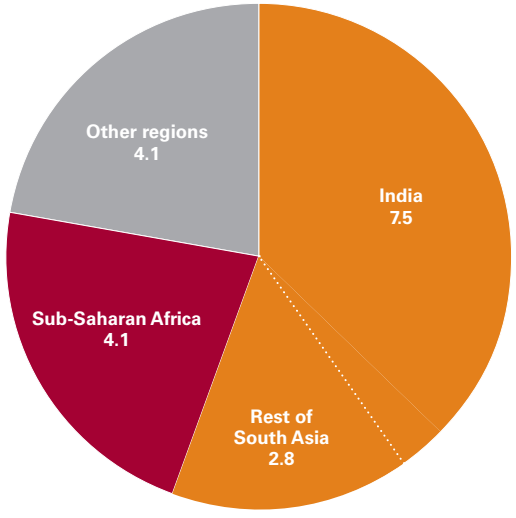
Share of infants under six moths of age who are exclusively breastfed, by region, 2006–2010 (per cent)



Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 3.15 The incidence of low-birthweight newborns is concentrated in the poorest regions

Number of newborns in developing countries weighing less than 2,500 grams at birth, by country and region, 2006–2010 (millions)



Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

in young children, but micronutrient malnutrition remains a challenge. Zinc deficiency places children at greater risk of illness and death due to pneumonia and diarrhoea, particularly children in low-income countries. Evidence shows that zinc is beneficial in managing acute or persistent diarrhoea in children ages 6–59 months, showing clinically important reductions in illness duration and severity.[21] Preventive zinc supplementation has been shown to reduce the incidence of diarrhoea, and research has also demonstrated that zinc supplementation reduces the incidence of acute lower respiratory infection among children under age 5. Several studies show that preventive zinc supplementation reduces by 18 per cent deaths among children ages 12–48 months.[22]

Similarly, some research indicates that vitamin A supplementation reduces all-cause and diarrhoea-related mortality among children ages 6–59 months.[23] Vitamin A given in therapy of measles has been shown to reduce children's risk of measles-associated pneumonia.[24] Recent data show sustained high coverage of the recommended two doses of vitamin A in the least developed countries since 2005 (figure 3.16).

Co-morbidities

The poorest and most-deprived children often suffer multiple illnesses or conditions at the same time, and such co-morbidities may substantially increase their risk of death and severe illness. Yet little is known about the magnitude of childhood co-morbidities in low-income countries.[25]

Recent studies indicate that symptoms of pneumonia and diarrhoea are highly correlated in children and are more often observed together in the same child than are other combinations of disease symptoms.[26] Pneumonia and diarrhoea share risk factors – notably poverty, undernutrition and poor home environments – and may be viewed as endpoints in this long cascade of factors. Evidence also suggests that diarrhoea itself may raise the risk of developing pneumonia.[27]

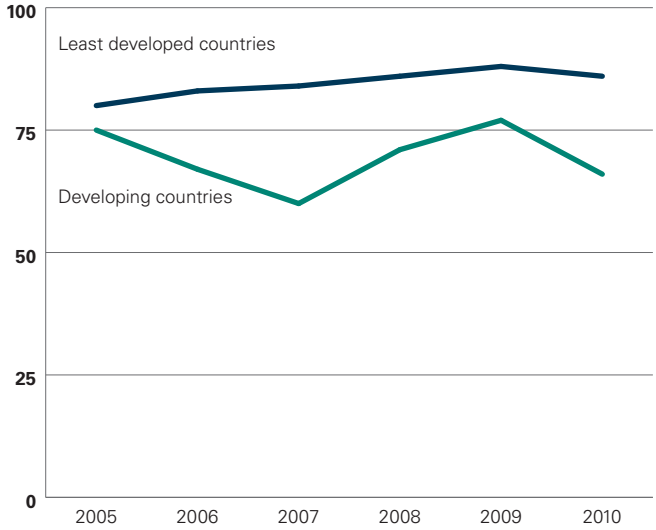
Other conditions or illnesses may also raise the risk of pneumonia or diarrhoea. Poor nutritional status, as discussed, is an important underlying risk factor that often interacts with infections to create a potentially lethal cycle of worsening illness and deteriorating nutritional status. Malaria infection, too, may interact with other illnesses to increase susceptibility

or severity of either disease, including pneumonia[28] and diarrhoea.[29] HIV places a child at high risk of pneumonia or diarrhoea and more severe and chronic forms of the diseases.[30] Similarly, pneumonia is commonly due to an opportunistic infection among HIV-positive children caused by common pneumonia pathogens such as *S. pneumoniae* and, in young infants, *P. jiroveci*.

WHO guidelines recommend that all children born to mothers living with HIV start cotrimoxazole prophylaxis between ages 4 and 6 weeks and continue until breastfeeding has terminated and HIV serostatus is known to be negative.[31] This intervention increases survival chances, but in 2010 only 23 per cent (19–24 per cent) of HIV-exposed infants in reporting low- and middle-income countries received it. Countries in East and Southern Africa have shown the most progress and account for most of the increase in coverage in 2010.

FIGURE 3.16 Least developed countries lead the way in coverage of vitamin A supplementation

Share of children ages 6–59 months who received two doses of vitamin A supplements during a calendar year (per cent)



Note: Analysis is based on estimates from 43 developing countries, including 26 least developed countries, with available data for all years during the trend period. The decrease in 2010 for developing countries was due mostly to a decrease in India (from 66 per cent in 2009 to 34 per cent in 2010).
Source: UNICEF global databases 2012.

4 Treatment coverage

In the poorest communities with the sickest children, caregivers often provide medicines at home or seek care outside the formal health sector. For pneumonia or diarrhoea symptoms, this could result in inappropriate treatment and delayed careseeking. Extending the reach of the health system through community case management strategies is an urgent priority (box 4.1).

Community case management

A recent UNICEF survey of sub-Saharan African countries showed that while most had a policy promoting community case management of pneumonia and diarrhoea, far fewer actually implemented such strategies at a scale to reach children most in need (figures 4.1 and 4.2).

The private sector also demands attention. In many high-mortality countries a large proportion of care for childhood illnesses, particularly diarrhoea, is sought from private retailers such as pharmacies and drug shops. In addition to the risk of unregulated distribution of drugs through the private market, more expensive and ineffective treatments such as antibiotics

BOX 4.1 The importance of integrated community case management strategies

The poorest and most-deprived children often have the highest risk of infections and severe disease but are least likely to seek appropriate care and to receive treatment. Extending the health system into these hard to reach and underserved communities is essential for reducing child deaths, particularly those due to pneumonia or diarrhoea.

Integrated community case management is a feasible and effective strategy for delivering life-saving treatment to children most in need. Depending on the health system structure, it can be delivered by trained community health workers, volunteers or more qualified community health professionals. It can also be provided through the private sector (for example, by nongovernmental organizations), which is not the same as the unregulated distribution of drugs through the private market. Evidence indicates that trained and supervised community health workers can provide high-quality care that substantially improves child health outcomes.[1] Home and community case management of diarrhoea has a long history of success.[2]

Community health workers should deliver integrated treatment services for common childhood illnesses, such as pneumonia, diarrhoea and malaria. Programmatic experience shows that an integrated strategy can manage treatment coverage and improve quality of care for sick children.[3] It is efficient, it is cost-effective[4] and it could potentially reduce mistreatment of illnesses due to symptom overlap and co-morbidities.[5]

Yet challenges and questions remain on how best to implement integrated community case management programmes. For example, more evidence is needed on quality of care when community health workers are given increasingly complex tasks or deliver multiple interventions. More information is also needed on how to recruit, retain, supervise and motivate community health workers to provide high-quality care. Rigorous monitoring, evaluation and documentation of existing integrated community case management programmes, along with an operations research 'learning agenda', are urgently needed.

Notes

1. USAID and others 2010.
2. WHO 1999.
3. Ghimire, Pradhan and Maskey 2010; Dawson and others 2008.
4. USAID and others 2010.
5. Källander, Nsungwa-Sabiiti and Peterson 2004.

Source: UNICEF 2011b.

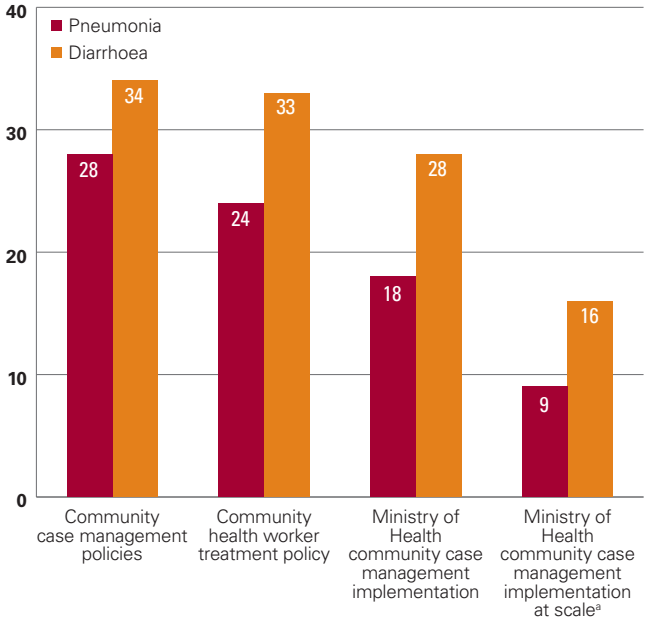
and antimotility agents for diarrhoea (rather than oral rehydration salts and zinc) are often provided.

Treatment for suspected pneumonia

Once children develop pneumonia, prompt and effective treatment saves lives. In low-income settings chest radiology, blood tests and sputum samples for culture are largely unavailable to confirm the pneumonia diagnosis, identify the disease-causing pathogen and determine illness severity. Without these tools, pneumonia is classified and treated based on symptoms and physical examinations according to WHO and UNICEF Integrated Management of Childhood Illness guidelines. Based on these guidelines, pneumonia is classified by a rapid respiratory rate counted by a health worker. Children with pneumonia classified this way should receive a full course of effective antibiotics because most severe cases have a bacterial cause.[1] WHO recommends amoxicillin provided twice daily for three days (in settings with low HIV prevalence) or five days (in settings with high HIV prevalence) as the most effective antibiotic treatment of childhood pneumonia. Pulse oximetry can improve the diagnostic specificity for pneumonia. Oxygen systems, injectable antibiotics and other supportive measures are also needed in health

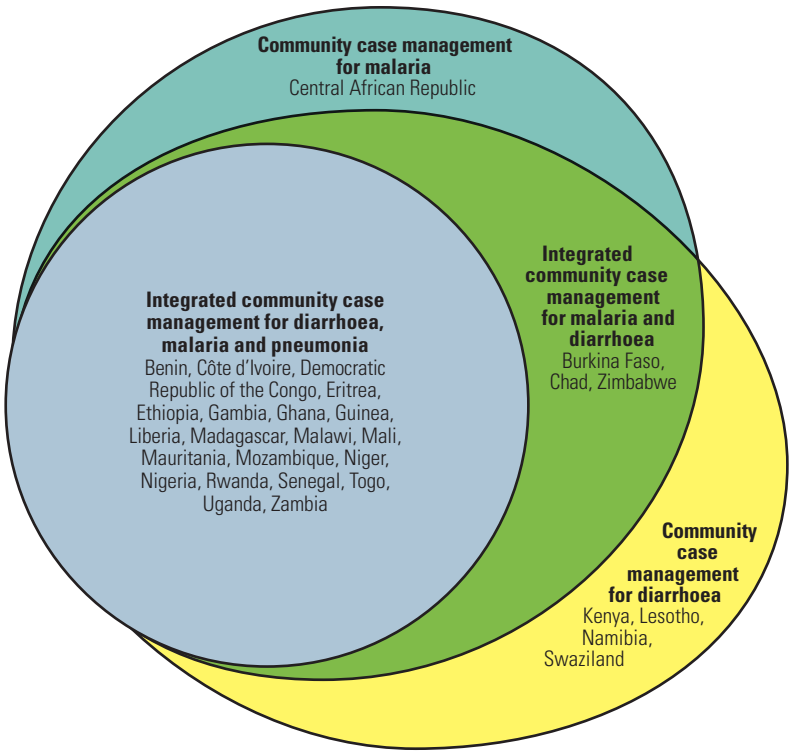
FIGURE 4.1 Most African countries have a community case management policy, but fewer implement programmes on a scale to reach the children most in need

Number of countries in sub-Saharan Africa with community case management policies, a community health worker treatment policy, Ministry of Health community case management implementation and Ministry of Health community case management implementation at scale for diarrhoea or pneumonia, 2010



a. Implementation at scale is defined as more than 49 per cent of the country.
Note: Data reflect responses from 40 of 44 (91 per cent) UNICEF country offices in sub-Saharan Africa (see annex 2).
Source: UNICEF 2011b.

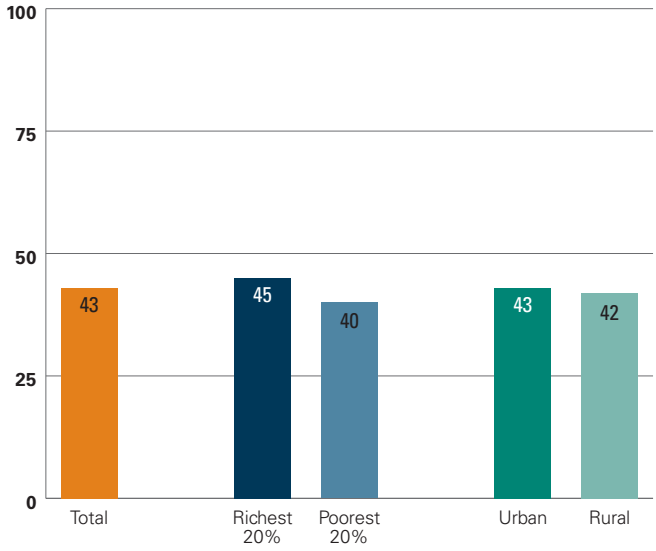
FIGURE 4.2 **Many African countries with a government community case management programme report integrated delivery for malaria, pneumonia and diarrhoea**



Note: Data cover 29 of 44 UNICEF country offices in sub-Saharan Africa that reported government community case management implementation in 2010 (see annex 2). Sub-Saharan African countries surveyed with no government community case management implementation were Angola, Botswana, Burundi, Cameroon, Comoros, Congo, Equatorial Guinea, Sierra Leone, Somalia, South Africa and United Republic of Tanzania. Benin, Mali and Mozambique updated policies in 2011 to have an integrated community case management approach for diarrhoea, malaria and pneumonia.
Source: UNICEF 2011b.

FIGURE 4.3 **Fewer than half of caregivers report fast or difficult breathing as signs to seek immediate care**

Share of caregivers who report that difficult or fast breathing is a sign to seek care immediately for the child, by background characteristic, 2005–2010 (per cent)



Note: Data are the unweighted average of 36 countries with available data.
Source: UNICEF analysis based on Multiple Indicator Cluster Surveys conducted in 36 countries.

facilities for children with severe acute respiratory syndromes.

Fast or difficult breathing: signs to seek immediate care

Caregivers play an important role in recognizing the symptoms of pneumonia and immediately seeking appropriate care for sick children.[2] Even though pneumonia continues to be the leading killer of children globally, only 43 per cent of caregivers across countries with data report fast or difficult breathing (key symptoms of pneumonia) as signs to seek immediate care for the child (figure 4.3). Available data indicate little difference between caregivers in rural and urban areas or in the poorest and richest households.

Seeking appropriate care for suspected childhood pneumonia

An early step in managing childhood pneumonia is for caregivers to seek appropriate care so that it can be classified and treated based on WHO and UNICEF Integrated Management of Childhood Illness guidelines.[3] As reported here, appropriate care generally includes public or private

hospitals, health centres or posts, private doctors and community health workers and exclude pharmacies, shops and traditional practitioners.

Across developing countries nearly two-thirds of caregivers report seeking appropriate care for a child with symptoms of acute respiratory infection (cough with fast or difficult breathing due to a chest-related problem), which is referred to as 'suspected pneumonia' in this report. Sub-Saharan Africa – the region with the most pneumonia deaths – has the lowest levels of appropriate careseeking for suspected childhood pneumonia (48 per cent; figure 4.4).

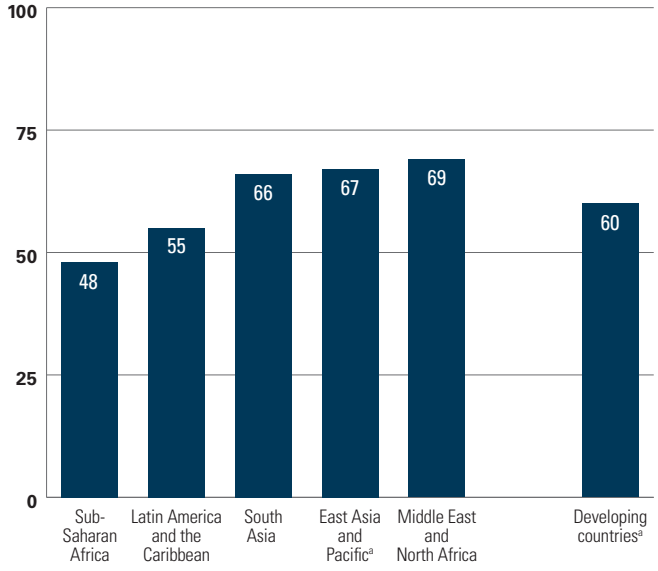
Boys and girls are about equally likely to receive appropriate care for suspected pneumonia. Across developing countries 62 per cent of boys and 59 per cent of girls are taken to appropriate care (figure 4.5), although South Asia and Middle East and North Africa show a slightly wider gender gap. Children with suspected pneumonia in rural areas or the poorest households are far less likely to be taken to appropriate care than are children in urban areas or better-off households (figures 4.6 and 4.7).

Data from a subset of countries with comparable data for around 2000 and 2010 indicate that progress in appropriate careseeking for suspected childhood pneumonia has been limited. In developing countries appropriate careseeking rose from 54 per cent at the start of the decade to 61 per cent by decade's end (figure 4.8). Sub-Saharan Africa showed the most progress, although it still has the lowest level of appropriate careseeking.

While progress in appropriate careseeking for suspected pneumonia was similar for boys and girls over the past decade, in every region progress was greater among rural children than among urban children (figure 4.9). Between 2000 and 2010 appropriate careseeking remained at 65 per cent in urban areas,

FIGURE 4.4 Most children with suspected pneumonia in developing countries are taken to an appropriate healthcare provider or facility

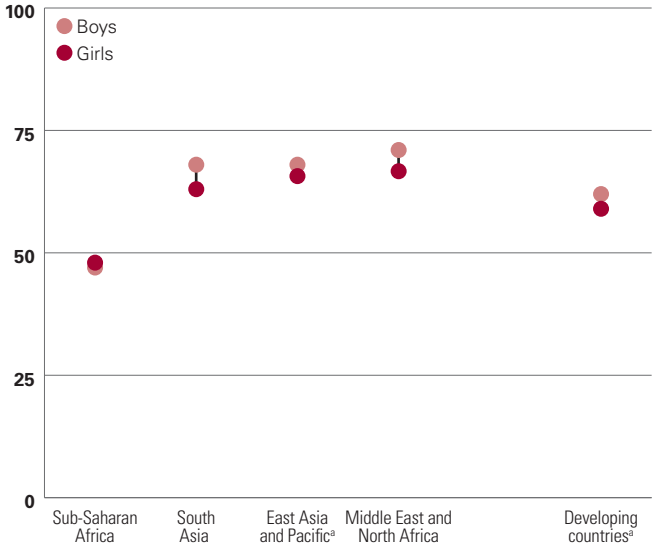
Share of children under age 5 with suspected pneumonia taken to an appropriate healthcare provider or facility, by region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 77 countries with available data for 2006–2011, covering 84 per cent of the under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.5 Boys and girls with suspected pneumonia are taken to an appropriate healthcare provider or facility at similar rates

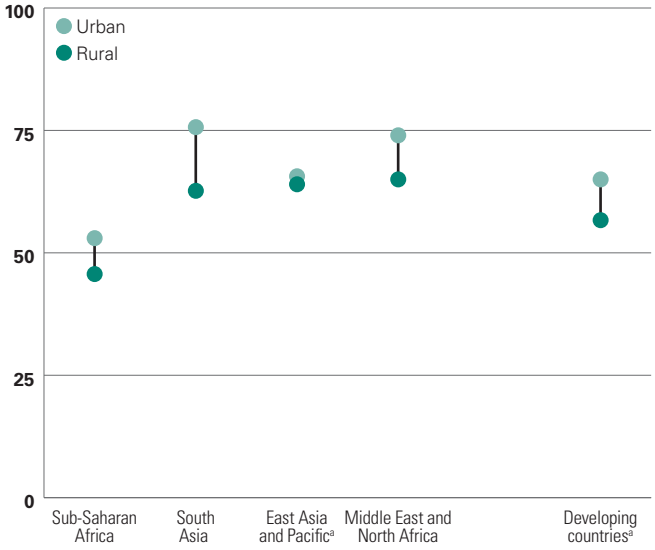
Share of children under age 5 with suspected pneumonia taken to an appropriate healthcare provider or facility, by gender and region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 70 countries with available data for 2006–2011, covering 80 per cent of the under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.6 Gaps in appropriate careseeking for suspected childhood pneumonia exist between rural and urban areas . . .

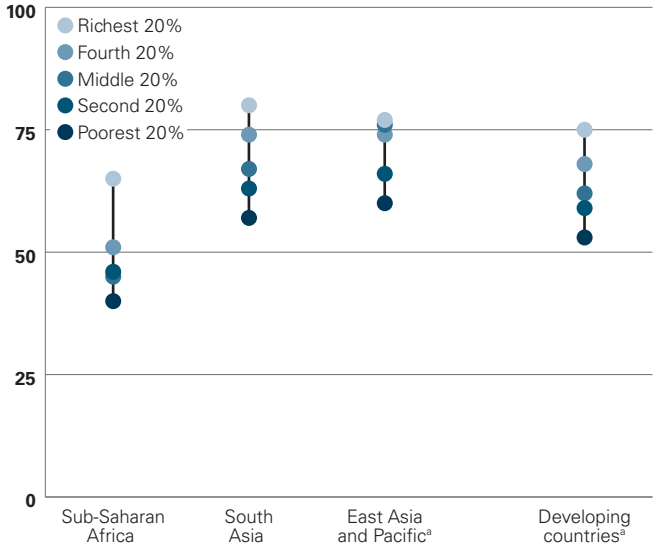
Share of children under age 5 with suspected pneumonia taken to an appropriate healthcare provider or facility, by residence and region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 63 countries with available data for 2006–2011, covering 72 per cent of the urban under-five population and 85 per cent of the rural under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.7 . . . and across household wealth quintiles

Share of children under age 5 with suspected pneumonia taken to an appropriate healthcare provider or facility, by household wealth quintile and region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 36 countries with available data for 2006–2011, covering 62 per cent of the under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, Middle East and North Africa and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

while rising from 50 per cent to 56 per cent in rural areas, nearly halving the rural-urban gap. The greatest gap reduction was in East Asia and Pacific (excluding China), due in part to declining urban coverage. South Asia saw little gap reduction between 2000 and 2010. These data suggest that increases in appropriate careseeking for suspected childhood pneumonia over the past decade were driven largely by gains among rural populations in every region. Despite this progress, a rural-urban gap remains, and all population groups within countries fall far short of universal careseeking. Limited data make similar trend analysis by household wealth quintile difficult.

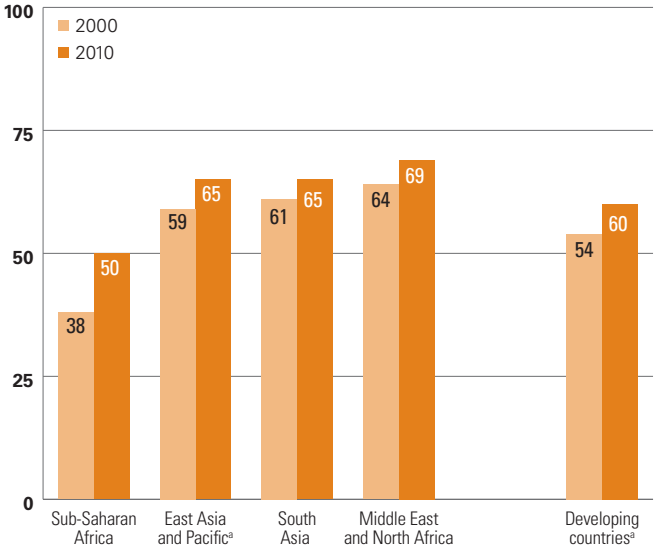
Antibiotic use for suspected childhood pneumonia

Despite the essential role of antibiotics in treating pneumonia, data on antibiotic use for suspected childhood pneumonia are limited. However, questions on antibiotic use among children with suspected pneumonia were added to national surveys (such as Multiple Indicator Cluster Surveys and Demographic and Health Surveys) around 2005, and a wealth of new data has become available over the past few years.

Less than a third of children with suspected pneumonia received antibiotics in developing countries, with South Asia averaging 18 per cent (figure 4.10). Importantly, not all children with suspected pneumonia should receive antibiotics, only those classified as having pneumonia (based on a rapid respiratory rate counted by a health worker), according to WHO and UNICEF Integrated Management of Childhood Illness guidelines (see annex 2). And not all children so classified have true pneumonia, but in settings without adequate diagnostic tools, the guidelines provide a common standard by which health workers can classify bacterial pneumonia illness in need of presumptive antibiotic treatment.

FIGURE 4.8 Every region has shown progress in appropriate careseeking for suspected childhood pneumonia over the past decade

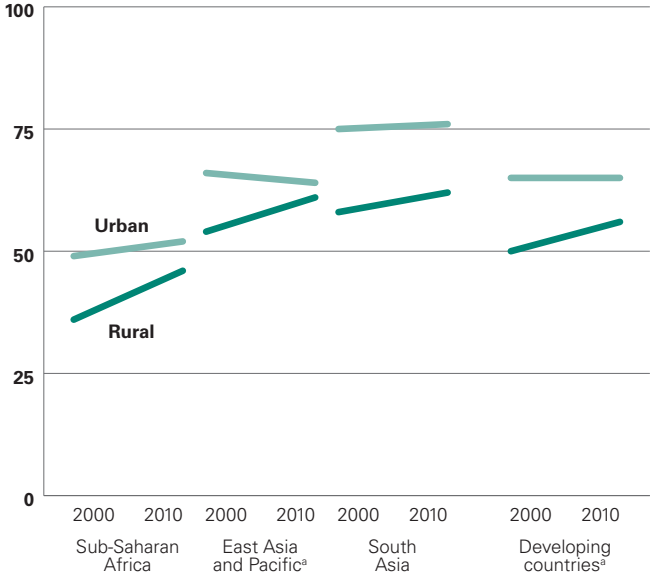
Share of children under age 5 with suspected pneumonia taken to an appropriate healthcare provider or facility, by region, around 2000 and around 2010 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 63 countries with available data, covering 71 per cent of the under-five population in developing countries in 2000 and 73 per cent in 2010 (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.9 Narrowing the rural-urban gap in careseeking for suspected childhood pneumonia over the past decade

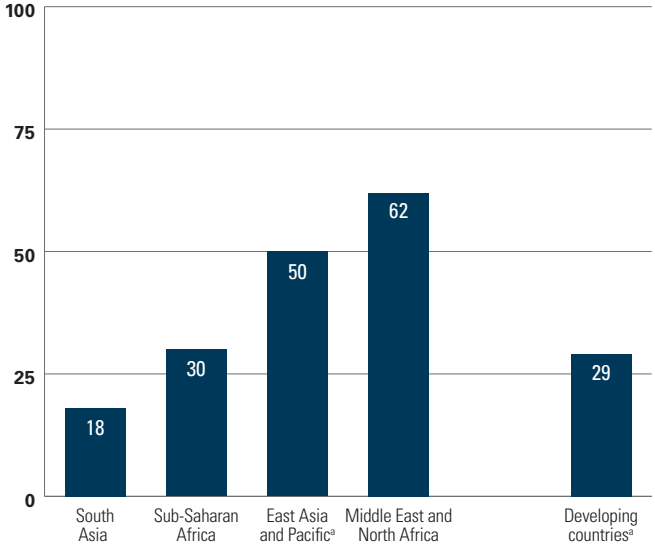
Share of children under age 5 with suspected pneumonia taken to an appropriate healthcare provider or facility, by residence and region, around 2000 and around 2010 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 46 countries with available data, covering 55 per cent of the urban under-five population and 76 per cent of the rural under-five population in developing countries in 2010 (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, Middle East and North Africa, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.10 **Across developing countries fewer than a third of children with suspected pneumonia receive antibiotics**

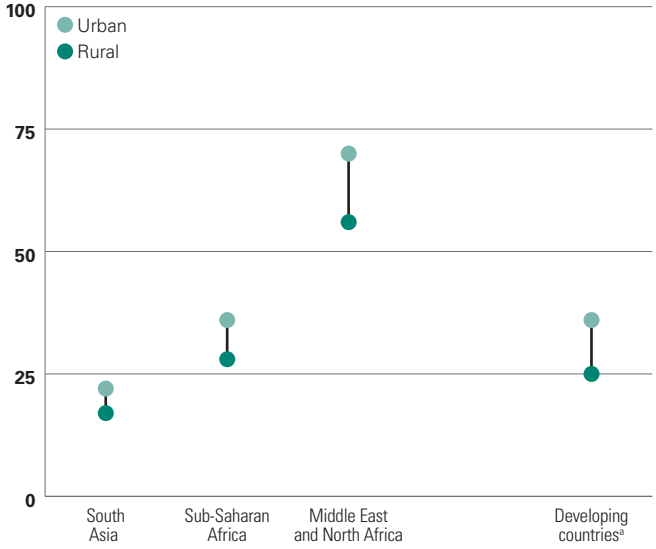
Share of children under age 5 with suspected pneumonia receiving antibiotics, by region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 63 countries with available data for 2006–2011, covering 71 per cent of the under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.11 **Children in rural areas are less likely to receive antibiotics for suspected pneumonia . . .**

Share of children under age 5 with suspected pneumonia receiving antibiotics, by residence and region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 53 countries with available data for 2006–2011, covering 54 per cent of the urban under-five population and 74 per cent of the rural under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, East Asia and the Pacific, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

Interpreting data on antibiotic use is difficult for the reasons outlined above and in annex 2. When measuring this indicator, it is possible that data underestimate the true level of treatment because it is likely that children who do not have pneumonia are included in the denominator. At the same time, it is possible that some of those children with symptoms may receive antibiotics despite not needing them. Identifying the actual antibiotic provided for suspected pneumonia to determine if treatment conforms with the standard treatment guideline in the country is problematic.

While boys and girls with suspected pneumonia are almost equally likely to receive antibiotics, gaps exist between children in rural and urban areas. Across developing regions children with suspected pneumonia in urban areas are 1.4 times more likely to receive antibiotics than are children in rural areas (figure 4.11).

Information on disparities by household wealth is limited, but nearly all low-income countries with available data show a wide gap in antibiotic use for suspected childhood pneumonia between the poorest and richest wealth quintiles (figure 4.12).

Diarrhoea treatment

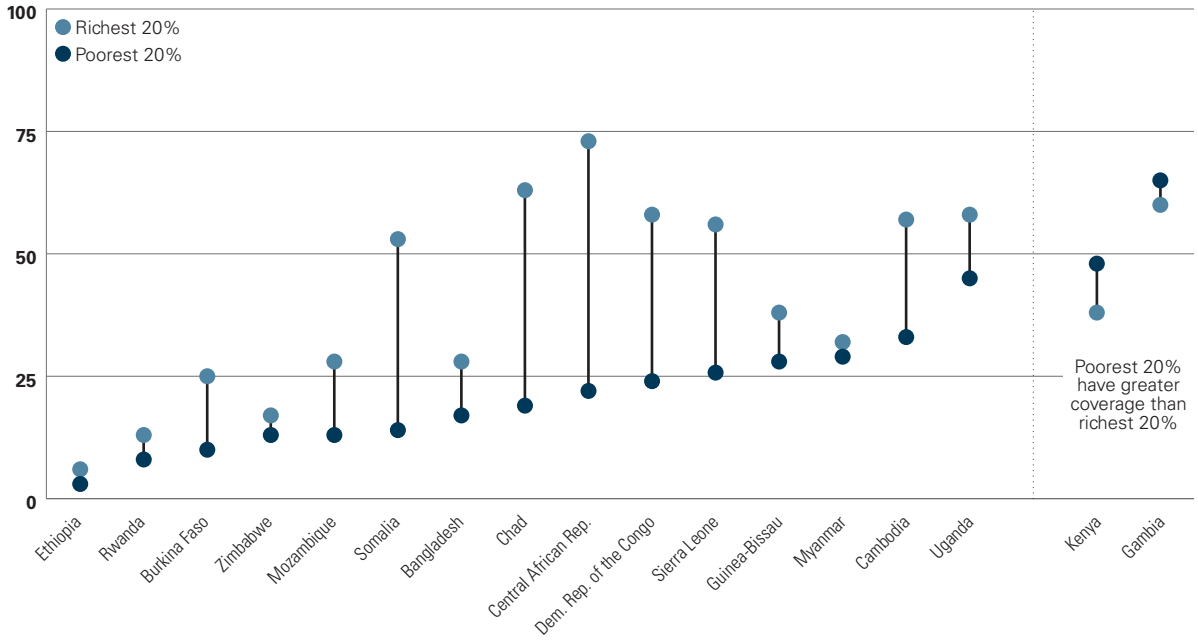
In 2004 UNICEF and WHO published a joint statement with the latest diarrhoea treatment recommendations for low-income countries, promoting oral rehydration therapy with solutions made of low-osmolarity oral rehydration salts (ORS), continued feeding and zinc treatment for children with acute diarrhoea (box 4.2).[4] This section assesses coverage of the treatment recommended to prevent dehydration (oral rehydration therapy with continued feeding) as well as its components: solutions made of ORS, recommended homemade fluids, increased fluids, continued feeding and zinc treatment.

Recommended treatment package: oral rehydration therapy with continued feeding

Across developing countries 39 per cent of children with diarrhoea receive the recommended

FIGURE 4.12 **. . . as are the poorest children**

Share of children under age 5 with suspected pneumonia receiving antibiotics, by household wealth quintile, low-income countries, 2006–2011 (per cent)



Note: Subnational estimates are often bracketed by large confidence intervals, so results should be interpreted with caution. Low-income group is based on the World Bank July 2011 classification (see http://data.worldbank.org/about/country-classifications/country-and-lending-groups#Low_income).
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

BOX 4.2 Diarrhoea treatment recommendations

Since the 1970s oral rehydration therapy has been the cornerstone of treatment programmes to prevent life-threatening dehydration associated with diarrhoea. Fluid replacement should begin at home and be administered by the caregiver at the onset of diarrhoea. Solutions made of oral rehydration salts (ORS) is the 'gold standard' of oral rehydration therapy, and a new formulation developed in the early 2000s (low-osmolarity ORS) has improved overall outcomes. ORS is available in smaller packet sizes (200 grams) and assorted flavours to facilitate use among children. UNICEF and WHO recommend that all children receive solutions made of low-osmolarity ORS to prevent and treat dehydration due to diarrhoea.

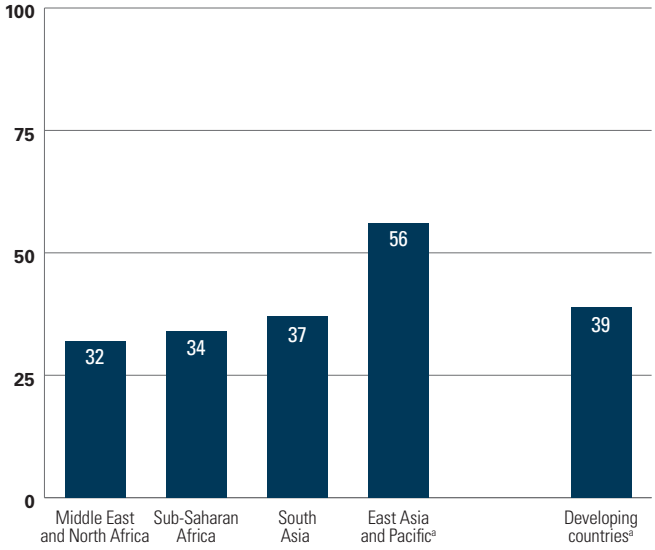
When ORS is not available, other fluids could help prevent dehydration, although they are not as effective in treating children who are already dehydrated. Such fluids (which many countries have designated as 'recommended homemade fluids') can be prepared at home using readily available and low-cost ingredients, such as sugar-salt solutions and cereal-based drinks. Breastmilk is also an excellent rehydration fluid and should be given to children still breastfeeding along with ORS.

In addition to fluid replacement, children with diarrhoea should continue to be fed during the episode. Food intake supports fluid absorption from the gut into the bloodstream to prevent dehydration and helps maintain nutritional status and ability to fight infection. Children should also simultaneously receive zinc treatment, a recently added and important component of the treatment recommendations. Zinc reduces the duration and severity of diarrhoea episodes, stool volume and the need for advanced medical care. Strategies for scaling up zinc treatment have also been associated with greater uptake of ORS and reduced demand from caregivers for other less effective drugs, such as antibiotics and antidiarrhoeal medications, which should not be routinely administered.

Source: UNICEF and WHO 2009.

FIGURE 4.13 The lowest recommended treatment coverage for childhood diarrhoea is in Middle East and North Africa and sub-Saharan Africa

Share of children under age 5 with diarrhoea receiving oral rehydration therapy (ORS or recommended home fluid or increased fluids) and continued feeding, by region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 75 countries with available data for 2006–2011, covering 70 per cent of the under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

treatment package (oral rehydration therapy, which includes solutions made of ORS or recommended homemade fluids or increased fluids along with continued feeding; zinc treatment is not included because data are largely unavailable). Sub-Saharan Africa (34 per cent) and South Asia (37 per cent) – the regions with the most diarrhoea deaths – have very low coverage with this treatment package (figure 4.13).

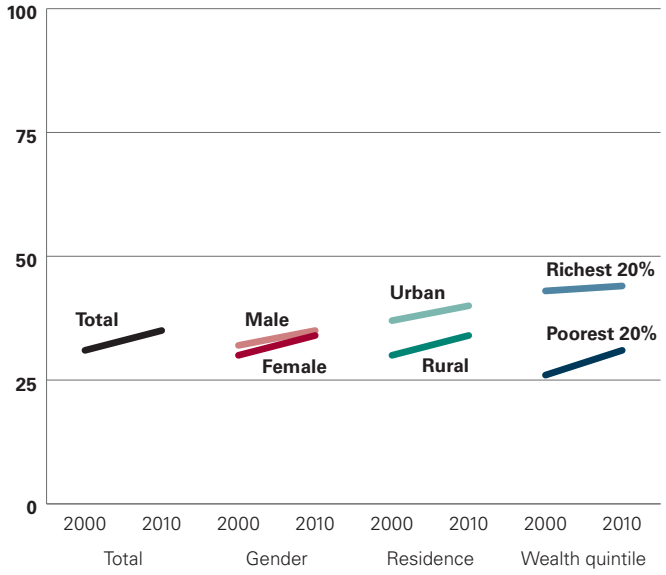
Data for analysing trends in coverage with the recommended treatment package are limited due to changes in data collection methods over time. However, coverage in sub-Saharan Africa since 2000 shows modest progress for the region as a whole as well as for the gap across population groups within the region (figure 4.14).

Solutions made of oral rehydration salts, including low-osmolarity ORS

One of the first steps to increase coverage of ORS is to increase availability through manufacturing and procurement. Although information from private manufacturers is not readily available, UNICEF remains one of the largest international procurers of ORS, obtaining close to 600 million packets since 2000, including the low-osmolarity formula starting in 2004 (figure 4.15).

FIGURE 4.14 Modest improvement in recommended treatment for diarrhoea in sub-Saharan Africa over the past decade

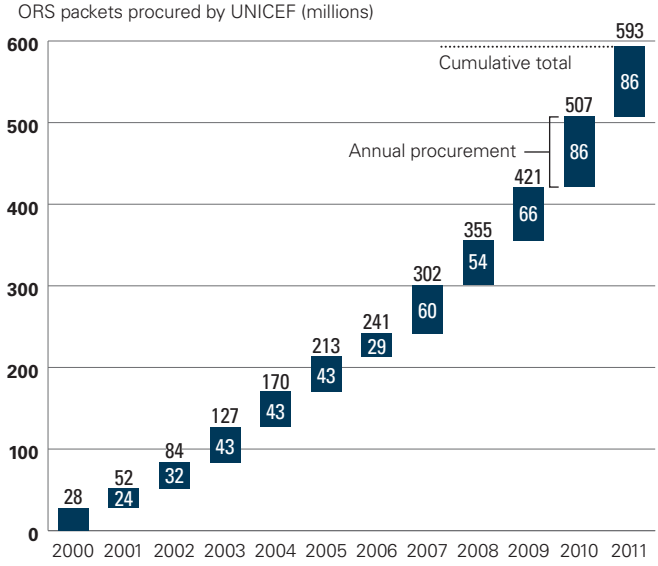
Share of children under age 5 with diarrhoea receiving oral rehydration therapy (oral rehydration salts or recommended home fluid or increased fluids) and continued feeding, by household wealth quintile and background characteristic, sub-Saharan Africa, around 2000 and around 2010 (per cent)



Note: Estimates are based on a subset of 31 countries with available data, covering 86 per cent of the under-five population in sub-Saharan Africa in 2010.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.15 UNICEF has procured some 600 million ORS packets since 2000

ORS packets procured by UNICEF (millions)



Note: Annual estimates may not sum to cumulative totals because of rounding. In 2003 UNICEF and WHO began procuring low-osmolarity oral rehydration salts. Data exclude local procurement by Bangladesh and India (up to 10 million packets per year).
Source: UNICEF Supply Division 2012.

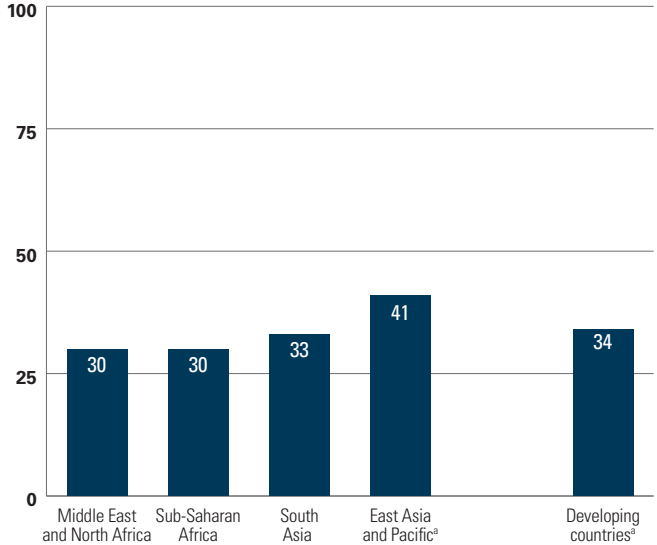
Manufacturers remain slow to shift their productions to the new formula; the pace of progress needs to quickly increase.

Recognizing the need to further boost use of ORS, flavoured versions have been included in the list of priority medicines for mothers and children developed by WHO, UNICEF and the United Nations Population Fund in 2011. UNICEF established the first long-term agreement for flavoured ORS with an African company in December 2011 and is working with manufacturers to increase the number of sources in the range of packet sizes recommended in the essential medicines list for children.

Only around a third of children with diarrhoea in developing countries receive ORS. Every region has coverage of about 40 per cent or less. Sub-Saharan Africa and Middle East and North Africa have the lowest, 30 per cent (figure 4.16). In every region boys and girls are equally likely to receive ORS to treat diarrhoea, while children in rural areas are less likely to receive them than are their urban peers (figure 4.17).

FIGURE 4.16 Only a third of children with diarrhoea in developing countries receive ORS

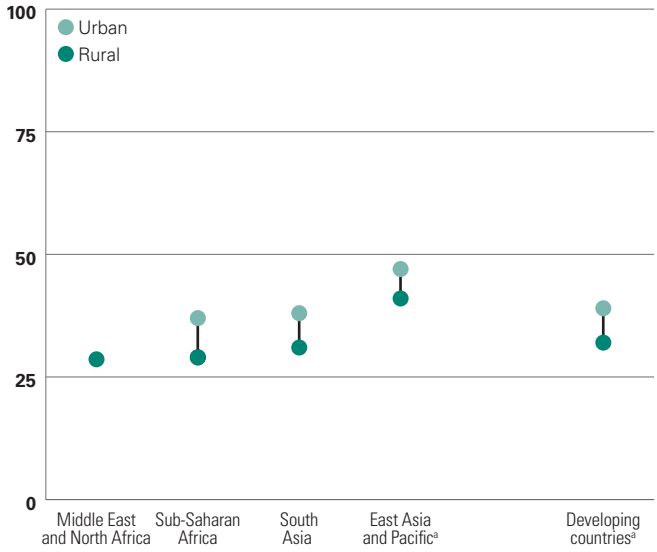
Share of children under age 5 with diarrhoea receiving ORS (ORS packet or prepackaged ORS fluids), by region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 80 countries with available data for 2006–2011, covering 70 per cent of the under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.17 Low use of solutions made of ORS in both urban and rural areas of every region

Share of children under age 5 with diarrhoea receiving ORS (ORS packet or prepackaged ORS fluids), by residence and region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 62 countries with available data , covering 56 per cent of the urban under-five population and 75 per cent of the rural under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

In the poorest countries the poorest children – those often at greatest risk of diarrhoea – are much less likely to receive ORS to treat diarrhoea than are the richest children (figure 4.18).

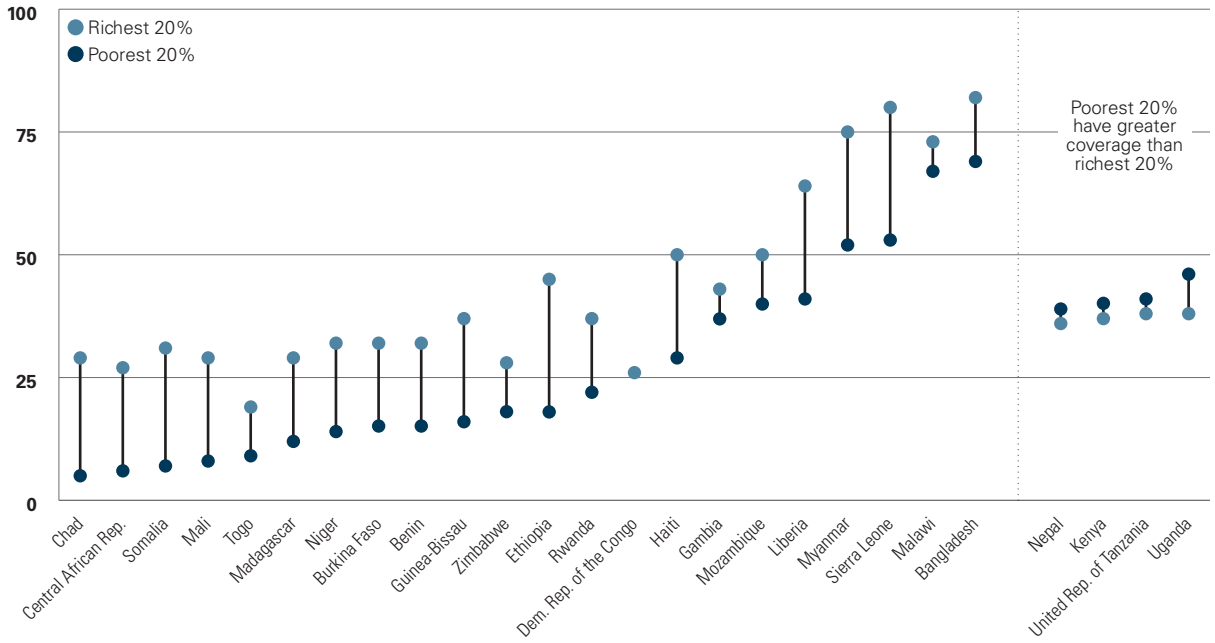
Data from a subset of countries with comparable data for around 2000 and 2010 show little progress in use of ORS to treat childhood diarrhoea (figure 4.19). Only sub-Saharan Africa showed any improvement – from 24 per cent to 30 per cent – although coverage is still too low. Despite this progress, the rural-urban gap in use of ORS did not narrow in sub-Saharan Africa or any other region during this time (figure 4.20).

Recommended homemade fluids, increased fluids and continued feeding

Household survey data on the use of recommended homemade fluids for childhood diarrhoea are limited and not assessed in this section (see annex 2). However, across developing countries less than a quarter of children with diarrhoea drink more fluids of any type, and all regions had levels of 32 per cent or less. Most children continue to be fed during the illness, receiving more, the same or somewhat less food than usual, but nearly a third in developing countries receive much less food or none at all during

FIGURE 4.18 **The poorest children often do not receive solutions made of ORS to treat diarrhoea**

Share of children under age 5 with diarrhoea receiving ORS (ORS packet or prepackaged ORS fluids), low-income countries, by household wealth quintile, 2006–2011 (per cent)



Note: Subnational estimates are often bracketed by large confidence intervals, so results should be interpreted with caution. The low-income group is based on the World Bank July 2011 classification (see http://data.worldbank.org/about/country-classifications/country-and-lending-groups#Low_income).
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

illness, despite the importance of continued food intake to support fluid absorption, maintain nutritional status and boost ability to fight infection (figure 4.21).

Zinc treatment

The 2004 WHO and UNICEF joint statement recommended zinc treatment for 10–14 days, in addition to low-osmolarity ORS, as an adjunct therapy that reduces the duration and severity of a diarrhoea episode and the likelihood of subsequent infections in the two to three months following treatment.[5] This recommendation came after scientific consensus and recognition that zinc and low-osmolarity ORS were critical for reducing mortality due to diarrhoea.

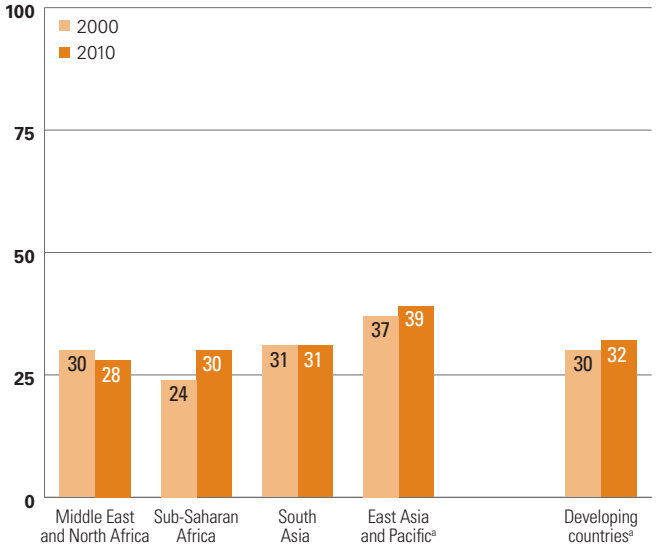
Despite the evidence of benefit, widespread introduction of zinc for diarrhoea treatment has been limited. Many countries have changed diarrhoea management policies to include zinc and low-osmolarity ORS, but there is a gap between policy change and effective programme implementation, leaving few children appropriately treated.[6]

Limited information is available on the prevalence of zinc treatment for childhood diarrhoea. Questions on zinc use were only recently added to household surveys, and to date, data are available for just 24 countries worldwide. The limited data indicate low use of zinc to treat childhood diarrhoea (table 4.1).

UNICEF and its partners are working closely with manufacturers to increase zinc availability. UNICEF is the largest buyer of zinc tablets, accounting for over 80 per cent of international procurement. UNICEF's zinc procurement began in 2006 and has increased substantially since (figure 4.22). Despite this progress, global zinc supply is dismally low compared with global need.

FIGURE 4.19 **Use of solutions made of ORS to treat childhood diarrhoea has changed little since 2000**

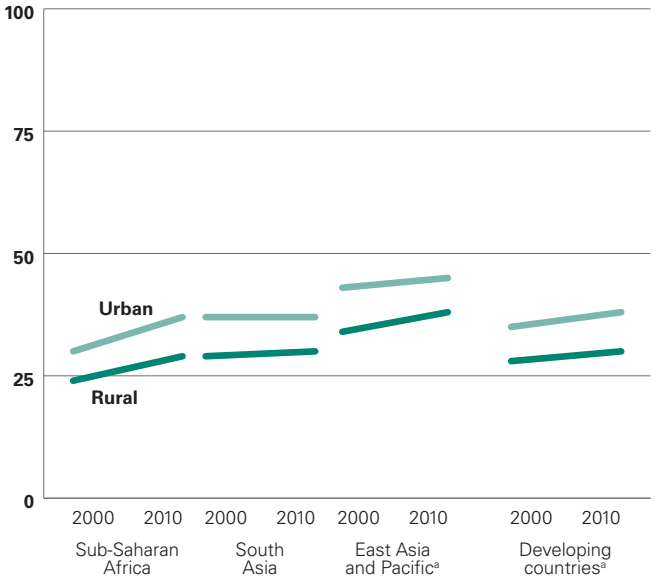
Share of children under age 5 with diarrhoea receiving ORS (ORS packet or prepackaged ORS fluids), by region, around 2000 and around 2010 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 65 countries with available data, covering 74 per cent of the under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.20 **No reduction in the rural-urban gap in use of solutions made of ORS to treat childhood diarrhoea**

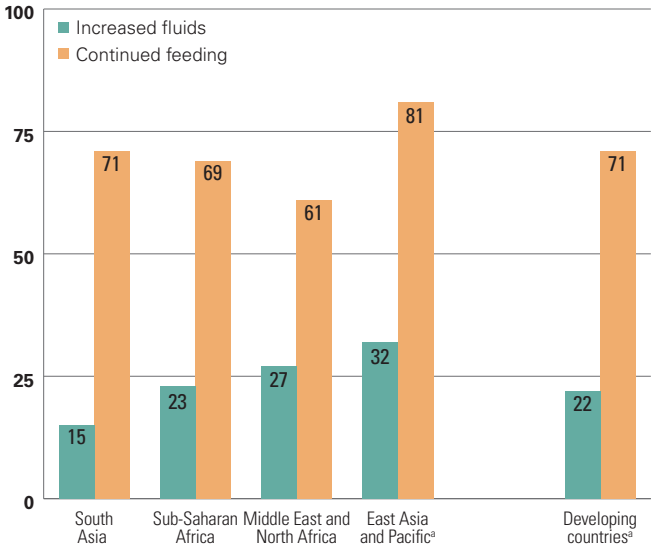
Share of children under age 5 with diarrhoea receiving ORS (ORS packet or prepackaged ORS fluids), by residence and region, around 2000 and around 2010 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 55 countries with available data, covering 60 per cent of the urban under-five population and 79 per cent of the rural under-five population in developing countries in 2010 (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.21 Most children with diarrhoea continue to be fed but do not receive increased fluids

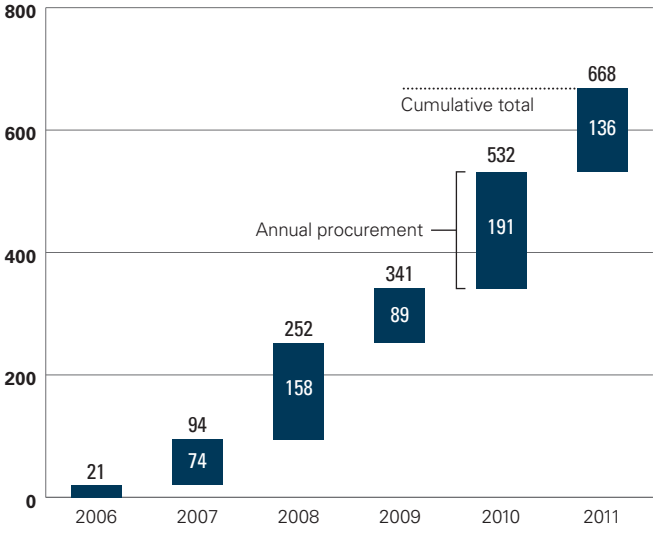
Share of children under age 5 with diarrhoea receiving increased fluids and continued feeding, by region, 2006–2011 (per cent)



a. Excludes China.
Note: Estimates are based on a subset of 67 countries with available data for 2006–2011, covering 79 per cent of the under-five population in developing countries (excluding China, for which comparable data are not available) and at least 50 per cent of the under-five population in each region. Data coverage was insufficient to calculate the regional average for CEE/CIS, Latin America and the Caribbean, and industrialized countries.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

FIGURE 4.22 UNICEF has procured nearly 700 million zinc tablets since 2006

Zinc tablets procured by UNICEF (millions)



Source: UNICEF Supply Division 2012.

TABLE 4.1 Limited data suggest low use of zinc to treat childhood diarrhoea

Share of children under age 5 with diarrhoea receiving zinc treatment, countries with data, 2006–2011 (per cent)

Country	Per cent	Source
Albania	5	DHS 2008–2009
Bangladesh	23	DHS 2007
Bhutan	1	MICS 2010
Cambodia	2	DHS 2010
Chad	<1	MICS 2010
Democratic People's Republic of Korea	19	MICS 2009
Democratic Republic of the Congo	2	MICS 2010
El Salvador	12	Other 2008
Ghana	2	DHS 2008
Guyana	1	DHS 2009
India	<1	DHS 2005–2006
Kenya	<1	DHS 2008–2009
Liberia	<1	DHS 2007
Madagascar	1	DHS 2008–2009
Malawi	<1	DHS 2010
Nepal	6	DHS 2011
Nigeria	1	DHS 2008
Philippines	2	DHS 2008
Rwanda	<1	DHS 2007–2008
Sierra Leone	2	DHS 2008
Timor-Leste	6	DHS 2009–2010
Uganda	1	DHS 2006
United Republic of Tanzania	5	DHS 2010
Zimbabwe	<1	DHS 2010–2011

DHS is Demographic and Health Survey; MICS is Multiple Indicator Cluster Survey.
Source: UNICEF global databases 2012, based on Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys.

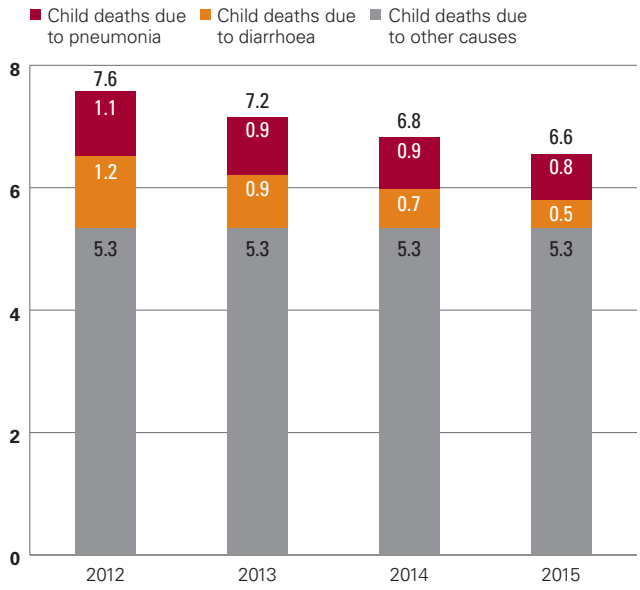
5 Estimated children's lives saved by scaling up key interventions in an equitable way

This report shows what has long been known: coverage of key pneumonia and diarrhoea interventions is often much lower in the poorest countries and among the most-deprived children in these countries. In addition, these groups often bear a larger share of their society's child deaths, which are more often due to common infections, notably pneumonia and diarrhoea. This results in greater scope for child survival impact if coverage can be scaled up among these vulnerable groups.

But what has not been done is to try and quantify this well established understanding. What could be the impact on children's lives of a more equitable distribution of interventions? The Lives Saved Tool is used here to simulate the effect of equity-focused approaches in pneumonia and diarrhoea control (see annex 2 for a description of the model and interventions included in the analysis).

FIGURE 5.1 Potential declines in child deaths by scaling up national coverage to the levels in the richest households

Predicted trends in the number of deaths among children under age 5 if national coverage of key pneumonia and diarrhoea interventions were raised to the levels among the richest 20 per cent across 75 countries, 2012–2015 (millions)



Source: Lives Saved Tool modelling by Johns Hopkins University Bloomberg School of Public Health (see annex 2).

The model predicts the potential number of deaths averted in children under age 5 by linking changes in coverage of maternal, newborn and child health interventions with empirical evidence of the effect of these interventions on child mortality. The model's predictions also take into account current demographic projections and country-specific cause of death profiles for children under age 5.

The first scenario addressed is how many children's lives could be saved if current national coverage of key pneumonia and diarrhoea interventions were raised to the levels in the richest households within the same country – an equity-focused goal within reach of many countries and, for many interventions, less ambitious than commonly established targets such as universal coverage. The second scenario addressed is whether programmes could save more children's lives by targeting key pneumonia and diarrhoea interventions to the poorest households compared with the richest ones (box 5.1).

The first scenario was simulated for the 75 countries with the highest burdens of maternal and child mortality identified by the Countdown to 2015 initiative[1] using available cause of death estimates.[2] The model suggests that childhood deaths due to pneumonia in these countries could decline nearly 30 per cent and that childhood deaths due to diarrhoea could decline 60 per cent (figure 5.1). These estimates suggest that more than 2 million pneumonia and diarrhoea deaths combined could be averted over 2012–2015 in these 75 countries by scaling up coverage of key pneumonia and diarrhoea interventions to the levels found in the richest households.

Focusing on these two diseases alone could reduce all-cause child mortality by roughly 13 per cent

BOX 5.1 Focus on the poorest children – the example of Bangladesh

A recent UNICEF report indicated that focusing on the poorest and most-deprived children within societies saves more lives and speeds progress towards international targets to reduce child mortality.[1] The Lives Saved Tool is used here to model this approach for pneumonia and diarrhoea control in Bangladesh.

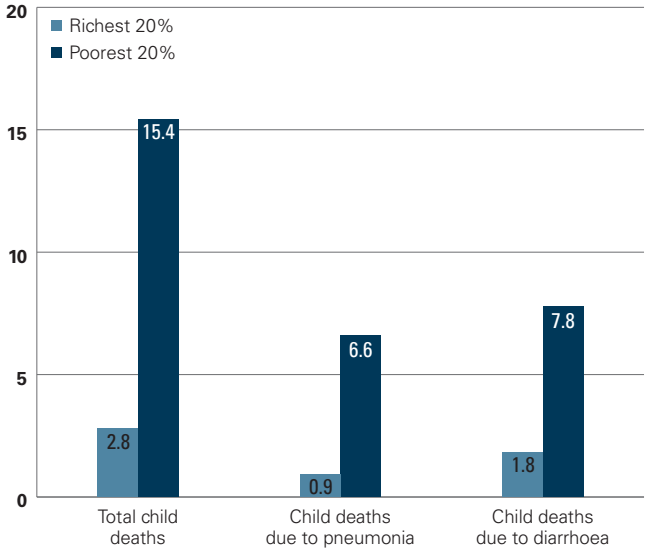
The lack of robust subnational mortality data in many low-income countries limits the model's ability to simulate this scenario more widely. But Bangladesh recently conducted a national verbal autopsy study to obtain cause of death estimates for subnational population groups. Verbal autopsy data have well known limitations,[2] and the wide confidence intervals around these estimates limit the strength of conclusions that may be drawn.

The model suggests that nearly six times as many children's lives could be saved in the poorest households (roughly 15,400) compared with the richest ones (roughly 2,800) by scaling up key pneumonia and diarrhoea interventions to near universal levels (see figure and annex 2). For pneumonia seven times as many childhood deaths could be averted in the poorest households (roughly 6,600) compared with the richest households (roughly 900); for diarrhoea four times as many childhood diarrhoea deaths could be averted in the poorest households (roughly 7,800) compared with the richest households (roughly 1,800).

This exercise attaches crude estimates to a well established understanding: targeting the poorest households with interventions to reduce the leading causes of child deaths results in more lives saved.

In Bangladesh more children's lives are saved by targeting the poorest households with key pneumonia and diarrhoea interventions

Predicted numbers of deaths averted among children under age 5 if near universal coverage (90 per cent) of key pneumonia and diarrhoea interventions were achieved among the poorest and richest 20 per cent in Bangladesh (thousands)



Note: Averted child deaths due to pneumonia and diarrhoea do not sum to total averted child deaths because pneumonia and diarrhoea interventions have an effect on other causes of child mortality.
Source: Lives Saved Tool modelling by Johns Hopkins University Bloomberg School of Public Health (see annex 2).

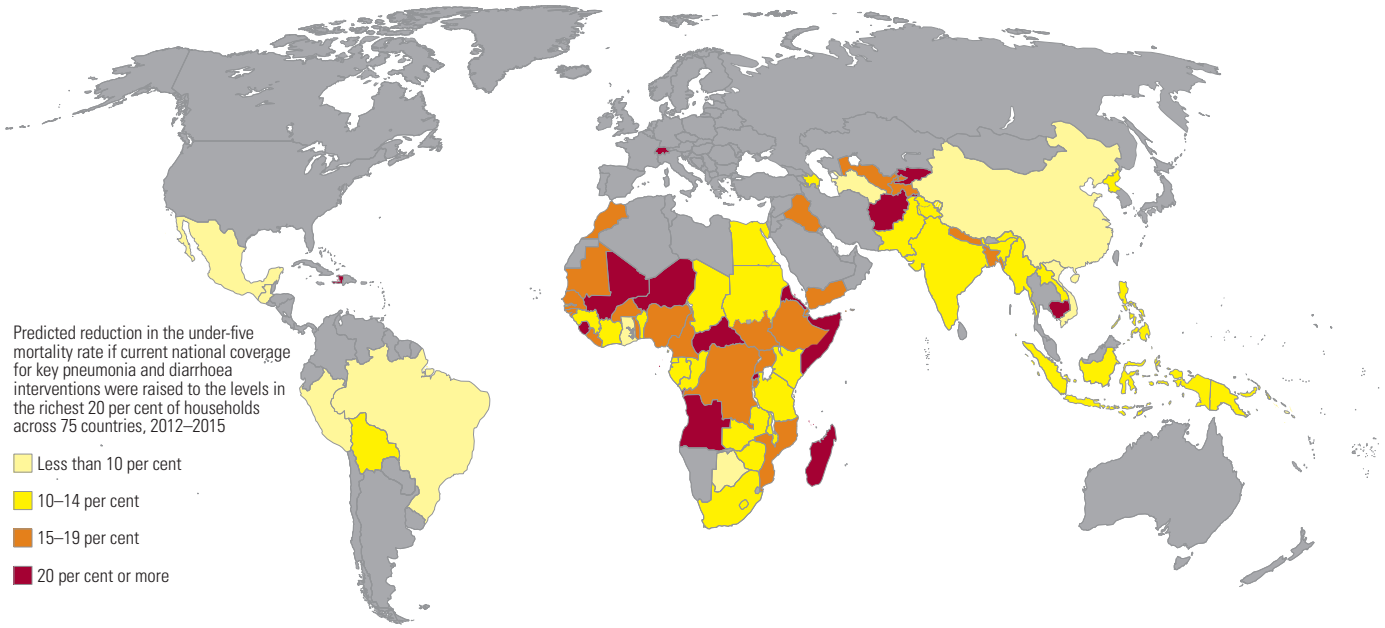
Notes

1. UNICEF 2010.
2. UNICEF 2011c.

across these 75 countries. The share of the child mortality burden due to these two diseases could shrink from nearly 30 per cent in 2012 to roughly 19 per cent in 2015. Across nearly all 75 high-burden countries, the under-five mortality rate could decline at least 10 per cent – and as much as 28 per cent in some cases (map 5.1).

These important benefits to child survival could be realized simply by raising national coverage of pneumonia and diarrhoea interventions to levels found in the richest groups. This is an achievable and equity-focused initial goal for many countries as they work towards more ambitious targets, such as universal coverage.

MAP 5.1 **Scaling up national coverage to levels in the richest households could substantially reduce under-five mortality rates in the highest burden countries**



Note: This map is stylized and not to scale. It does not reflect a position by UNICEF on the legal status of any country or territory or the delimitation of any frontiers. The dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the Parties. The final boundary between the Republic of the Sudan and the Republic of South Sudan has not yet been determined. The final status of the Abyei area has not yet been determined.
Source: Lives Saved Tool modelling by Johns Hopkins University Bloomberg School of Public Health (see annex 2).

6
Pneumonia and diarrhoea: a call to action to narrow the gap in child survival

With the Millennium Development Goals set to be achieved by 2015, how can the world accelerate progress in child survival to meet this deadline while ensuring the most vulnerable children are not neglected in the search for greater global impact?

This report makes a remarkable and compelling argument for greater commitment, attention and funding to these leading causes of child deaths that disproportionately affect the world's most vulnerable children. Focused action on pneumonia and diarrhoea has great potential to narrow the child survival gap both across and within countries – and to accelerate countries' progress towards eliminating preventable child deaths.

Indeed, the world has made substantial gains in child survival over the past two decades, although progress has been uneven and inequitable. The highest child mortality rates are in the world's poorest regions and countries, and within most countries the poorest and most vulnerable children are more likely to die before their fifth birthday.

Pneumonia and diarrhoea are among the leading causes of child deaths worldwide, and their deaths are also highly concentrated in the poorest regions and countries, and likely among the most vulnerable children within these societies. But global and national attention to these diseases has been sorely lacking. Other public health scourges, such as malaria and HIV, have rightly received increased funding and attention in recent years, and much work remains to reduce their burdens. We firmly support and are actively engaged in these efforts. We also recognize the need for pneumonia and diarrhoea to assume a more prominent position on the child survival agenda given their substantial contributions to child mortality.

This report is a call to action for pneumonia and diarrhoea to reduce the child survival gap between the poorest and better-off children and to accelerate progress towards international targets, including the Millennium Development Goals.

We know what needs to done. Action plans for pneumonia and diarrhoea have been set out by UNICEF, WHO and partners (see annex 1). They include well known, proven and high-impact interventions across different sectors – health, nutrition, water and sanitation – that can be immediately scaled up. Many interventions for pneumonia and diarrhoea control are identical and could be addressed in an integrated manner (see figure 2.1 in chapter 2).

Momentum is building for these leading causes of child deaths. A global partnership for diarrhoea is being formed, to be integrated with the Global Partnership for the Prevention and Control of Pneumonia founded in 2009 (box 6.1).

BOX 6.1 Global action plan for pneumonia and diarrhoea

Building on the Global Action Plan for the Prevention and Control of Pneumonia, a global partnership was formed in 2011 to develop an integrated plan of action for both pneumonia and diarrhoea. This body of work includes a state-of-the-art analysis of the global burden, risk factors, potential interventions, country-level experience and evidence gaps to address the persisting burden of childhood pneumonia and diarrhoea in developing countries.

Given the important synergies between pneumonia and diarrhoea, an important milestone in this exercise will be agreement on a coordinated global action plan for pneumonia and diarrhoea control to guide public health policy for integrated implementation strategies and to identify evidence gaps for future research.

This global action plan, to be released in early 2013, will set out a clear and integrated vision for pneumonia and diarrhoea control and support global advocacy efforts.

Source: Personal communication with Zulfiqar A Bhutta, professor in the Aga Khan University Division of Maternal and Child Health, 2012.

This partnership will help set an integrated vision for pneumonia and diarrhoea control, identify evidence gaps for future research and support global advocacy efforts.

This report is part of the global effort to raise the profile of pneumonia and diarrhoea and highlight their central positions in equity-based child survival strategies.

Annex 1
Action plans for pneumonia and diarrhoea control

Pneumonia

The Global Action Plan for the Prevention and Control of Pneumonia (WHO and UNICEF 2009b) was launched in 2009 by WHO and UNICEF.

Goals and vision

The vision of the Global Action Plan for the Prevention and Control of Pneumonia is that every child is protected against pneumonia through a healthy environment and has access to preventive and treatment measures. Specific goals are to:

- Reduce mortality due to pneumonia in children under age 5 by 65 per cent by 2015 compared with 2000 levels.
- Reduce the incidence of severe pneumonia by 25 per cent in children under age 5 by 2015 compared with 2000 levels.

Three targets are to be reached by the end of 2015:

- 90 per cent coverage of each relevant vaccine (with 80 per cent coverage in every district).
- 90 per cent access to appropriate pneumonia case management.
- 90 per cent coverage of exclusive breastfeeding during the first six months of life.

Technical consensus statement

In the context of child survival strategies, countries should address pneumonia control. The key strategies for treating, preventing and protecting from pneumonia are:

- Case management at all levels.
- Vaccination.
- Prevention and management of HIV infection.
- Improvement of nutrition and reduction of low birthweight.
- Control of indoor air pollution.

Five interventions could more than halve pneumonia mortality and morbidity:

- *Adopting effective case management at the community and health facility levels.* Countries with a high under-five mortality rate should adopt plans to expand adequate case management of pneumonia at the hospital, health facility and community levels to achieve 90 per cent coverage within a predetermined timeframe.
- *Achieving Global Immunization Vision and strategy targets for vaccines against measles and pertussis.* Countries that have not yet done so, especially high-mortality countries, should introduce PCV and Hib vaccine into their national immunization programmes.
- *Promoting exclusive breastfeeding and zinc supplementation.* These strategies reduce rates of low birthweight and undernutrition, which helps prevent pneumonia.
- *Reducing indoor air pollution.* New technologies can reduce indoor air pollution, which may prevent pneumonia, and additional research is needed to demonstrate the health benefits of these interventions.
- *Preventing mother-to-child transmission of HIV, improving management of HIV infection and increasing use of* P. jiroveci *pneumonia prophylaxis.* These interventions are important in countries with HIV prevalence.

Other preventive strategies, such as encouraging hand washing, should also be promoted.

Pneumonia is a common and serious consequence of pandemic influenza. Preparedness for pandemic influenza should include prevention and control of pneumonia and adds urgency to community case management.

Diarrhoea

The UNICEF and WHO report, 'Diarrhoea: Why Children Are Dying and What Can Be Done' (UNICEF and WHO 2009) lays out a seven-point action plan for comprehensive diarrhoea control.

Treatment

The treatment package focuses on two main elements, as laid out in UNICEF and WHO (2004):

- Fluid replacement to prevent dehydration.
- Zinc treatment.

Oral rehydration therapy is the cornerstone of fluid replacement. New elements of this approach include low-osmolarity ORS, which is more effective at replacing fluids than previous ORS formulations, and zinc treatment, which decreases diarrhoea severity and duration. Other important components are continued feeding, including breastfeeding, during the diarrhoea episode and use of appropriate fluids available in the home if ORS is not available.

Prevention package

The prevention package focuses on five main elements to reduce diarrhoea in the medium to long term:

- Increasing coverage of the rotavirus and measles vaccines.
- Promoting early and exclusive breastfeeding and vitamin A supplementation.
- Promoting hand washing with soap.
- Improving water supply quantity and quality, including treatment and safe storage of household water.
- Promoting communitywide sanitation.

New aspects of this approach include rotavirus vaccination, which was recently recommended for global introduction into national vaccination programmes, and approaches to increase demand to stop open defecation, which have proven more effective than previous strategies.

Implementation of the prevention package must be approached in a concerted way, because single interventions alone are likely to have lesser overall impact. For example, diarrhoea caused by rotavirus cannot be prevented solely by improvements in water and sanitation. And rotavirus vaccine does not prevent other pathogens (such as *E. coli* and Shigella) from causing diarrhoea. The package should be accompanied by clear, targeted and integrated behaviour and social change communication strategies to improve uptake by families and communities.

Annex 2
Technical background

Data sources

Cause-specific mortality estimates, recently published for 2010, are based on the work of the Child Health Epidemiology Reference Group (see www.cherg.org).[1]

Prevention and treatment coverage estimates are derived from a series of public access databases compiled by UNICEF and reflect data available as of 15 April 2012 (see www.childinfo.org). These databases are based on information from nationally representative household surveys routinely administered in low-income countries, notably UNICEF-supported Multiple Indicator Cluster Surveys (see www.childinfo.org), U.S. Agency for International Development–supported Demographic and Health Surveys (see www.measuredhs.com) and others. Some coverage estimates are derived using a combination of survey data and other sources, such as data on water supply and sanitation and on immunization.

Information on community case management policy and implementation is based on a cross-sectional survey of 44 UNICEF country offices in sub-Saharan Africa using a structured instrument with closed and open-ended questions. The offices were first contacted in May 2010 and queried through May 2011 to ensure that information reflected the status of community case management in 2010. Of 44 country offices, 4 did not respond: Cape Verde, Gabon, Guinea-Bissau and Sao Tome and Principe.

Prevention indicators

Immunization coverage estimates are developed jointly by WHO and UNICEF (see www.childinfo.org). The WHO Department of Immunization, Vaccines and Biologicals maintains information on the year of vaccine introduction into national immunization programmes, which are presented in this report for PCV, HIB vaccine and rotavirus vaccine.

Water, sanitation and hygiene coverage estimates are developed jointly by the WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation, which released its latest estimates in March 2012 (see www.wssinfo.org).

Household air pollution data (solid fuel use) are from the WHO Household Energy Database, which reflects modelled estimates for 2010 derived from national household surveys (Multiple Indicator Cluster Surveys and Demographic and Health Surveys) and census data (see www.who.int/indoorair/health_impacts/he_database/).

Nutrition coverage estimates are based largely on nationally representative household surveys, such as Multiple Indicator Cluster Surveys and Demographic and Health Surveys, without adjustments. Low birthweight incidence estimates are adjusted for underreporting and misreporting using a methodology developed jointly by UNICEF and WHO.[2]

Treatment indicators

Diarrhoea

Diarrhoea treatment programme recommendations were set out in the 2004 UNICEF and WHO Joint Statement,[3] and the main indicators to monitor these recommendations were agreed on during a WHO and UNICEF advisory meeting on child survival indicators in 2004[4] and reconfirmed in a 2007 technical meeting on Countdown indicators.[5] These treatment recommendations are under review and may be updated later this year.

Diarrhoea treatment with oral rehydration therapy and continued feeding is the proportion of children ages 0–59 months with diarrhoea in the two weeks prior to the interview receiving oral rehydration therapy (oral rehydration salts, recommended home fluid or increased fluids) and continued feeding during the illness.

Diarrhoea treatment with ORS is the proportion of children ages 0–59 months with diarrhoea in the two weeks prior to the interview receiving oral rehydration salts (either a special packet of ORS or prepackaged ORS fluid) during the illness.

Recommended homemade fluids are the proportion of children ages 0–59 months with diarrhoea in the two weeks prior to the interview receiving a government-recommended homemade fluid (to be customized at the country-level based on national guidelines) during the illness.

Increased fluids are the proportion of children ages 0–59 months with diarrhoea in the two weeks prior to the interview receiving more to drink than usual during the illness.

Continued feeding is the proportion of children ages 0–59 months with diarrhoea in the two weeks prior to the interview receiving more, the same or somewhat less to eat than usual during the illness.

Zinc treatment is the proportion of children ages 0–59 months with diarrhoea in the two weeks prior to the interview receiving zinc during the illness.

Suspected pneumonia

Careseeking for suspected pneumonia is the proportion of children ages 0–59 months with suspected pneumonia (cough and fast or difficult breathing due to a problem in the chest) taken to appropriate care during the illness. Appropriate care includes public or private hospitals, health centres or posts, private doctors or community health workers and excludes pharmacies, drug shops and traditional practitioners.

Antibiotic treatment for suspected pneumonia is the proportion of children ages 0–59 months with suspected pneumonia (cough and fast or difficult breathing due to a problem in the chest) receiving antibiotics during the illness.

Suspected pneumonia was originally defined as 'cough and (fast or difficult breathing)' without specifying a chest-related problem. Coverage estimates based on this denominator are footnoted in the statistical tables and are used in the trend analysis in the report. Further analysis is needed to determine how these definition changes affect overall coverage estimates.

Data on recognition of danger signs of pneumonia were derived from the Multiple Indicator Cluster Survey question 'What types of symptoms would cause you to take your child to a health facility right away?' Respondents could provide multiple responses but were not prompted about any specific signs or symptoms. Because this was an open-ended question, certain symptoms could be underreported, given that a particular response might not immediately have come to mind and was thus omitted by the respondent.

Measurement issues

Several measurement issues need to be taken into account when interpreting treatment data from household surveys.

Caregiver recall of drugs used for childhood illnesses is limited by their knowledge of treatments received; research indicates low validity of such reports in household survey interviews.[6]

Limited information is available on antibiotic use for suspected pneumonia. These questions were added to Multiple Indicator Cluster Surveys and Demographic and Health Surveys around 2005, which limits analysis of trends. Information is not collected on the type of antibiotic used for pneumonia symptoms or on whether the proper dose was given. Information is also not collected on early administration of ORS for a child with diarrhoea, the number of ORS packets received during the course of the illness or whether these fluids were correctly prepared. In addition, for recommended homemade fluids country guidelines differ on what constitutes an alternative appropriate fluid that could also prevent dehydration (for example, cereal-based solutions). These policies are not always defined, and thus survey questions may not be adequately customized according to specific national guidelines prior to starting survey work. The recommended homemade fluid indicator is limited by this lack of customization in many surveys.

Numerous slight wording changes have been made to the construction of diarrhoea treatment questions over time as well as to their response categories. And survey questionnaires

are translated into different languages, which may result in slight differences in the wording of questions across countries and over time. Further analysis is needed to determine the extent to which these slight wording changes affect overall coverage values. In particular, the change in response categories for the continued feeding question around 2000 has affected data availability for this indicator and for the oral rehydration and continued feeding indicator. This limits analysis of trends over time prior to 2000 for these diarrhoea treatment indicators.

Zinc treatment is measured through an open-ended question. Respondents are asked 'What (else) was given to treat the diarrhoea?' Low proportions of zinc treatment could be the result of underreporting if the respondent does not know what was given to the child or does not recall.

Prevalence estimates derived from household surveys can vary markedly by season and by timing of outbreaks (such as cholera). These estimates are also limited by caregiver recall of symptoms, and research indicates that caregivers with less education or living in poorer households may underreport diarrhoea symptoms in their children in household survey interviews.[7] This pattern likely holds for other illness symptoms as well, such as fever and respiratory symptoms. Surveys do not measure the type of diarrhoea experienced by the child (including its length and severity). While these prevalence estimates are not presented in this report, they are used to derive the denominator for treatment coverage values.

Suspected pneumonia prevalence refers to children with a combination of respiratory symptoms for which they should seek clinical assessment for pneumonia by an appropriate provider. These respiratory symptoms include 'cough and fast or difficult breathing due to a chest-related problem'. Not all children with suspected pneumonia in the previous two weeks should receive antibiotic treatment, only those with pneumonia as classified by the Integrated Management of Child Illness guidelines (based on a rapid respiratory rate counted by a health worker). It is not possible to measure such pneumonia prevalence among children under age 5 during a household survey interview or to ascertain underlying pneumonia illness for children with these respiratory symptoms.

Lives Saved Tool

Lives saved predictions are derived from the Lives Saved Tool, a model developed by a consortium of academic and international organizations led by the Johns Hopkins University Bloomberg School of Public Health (see www.jhsph.edu/dept/ih/IIP/list/). The model estimates the potential number of deaths averted in children under age 5 by linking changes in coverage of maternal, newborn and child health interventions with empirical evidence of the effect of the interventions on child mortality. The model takes into account current demographic projections, nutritional status and country-specific cause of death profiles for children under age 5. Cause of death estimates are for 2008.[8]

The pneumonia and diarrhoea interventions in the Bangladesh scenario include preventive measures (zinc supplementation, improved water sources, water connection in the home, improved sanitation, hand washing with soap, hygienic disposal of children's faeces, PCV, Hib vaccine and rotavirus vaccine) and treatment measures (antibiotics for suspected pneumonia treatment and ORS and zinc for diarrhoea treatment). For the analysis of 75 high-mortality countries additional interventions were added to the scenario, including vitamin A supplementation, exclusive breastfeeding for the first six months of life, intermittent preventive treatment for malaria during pregnancy and antibiotics for dysentery.

The Bangladesh example analyses the scale up of the above basic package of pneumonia and diarrhoea interventions to 90 per cent levels (near universal coverage) among the richest and poorest 20 per cent of households. The 2007 Bangladesh Demographic and Health Survey provides baseline coverage data for these subnational populations. This survey also included a verbal autopsy study that provides estimates of under-five deaths by cause for these same subnational groups. Verbal autopsy methods are used in countries where vital registration systems are weak. The interviewer returns to surveyed households where a death of a child was reported to interview caregivers or other next of kin about symptoms exhibited by the child prior to death. This information is then used to generate cause of death estimates for these children

(see www.who.int/healthinfo/statistics/mort_verbalautopsy.pdf for more information on verbal autopsy methods).

Regional estimates and trends over time

Regional and global estimates are based on population-weighted averages, which are presented only if available data cover at least 50 per cent of the relevant population in the regional or global grouping. The list of countries in the global and regional groupings is available at www.childinfo.org.

Trends over time are calculated for regional and global groupings based on a subset of countries with at least one data point around 2000 (1997–2003) and a comparable data point around 2010 (2006–2011) with at least four years between data points. Data points for the year closest to the earlier and later time periods are used to estimate trends for 2000 and 2010, and other data points in the time series are not included in the analysis. A regional or global grouping is presented for 2000 and 2010 if available data for this subset of countries cover at least 50 per cent of the relevant population in the regional or global grouping.

Notes

Chapter 1

1. UNICEF, WHO, World Bank and UN Population Division 2011.
2. You and others 2010.
3. UNICEF and WHO 2006.
4. Victora and others 2003; UNICEF 2012.

Chapter 3

1. WHO 2008.
2. WHO 2012a.
3. GAVI Alliance 2011.
4. Simons and others forthcoming.
5. Guiso and others 2010.
6. Black and others 2003.
7. WHO and UNICEF Joint Monitoring Programme for Water Supply and Sanitation 2012.
8. Jamison and others 2006.
9. Cairncross and others 2010.
10. Curtis, Danquah and Aunger 2009.
11. Burr 1999; Pandey and others 1989.
12. WHO 2011.
13. Cardoso and others 2004; Ballard and Neumann 1995.
14. Mehta and others 2011.
15. Black and others 2008.
16. Checkley and others 2003.
17. Feachem and others 1984.
18. Duijts, Ramdadhani and Moll 2009.
19. Edmond and others 2006; Mullany and others 2008.
20. Lira and others 1996.
21. Black 2003.
22. Sazawal and others 2007; Lassi, Haider and Bhutta 2010.
23. International Vitamin A Consultative Group 1996.
24. Rosales 2002.
25. Mulholland 2005.
26. Fenn and others 2005
27. Schmidt and others 2009.
28. Berkley and others 1999.
29. Graham and others 2000.
30. WHO 2010.
31. WHO and UNICEF 2009a; WHO, UNAIDS and UNICEF 2011.

Chapter 4

1. Gove 1997.
2. UNICEF and WHO 2006.
3. UNICEF and WHO 2006.
4. WHO and UNICEF 2004.
5. Zinc Investigators' Collaborative Group 2000.
6. Fischer and others 2009.

Chapter 5

1. Countdown to 2015 2012.
2. Black and others 2010.

Chapter 6

1. UNICEF, WHO, World Bank and UN Population Division 2011.

Annex 2

1. Liu and others 2012.
2. Blanc and Wardlaw 2005.
3. WHO and UNICEF 2004.
4. UNICEF and WHO 2004.
5. Countdown to 2015 2007.
6. Hildenwall and others 2009.
7. Manesh 2008.
8. Black and others 2010.

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Demographics, immunization and nutrition

Country or territory	Number of children under age 5 (thousands) 2010	Under-five mortality rate[a] (deaths per 1,000 live births) 2010	Number of deaths among children under age 5 (thousands) 2010	Child immunization, 2010 (% of one-year-old children)			Exclusive breast-feeding (% of infants under age 6 months) 2006–2010[b]	Undernutrition, 2006–2010[b] (% of children under age 5)		
								Underweight		Stunting
				Measles	Hib	DTP3		Moderate and severe	Severe	Moderate and severe
Afghanistan	5,546	149	191	62	66	66	—	33[c]	12[c]	59[c]
Albania	208	18	1	99	99	99	39	5	2	19
Algeria	3,447	36	26	95	95	95	7	3	1	15
Andorra	4	4	0	99	98	99	—	—	—	—
Angola	3,378	161	121	93	91	91	11[c]	16[d]	7[d]	29[d]
Antigua and Barbuda	8	8	0	98	98	98	—	—	—	—
Argentina	3,386	14	10	99	94	94	—	2[d]	0[d]	8[d]
Armenia	226	20	97	48	94	35	5	1	19	
Australia	1,458	5	1	94	92	92	—	—	—	—
Austria	386	4	0	76	83	83	—	—	—	—
Azerbaijan	795	46	9	67	—	72	12	8	2	25
Bahamas	26	16	0	94	98	99	—	—	—	—
Bahrain	93	10	0	99	99	99	—	—	—	—
Bangladesh	14,707	48	140	94	95	95	43	41	12	43
Barbados	15	20	0	85	86	86	—	—	—	—
Belarus	515	6	1	99	0	98	9c	1[c]	1[c]	4[c]
Belgium	616	4	1	94	97	99	—	—	—	—
Belize	37	17	0	98	96	96	10	4	1	22
Benin	1,506	115	39	69	83	83	—	18	5	43
Bhutan	71	56	1	95	—	91	49	13	3	34
Bolivia (Plurinational State of)	1,235	54	14	79	80	80	60	4	1	27
Bosnia and Herzegovina	165	8	0	93	80	90	18[c]	1[c]	0[c]	10[c]
Botswana	225	48	2	94	—	96	20	11	4	31
Brazil	15,156	19	55	99	99	98	40	2	—	7
Brunei Darussalam	37	7	0	94	95	95	—	—	—	—
Bulgaria	373	13	1	97	91	94	—	—	—	—
Burkina Faso	2,955	176	120	94	95	95	16	26	7	35
Burundi	1,185	142	38	92	96	96	69	29	8	58
Cambodia	1,492	51	16	93	92	92	74	28	7	40
Cameroon	3,055	136	93	79	84	84	21	16	5	36
Canada	1,885	6	2	93	80	80	—	—	—	—
Cape Verde	51	36	0	96	—	99	60[c]	—	—	—
Central African Republic	651	159	23	62	54	54	23	24	8	43
Chad	2,006	173	80	46	59	59	3	30	13	39
Chile	1,219	9	2	93	92	92	—	—	—	—
China	81,596	18	315	99	—	99	28	4[d]	—	10[d]
Colombia	4,498	19	18	88	88	88	43	3	1	13
Comoros	122	86	2	72	81	74	—	—	—	—
Congo	623	93	13	76	90	90	19[c]	11[c]	3[c]	30[c]
Cook Islands	2	9	0	99	99	99	—	—	—	—
Costa Rica	363	10	1	83	90	88	15	1	—	6
Côte d'Ivoire	2,969	123	80	70	85	85	4	16	5	40
Croatia	210	6	0	95	96	96	—	—	—	—
Cuba	569	6	1	99	96	96	26	—	—	—

Demographics, immunization and nutrition

Country or territory	Number of children under age 5 (thousands) 2010	Under-five mortality rate[a] (deaths per 1,000 live births) 2010	Number of deaths among children under age 5 (thousands) 2010	Child immunization, 2010 (% of one-year-old children)			Exclusive breast-feeding (% of infants under age 6 months) 2006–2010[b]	Undernutrition, 2006–2010[b] (% of children under age 5)		
								Underweight		Stunting
				Measles	Hib	DTP3		Moderate and severe	Severe	Moderate and severe
Cyprus	64	4	0	87	96	99	—	—	—	—
Czech Republic	548	4	0	98	99	99	—	—	—	—
Democratic People's Republic of Korea	1,704	33	12	99	—	93	65[c]	19	4	32
Democratic Republic of the Congo	11,848	170	465	68	63	63	37	24	8	43
Denmark	326	4	0	85	90	90	—	—	—	—
Djibouti	113	91	2	85	88	88	1	23[d]	5[d]	31[d]
Dominica	6	12	0	99	98	98	—	—	—	—
Dominican Republic	1,054	27	6	79	81	88	9	7	2	18
Ecuador	1,470	20	6	98	99	99	40[c]	6[c]	—	—
Egypt	9,008	22	41	96	—	97	53	6	1	29
El Salvador	617	16	2	92	92	92	31	6[d]	1[d]	19[d]
Equatorial Guinea	107	121	3	51	—	33	—	—	—	—
Eritrea	861	61	11	99	99	99	52[c]	35[c]	13[c]	44[c]
Estonia	78	5	0	95	94	94	—	—	—	—
Ethiopia	11,932	106	271	81	86	86	49[c]	33[c]	11[c]	51[c]
Fiji	90	17	0	94	99	99	40[c]	—	—	—
Finland	299	3	0	98	98	99	—	—	—	—
France	3,974	4	3	90	97	99	—	—	—	—
Gabon	185	74	3	55	45	45	—	—	—	—
Gambia	287	98	6	97	98	98	36	18	4	24
Georgia	256	22	1	94	67	91	—	1	1	11
Germany	3,467	4	3	96	94	93	—	—	—	—
Ghana	3,533	74	57	93	94	94	63	14	3	28
Greece	586	4	1	99	83	99	—	—	—	—
Grenada	10	11	0	95	97	97	—	—	—	—
Guatemala	2,167	32	14	93	94	94	50	13[d]	—	48[d]
Guinea	1,658	130	48	51	57	57	48	21	7	40
Guinea-Bissau	240	150	8	61	76	76	38	18	5	32
Guyana	65	30	0	95	95	95	33	11	2	18
Haiti	1,237	165	45	59	—	59	41	18	6	29
Holy See	0	—	—	—	—	—	—	—	—	—
Honduras	966	24	5	99	98	98	30	8	1	29
Hungary	491	6	1	99	99	99	—	—	—	—
Iceland	24	2	0	93	96	96	—	—	—	—
India	127,979	63	1,696	74	—	72	46	43	16	48
Indonesia	21,579	35	151	89	—	83	32	18	5	37
Iran (Islamic Republic of)	6,149	26	34	99	—	99	23[c]	—	—	—
Iraq	5,188	39	43	73	—	65	25	6	2	26
Ireland	358	4	0	90	94	94	—	—	—	—
Israel	735	5	1	98	93	96	—	—	—	—
Italy	2,902	4	2	90	95	96	—	—	—	—
Jamaica	247	24	1	88	99	99	15[c]	2	—	4

Demographics, immunization and nutrition

Country or territory	Number of children under age 5 (thousands) 2010	Under-five mortality rate[a] (deaths per 1,000 live births) 2010	Number of deaths among children under age 5 (thousands) 2010	Child immunization, 2010 (% of one-year-old children)			Exclusive breast-feeding (% of infants under age 6 months) 2006–2010[b]	Undernutrition, 2006–2010[b] (% of children under age 5)		
								Underweight		Stunting
				Measles	Hib	DTP3		Moderate and severe	Severe	Moderate and severe
Japan	5,431	3	3	94	—	98	—	—	—	—
Jordan	816	22	4	98	98	98	22	2	0	8
Kazakhstan	1,641	33	13	99	96	99	17	4	1	17
Kenya	6,664	85	122	86	83	83	32	16	4	35
Kiribati	10	49	0	89	91	91	—	—	—	—
Kuwait	281	11	1	98	98	98	—	—	—	—
Kyrgyzstan	595	38	5	99	96	96	32	2	0	18
Lao People's Democratic Republic	683	54	8	64	74	74	26	31	9	48
Latvia	115	10	0	93	88	89	—	—	—	—
Lebanon	322	22	2	53	74	74	—	—	—	—
Lesotho	274	85	5	85	83	83	54	13	2	39
Liberia	681	103	15	64	64	64	34	15[d]	2[d]	42[d]
Libya	716	17	2	98	98	98	—	—	—	—
Liechtenstein	2	2	0	—	—	—	—	—	—	—
Lithuania	166	7	0	96	95	95	—	—	—	—
Luxembourg	29	3	0	96	98	99	—	—	—	—
Madagascar	3,305	62	44	67	74	74	51	—	—	50
Malawi	2,715	92	56	93	93	93	72	13	3	47
Malaysia	2,828	6	3	96	94	94	—	13	—	17
Maldives	26	15	0	97	—	96	48	17	3	19
Mali	2,912	178	120	63	77	76	38	27	10	38
Malta	19	6	0	73	76	76	—	—	—	—
Marshall Islands	5	26	0	97	92	94	31	—	—	—
Mauritania	513	111	13	67	64	64	46	15[d]	3[d]	23[d]
Mauritius	84	15	0	99	99	99	21[c]	—	—	—
Mexico	11,095	17	37	95	95	95	—	3	—	16
Micronesia (Federated States of)	13	42	0	80	70	85	—	—	—	—
Monaco	2	4	0	99	99	99	—	—	—	—
Mongolia	297	32	2	97	96	96	57[c]	5[c]	1[c]	27[c]
Montenegro	39	8	0	90	90	94	19[c]	2[c]	1[c]	7[c]
Morocco	3,022	36	23	98	99	99	31[c]	9[c]	2[c]	23[c]
Mozambique	3,876	135	114	70	74	74	37	18	5	44
Myanmar	3,956	66	56	88	—	90	24	23	6	35
Namibia	286	40	2	75	83	83	24	17	4	29
Nauru	1	40	0	99	99	99	67	5	1	24
Nepal	3,506	50	35	86	—	82	53	39	11	49
Netherlands	934	4	1	96	97	97	—	—	—	—
New Zealand	312	6	0	91	89	93	—	—	—	—
Nicaragua	678	27	4	99	98	98	31	6	1	22
Niger	3,085	143	100	71	70	70	27	40[d]	14[d]	47[d]
Nigeria	26,569	143	861	71	—	69	13	23	9	41
Niue	0	22	0	99	99	99	—	—	—	—

Demographics, immunization and nutrition

Country or territory	Number of children under age 5 (thousands) 2010	Under-five mortality rate[a] (deaths per 1,000 live births) 2010	Number of deaths among children under age 5 (thousands) 2010	Child immunization, 2010 (% of one-year-old children)			Exclusive breast-feeding (% of infants under age 6 months) 2006–2010[b]	Undernutrition, 2006–2010[b] (% of children under age 5)		
								Underweight		Stunting
				Measles	Hib	DTP3		Moderate and severe	Severe	Moderate and severe
Norway	303	3	0	93	94	93	—	—	—	—
Occupied Palestinian Territory	620	22	3	98	96	96	27	—	—	—
Oman	282	9	1	97	99	99	—	9	—	10
Pakistan	21,418	87	423	86	88	88	37	31[c]	13[c]	42[c]
Palau	2	19	0	75	66	49	—	—	—	—
Panama	345	20	1	95	94	94	—	4[d]	—	19[d]
Papua New Guinea	962	61	12	55	56	56	56	18[c]	5[c]	43[c]
Paraguay	740	25	4	94	98	90	24	3[c]	—	18[c]
Peru	2,909	19	11	94	93	93	68	4	1	24
Philippines	11,254	29	66	88	—	87	34	22[d]	—	32[d]
Poland	1,933	6	3	98	99	99	—	—	—	—
Portugal	517	4	0	96	97	98	—	—	—	—
Qatar	91	8	0	99	97	97	—	—	—	—
Republic of Korea	2,372	5	3	98	—	94	—	—	—	—
Republic of Moldova	215	19	1	97	63	90	46[c]	3[c]	1[c]	10[c]
Romania	1,079	14	3	95	—	97	16[c]	4[c]	1[c]	13[c]
Russian Federation	8,117	12	20	98	—	97	—	—	—	—
Rwanda	1,831	91	38	82	80	80	85	11	2	44
Saint Kitts and Nevis	5	8	0	99	96	95	—	—	—	—
Saint Lucia	15	16	0	95	97	97	—	—	—	—
Saint Vincent and the Grenadines	9	21	0	99	99	99	—	—	—	—
Samoa	22	20	0	61	87	87	51	—	—	—
San Marino	2	2	0	93	92	92	—	—	—	—
Sao Tome and Principe	23	80	0	92	98	98	51	13	3	29
Saudi Arabia	3,145	80	12	98	98	98	—	—	—	—
Senegal	2,081	75	34	60	70	70	34[c]	14[c]	4[c]	19[c]
Serbia	565	7	1	95	91	91	15[c]	1[c]	0[c]	7[c]
Seychelles	14	14	0	99	99	99	—	—	—	—
Sierra Leone	970	174	39	82	90	90	11	21	7	36
Singapore	231	3	0	95	—	97	—	—	—	—
Slovakia	276	8	0	98	99	99	—	—	—	—
Slovenia	99	3	0	95	96	96	—	—	—	—
Solomon Islands	80	27	0	68	79	79	74	12	2	33
Somalia	1,667	180	70	46	—	45	9	32	12	42
South Africa	5,041	57	58	65	45	63	8[c]	9	—	24
South Sudan	—	—	—	—	—	—	—	—	—	—
Spain	2,521	5	2	95	97	97	—	—	—	—
Sri Lanka	1,893	17	6	99	99	99	76	21	4	17
Sudan	—	—	—	—	—	—	—	—	—	—
Suriname	48	31	0	89	86	88	2	7	1	11
Swaziland	157	78	3	94	89	89	44	6	1	31
Sweden	557	3	0	96	98	98	—	—	—	—

Demographics, immunization and nutrition

Country or territory	Number of children under age 5 (thousands) 2010	Under-five mortality rate[a] (deaths per 1,000 live births) 2010	Number of deaths among children under age 5 (thousands) 2010	Child immunization, 2010 (% of one-year-old children)			Exclusive breast-feeding (% of infants under age 6 months) 2006–2010[b]	Undernutrition, 2006–2010[b] (% of children under age 5)		
								Underweight		Stunting
				Measles	Hib	DTP3		Moderate and severe	Severe	Moderate and severe
Switzerland	376	5	0	90	94	96	—	—	—	—
Syrian Arab Republic	2,494	16	8	82	80	80	43	10	—	28
Tajikistan	871	63	12	94	93	93	25[c]	15	6	39
Thailand	4,361	13	11	98	—	99	15	7	1	16
The former Yugoslav Republic of Macedonia	112	12	0	98	89	95	—	2	0	11
Timor-Leste	193	55	2	66	—	72	52	45	15	58
Togo	863	103	19	84	92	92	63	17	4	30
Tonga	14	16	0	99	99	99	—	—	—	—
Trinidad and Tobago	95	27	1	92	90	90	13	—	—	—
Tunisia	868	16	3	97	—	98	6	3	—	9
Turkey	6,413	18	24	97	96	96	42	2	0	12
Turkmenistan	506	56	6	99	58	96	11[c]	8[c]	2[c]	19[c]
Tuvalu	1	33	0	85	89	89	35	2	0	10
Uganda	6,465	99	141	55	60	60	60	16	4	38
Ukraine	2,376	13	7	94	81	90	18	—	—	—
United Arab Emirates	421	7	1	94	94	94	—	—	—	—
United Kingdom	3,766	5	4	93	97	96	—	—	—	—
United Republic of Tanzania	8,010	76	133	92	91	91	50	16	4	42
United States	21,650	8	32	92	93	95	—	—	—	—
Uruguay	246	11	1	95	95	95	57	5[c]	2[c]	15[c]
Uzbekistan	2,738	52	31	98	99	99	26	4	1	19
Vanuatu	33	14	0	52	—	68	40	—	—	—
Venezuela (Bolivarian Republic of)	2,926	18	11	79	78	78	—	4	—	16
Viet Nam	7,186	23	34	98	63	93	17	20	—	31
Yemen	4,057	77	69	73	87	87	12[c]	43[c]	19[c]	58[c]
Zambia	2,412	111	60	91	82	82	61	15	3	45
Zimbabwe	1,692	80	29	84	83	83	32	10	2	32
Memorandum										
Sudan and South Sudan[e]	—	—	—	—	—	—	—	—	—	—

Demographics, immunization and nutrition

UNICEF regions[f]	Number of children under age 5 (thousands) 2010	Under-five mortality rate[a] (deaths per 1,000 live births) 2010	Number of deaths among children under age 5 (thousands) 2010	Child immunization, 2010 (% of one-year-old children)			Exclusive breast-feeding (% of infants under age 6 months) 2006–2010[b]	Undernutrition, 2006–2010[b] (% of children under age 5)		
								Underweight		Stunting
				Measles	Hib	DTP3		Moderate and severe	Severe	Moderate and severe
Africa	155,135	111	3,804	78	59	79	34	19[a]	6	38
Sub-Saharan Africa	138,075	121	3,709	75	61	77	33	20[a]	7	39
Eastern and Southern Africa	62,198	98	1,322	79	77	80	49	15[a]	4	39
West and Central Africa	69,372	143	2,241	71	46	72	24	23[a]	8	40
Middle East and North Africa	47,524	41	415	90	48	91	34	11[a]	4	28
Asia	316,151	48	3,186	85	16[g]	84	38	27[a]	13[g]	34
South Asia	175,146	67	2,492	77	22	76	45	42[a]	15	47
East Asia and Pacific	141,004	24	694	95	7[g]	94	29	10[a]	5[g]	19
Latin America and Caribbean	53,461	23	249	93	92	93	42	4[a]	—	15
Central and Eastern Europe/Commonwealth of Independent States	28,015	23	136	96	57	95	30	—	—	—
Industrialized countries	57,212	6	65	93	85	95	—	—	—	—
Developing countries	563,545	63	7,516	84	38[g]	84	37	18[a]	9[g]	29
Least developed countries	122,520	110	2,949	78	73	80	42	25[a]	8	41
World	633,933	57	7,614	85	42[g]	85	37	9[a]	10[g]	27

Notes

Regional components may not sum to totals because of rounding.

— Data are not available.

a Based on statistical models.

b Data are for the most recent year available during the period specified.

c Data refer to years or periods other than those specified in the column heading. Such data are not included in the calculation of regional and global averages. Estimates from data years prior to 2001 are not displayed.

d Data differ from the standard definition or refer to only part of a country. Such data are included in the calculation of regional and global averages.

e Because of the cession in July 2011 of the Republic of South Sudan by the Republic of the Sudan, and its subsequent admission to the United Nations on 14 July 2011, disaggregated data for the Sudan and South Sudan as separate States are not yet available for most indicators. Aggregated data presented are for the Sudan pre-cession (see Memorandum item).

f For a complete list of countries and territories in the regions, subregions and country categories, see page 124 of *The State of the World's Children 2012*.

g Excludes China.

Definitions

Under-five mortality rate – Probability of dying between birth and exactly 5 years of age, expressed per 1,000 live births.

Measles – Percentage of surviving infants who received the first dose of the measles-containing vaccine.

Hib3 – Percentage of surviving infants who received three doses of *Haemophilus influenzae* type b vaccine.

DTP3 – Percentage of surviving infants who received three doses of diphtheria, tetanus and pertussis vaccine.

Exclusive breastfeeding – Percentage of children under age 6 months who were fed exclusively with breastmilk in the past 24 hours.

Underweight (WHO), moderate and severe: Percentage of children under age 5 who are below minus two standard deviations from median weight-for-age of the WHO Child Growth Standards.

Underweight (WHO), severe: Percentage of children under age 5 who are below minus three standard deviations from median weight-for-age of the WHO Child Growth Standards.

Stunting (WHO), moderate and severe: Percentage of children under age 5 who are below minus two standard deviations from median height-for-age of the WHO Child Growth Standards.

Sources

Column 1: United Nations Population Division 2011.

Columns 2 and 3: UN Inter-Agency Group for Child Mortality Estimation.

Columns 4–6: UNICEF and WHO.

Column 7: Multiple Indicator Cluster Surveys, Demographic and Health Surveys and other national surveys; UNICEF.

Columns 8–10: UNICEF and WHO.

STATISTICAL TABLE 2

Preventive measures and determinants of pneumonia and diarrhoea

Country or territory	Population using an improved drinking water source (%)				Population using an improved sanitation facility (%)				Population using solid fuels as the main cooking fuel (%)
	Total		Rural	Urban	Total		Rural	Urban	Total
	2000	2010	2010	2010	2000	2010	2010	2010	2010
Afghanistan	22	50	42	78	32	37	30	60	85
Albania	98	95	94	96	84	94	93	95	39
Algeria	89	83	79	85	92	95	88	98	<5
Andorra	100	100	100	100	100	100	100	100	<5
Angola	46	51	38	60	42	58	19	85	55
Antigua and Barbuda	91	—	—	95	95	—	—	98	<5
Argentina	96	—	—	98	91	—	—	—	<5
Armenia	92	98	97	99	89	90	80	95	19
Australia	100	100	100	100	100	100	100	100	<5
Austria	100	100	100	100	100	100	100	100	<5
Azerbaijan	74	80	71	88	62	82	78	86	7
Bahamas	96	—	—	98	100	100	100	100	<5
Bahrain	—	—	—	100	—	—	—	100	<5
Bangladesh	79	81	80	85	47	56	55	57	91
Barbados	100	100	100	100	100	100	100	100	<5
Belarus	100	100	99	100	93	93	97	91	<5
Belgium	100	100	100	100	100	100	100	100	<5
Belize	86	98	99	98	83	90	87	93	12
Benin	66	75	68	84	9	13	5	25	91
Bhutan	86	96	94	100	39	44	29	73	40
Bolivia (Plurinational State of)	80	88	71	96	22	27	10	35	29
Bosnia and Herzegovina	97	99	98	100	95	95	92	99	45
Botswana	95	96	92	99	52	62	41	75	37
Brazil	94	98	85	100	74	79	44	85	6
Brunei Darussalam	—	—	—	—	—	—	—	—	<5
Bulgaria	100	100	100	100	100	100	100	100	14
Burkina Faso	60	79	73	95	11	17	6	50	92
Burundi	72	72	71	83	45	46	46	49	>95
Cambodia	44	64	58	87	17	31	20	73	89
Cameroon	64	77	52	95	49	49	36	58	75
Canada	100	100	99	100	100	100	99	100	<5
Cape Verde	83	88	85	90	44	61	43	73	32
Central African Republic	63	67	51	92	22	34	28	43	>95
Chad	45	51	44	70	10	13	6	30	88
Chile	94	96	75	99	92	96	83	98	6
China	80	91	85	98	44	64	56	74	46
Colombia	91	92	72	99	73	77	63	82	14
Comoros	92	95	97	91	28	36	30	50	71
Congo	70	71	32	95	20	18	15	20	77
Cook Islands	95	—	—	98	100	100	100	100	<5
Costa Rica	95	97	91	100	95	95	96	95	6
Côte d'Ivoire	77	80	68	91	22	24	11	36	78
Croatia	99	99	97	100	99	99	98	99	8
Cuba	90	94	89	96	86	91	81	94	9

Preventive measures and determinants of pneumonia and diarrhoea

Country or territory	Population using an improved drinking water source (%)				Population using an improved sanitation facility (%)				Population using solid fuels as the main cooking fuel (%)
	Total		Rural	Urban	Total		Rural	Urban	Total
	2000	2010	2010	2010	2000	2010	2010	2010	2010
Cyprus	100	100	100	100	100	100	100	100	<5
Czech Republic	100	100	100	100	98	98	97	99	<5
Democratic People's Republic of Korea	100	98	97	99	61	80	71	86	91
Democratic Republic of the Congo	44	45	27	79	16	24	24	24	93
Denmark	100	100	100	100	100	100	100	100	<5
Djibouti	82	88	54	99	60	50	10	63	13
Dominica	95	—	—	96	81	—	—	—	<5
Dominican Republic	87	86	84	87	78	83	75	87	7
Ecuador	86	94	89	96	83	92	84	96	<5
Egypt	96	99	99	100	86	95	93	97	<5
El Salvador	82	88	76	94	83	87	83	89	22
Equatorial Guinea	51	—	—	—	89	—	—	—	51
Eritrea	54	—	—	—	11	—	4	—	60
Estonia	98	98	97	99	95	95	94	96	11
Ethiopia	29	44	34	97	9	21	19	29	>95
Fiji	93	98	95	100	75	83	71	94	37
Finland	100	100	100	100	100	100	100	100	<5
France	100	100	100	100	100	100	100	100	<5
Gabon	85	87	41	95	36	33	30	33	26
Gambia	83	89	85	92	63	68	65	70	91
Georgia	89	98	96	100	95	95	93	96	46
Germany	100	100	100	100	100	100	100	100	<5
Ghana	71	86	80	91	10	14	8	19	84
Greece	99	100	99	100	98	98	97	99	<5
Grenada	94	—	—	97	97	97	97	96	<5
Guatemala	87	92	87	98	71	78	70	87	57
Guinea	63	74	65	90	14	18	11	32	>95
Guinea-Bissau	50	64	53	91	14	20	9	44	>95
Guyana	89	94	93	98	79	84	82	88	7
Haiti	62	69	51	85	22	17	10	24	91
Holy See	—	—	—	—	—	—	—	—	—
Honduras	82	87	79	95	64	77	69	85	51
Hungary	99	100	100	100	100	100	100	100	<5
Iceland	100	100	100	100	100	100	100	100	<5
India	81	92	90	97	25	34	23	58	58
Indonesia	78	82	74	92	44	54	39	73	55
Iran (Islamic Republic of)	93	96	92	97	90	100	100	100	<5
Iraq	80	79	56	91	69	73	67	76	<5
Ireland	100	100	100	100	99	99	98	100	<5
Israel	100	100	100	100	100	100	100	100	<5
Italy	100	100	100	100	—	—	—	—	<5
Jamaica	93	93	88	98	80	80	82	78	11

Preventive measures and determinants of pneumonia and diarrhoea

Country or territory	Population using an improved drinking water source (%)				Population using an improved sanitation facility (%)				Population using solid fuels as the main cooking fuel (%)
	Total		Rural	Urban	Total		Rural	Urban	Total
	2000	2010	2010	2010	2000	2010	2010	2010	2010
Japan	100	100	100	100	100	100	100	100	<5
Jordan	96	97	92	98	98	98	98	98	<5
Kazakhstan	96	95	90	99	97	97	98	97	9
Kenya	52	59	52	82	28	32	32	32	80
Kiribati	62	—	—	—	33	—	—	—	80
Kuwait	99	99	99	99	100	100	100	100	<5
Kyrgyzstan	82	90	85	99	93	93	93	94	34
Lao People's Democratic Republic	45	67	62	77	26	63	50	89	>95
Latvia	99	99	96	100	78	—	—	—	5
Lebanon	100	100	100	100	98	—	—	100	<5
Lesotho	80	78	73	91	25	26	24	32	61
Liberia	61	73	60	88	12	18	7	29	>95
Libya	54	—	—	—	97	97	96	97	<5
Liechtenstein	—	—	—	—	—	—	—	—	—
Lithuania	92	—	—	98	86	—	—	95	21
Luxembourg	100	100	100	100	100	100	100	100	<5
Madagascar	38	46	34	74	12	15	12	21	>95
Malawi	62	83	80	95	46	51	51	49	>95
Malaysia	97	100	99	100	92	96	95	96	<5
Maldives	95	98	97	100	79	97	97	98	8
Mali	46	64	51	87	18	22	14	35	>95
Malta	100	100	100	100	100	100	100	100	<5
Marshall Islands	95	94	99	92	70	75	53	83	32
Mauritania	40	50	48	52	21	26	9	51	58
Mauritius	99	99	99	100	89	89	88	91	<5
Mexico	90	96	91	97	75	85	79	87	14
Micronesia (Federated States of)	92	—	—	—	26	—	—	—	41
Monaco	100	100	NA	100	100	100	NA	100	<5
Mongolia	65	82	53	100	49	51	29	64	72
Montenegro	98	98	96	99	90	90	87	92	28
Morocco	78	83	61	98	64	70	52	83	<5
Mozambique	42	47	29	77	14	18	5	38	95
Myanmar	67	83	78	93	62	76	73	83	92
Namibia	81	93	90	99	28	32	17	57	55
Nauru	98	88	NA	88	66	65	NA	65	<5
Nepal	83	89	88	93	20	31	27	48	82
Netherlands	100	100	100	100	100	100	100	100	<5
New Zealand	100	100	100	100	—	—	—	—	<5
Nicaragua	80	85	68	98	48	52	37	63	54
Niger	42	49	39	100	7	9	4	34	>95
Nigeria	53	58	43	74	34	31	27	35	74
Niue	100	100	100	100	100	100	100	100	<5

Preventive measures and determinants of pneumonia and diarrhoea

Country or territory	Population using an improved drinking water source (%)				Population using an improved sanitation facility (%)				Population using solid fuels as the main cooking fuel (%)
	Total		Rural	Urban	Total		Rural	Urban	Total
	2000	2010	2010	2010	2000	2010	2010	2010	2010
Norway	100	100	100	100	100	100	100	100	<5
Occupied Palestinian Territory	92	85	81	86	89	92	92	92	—
Oman	83	89	78	93	90	99	95	100	<5
Pakistan	89	92	89	96	37	48	34	72	64
Palau	83	85	96	83	84	100	100	100	<5
Panama	90	—	—	97	65	—	—	—	18
Papua New Guinea	39	40	33	87	46	45	41	71	73
Paraguay	74	86	66	99	58	71	40	90	49
Peru	81	85	65	91	63	71	37	81	36
Philippines	89	92	92	93	65	74	69	79	50
Poland	—	—	—	100	90	—	—	96	<5
Portugal	99	99	100	99	98	100	100	100	<5
Qatar	100	100	100	100	100	100	100	100	<5
Republic of Korea	93	98	88	100	100	100	100	100	<5
Republic of Moldova	93	96	93	99	79	85	82	89	11
Romania	84	—	—	99	72	—	—	—	17
Russian Federation	95	97	92	99	72	70	59	74	<5
Rwanda	66	65	63	76	47	55	56	52	>95
Saint Kitts and Nevis	99	99	99	99	96	96	96	96	56
Saint Lucia	95	96	95	98	62	65	63	71	<5
Saint Vincent and the Grenadines	—	—	—	—	—	—	96	—	<5
Samoa	92	96	96	96	98	98	98	98	53
San Marino	—	—	—	—	—	—	—	—	<5
Sao Tome and Principe	79	89	88	89	21	26	19	30	71
Saudi Arabia	—	—	—	97	—	—	—	100	<5
Senegal	66	72	56	93	45	52	39	70	51
Serbia	99	99	98	99	92	92	88	96	32
Seychelles	—	—	—	100	—	—	—	98	<5
Sierra Leone	46	55	35	87	11	13	6	23	>95
Singapore	100	100	NA	100	100	100	NA	100	<5
Slovakia	100	100	100	100	100	100	99	100	<5
Slovenia	100	99	99	100	100	100	100	100	<5
Solomon Islands	70	—	—	—	31	—	—	98	90
Somalia	22	29	7	66	22	23	6	52	>95
South Africa	86	91	79	99	75	79	67	86	15
South Sudan	—	—	—	—	—	—	—	—	—
Spain	100	100	100	100	100	100	100	100	<5
Sri Lanka	80	91	90	99	82	92	93	88	75
Sudan	—	—	—	—	—	—	—	—	—
Suriname	89	92	81	97	81	83	66	90	12
Swaziland	52	71	65	91	52	57	55	64	55
Sweden	100	100	100	100	100	100	100	100	<5

Preventive measures and determinants of pneumonia and diarrhoea

Country or territory	Population using an improved drinking water source (%)				Population using an improved sanitation facility (%)				Population using solid fuels as the main cooking fuel (%)
	Total		Rural	Urban	Total		Rural	Urban	Total
	2000	2010	2010	2010	2000	2010	2010	2010	2010
Switzerland	100	100	100	100	100	100	100	100	<5
Syrian Arab Republic	87	90	86	93	88	95	93	96	<5
Tajikistan	61	64	54	92	90	94	94	95	34
Thailand	92	96	95	97	94	96	96	95	26
The former Yugoslav Republic of Macedonia	100	100	99	100	88	88	82	92	33
Timor-Leste	54	69	60	91	39	47	37	73	92
Togo	55	61	40	89	13	13	3	26	94
Tonga	100	100	100	100	96	96	96	98	43
Trinidad and Tobago	91	94	93	98	92	92	92	92	<5
Tunisia	90	—	—	99	81	—	—	96	<5
Turkey	93	100	99	100	87	90	75	97	<5
Turkmenistan	83	—	—	97	98	98	97	99	<5
Tuvalu	94	98	97	98	83	85	81	88	19
Uganda	58	72	68	95	30	34	34	34	>95
Ukraine	97	98	98	98	95	94	89	96	<5
United Arab Emirates	100	100	100	100	97	98	95	98	<5
United Kingdom	100	100	100	100	100	100	100	100	<5
United Republic of Tanzania	54	53	44	79	9	10	7	20	94
United States	99	99	94	100	100	100	99	100	<5
Uruguay	98	100	100	100	96	100	99	100	<5
Uzbekistan	89	87	81	98	91	100	100	100	11
Vanuatu	76	90	87	98	41	57	54	64	84
Venezuela (Bolivarian Republic of)	92	—	—	—	89	—	—	—	<5
Viet Nam	77	95	93	99	56	76	68	94	56
Yemen	60	55	47	72	39	53	34	93	33
Zambia	54	61	46	87	47	48	43	57	83
Zimbabwe	80	80	69	98	40	40	32	52	66
Memorandum									
Sudan and South Sudan[a]	62	58	52	67	27	26	14	44	79

Preventive measures and determinants of pneumonia and diarrhoea

UNICEF regions[b]	Population using an improved drinking water source (%)				Population using an improved sanitation facility (%)				Population using solid fuels as the main cooking fuel (%)
	Total		Rural	Urban	Total		Rural	Urban	Total
	2000	2010	2010	2010	2000	2010	2010	2010	2010
Africa	61	66	54	85	37	40	31	54	67
Sub-Saharan Africa	55	61	49	83	28	30	23	43	80
Eastern and Southern Africa	54	61	50	87	31	35	27	54	78
West and Central Africa	56	62	47	82	25	26	20	35	82
Middle East and North Africa	86	86	76	93	77	82	70	91	10
Asia	81	90	86	97	41	54	43	71	54
South Asia	81	90	88	96	29	38	28	60	63
East Asia and Pacific	80	90	84	97	50	67	58	77	47
Latin America and Caribbean	91	94	81	98	75	80	60	84	14
Central and Eastern Europe/Commonwealth of Independent States	93	96	91	99	83	85	82	87	6
Industrialized countries	100	100	98	100	99	100	100	100	0
Developing countries	79	86	79	95	47	56	43	73	49
Least developed countries	57	63	56	82	29	35	30	48	88
World	83	89	81	96	56	63	47	79	41

Notes

— Data are not available.

a Because of the cession in July 2011 of the Republic of South Sudan by the Republic of the Sudan, and its subsequent admission to the United Nations on 14 July 2011, disaggregated data for the Sudan and South Sudan as separate States are not yet available for most indicators. Aggregated data presented are for the Sudan pre-cession (see Memorandum item).

b For a complete list of countries and territories in the regions, subregions and country categories, see page 124 of *The State of the World's Children 2012*.

Definitions

Population using an improved drinking water source – Percentage of the population using any of the following as their main drinking water source: drinking water supply piped into dwelling, plot, yard or neighbour's yard; public tap or standpipe; tube well or borehole; protected dug well; protected spring; rainwater; bottled water plus one of the previous sources as their secondary source.

Population using an improved sanitation facility – Percentage of the population using any of the following sanitation facilities, not shared with other households: flush or pour-flush latrine connected to a piped sewerage system, septic tank or pit latrine; ventilated improved pit latrine; pit latrine with a slab; covered pit; composting toilet.

Population using solid fuels as the main cooking fuel – Percentage of population using solid fuels as the main cooking fuel. Solid fuels include wood, coal, charcoal, crops or other agricultural waste, dung and shrubs.

Sources

Columns 1–8: WHO and UNICEF 2012.
Column 9: WHO 2012b.

STATISTICAL TABLE 3

Pneumonia treatment, by background characteristic

	Careseeking for suspected pneumonia						Antibiotic treatment for suspected pneumonia					
Country or territory	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Afghanistan	—	—	—	—	—		—	—	—	—	—	
Albania	70	—	—	—	—	DHS 2008–2009	60	—	—	—	—	DHS 2008–2009
Algeria	53	49	56	38	68	MICS 2006	59	53	64	39	78	MICS 2006
Andorra	—	—	—	—	—		—	—	—	—	—	
Angola	—	—	—	—	—		—	—	—	—	—	
Antigua and Barbuda	—	—	—	—	—		—	—	—	—	—	
Argentina	—	—	—	—	—		—	—	—	—	—	
Armenia	57	—	—	—	—	DHS 2010[a]	11	9	12	—	—	DHS 2005
Australia	—	—	—	—	—		—	—	—	—	—	
Austria	—	—	—	—	—		—	—	—	—	—	
Azerbaijan	36	38	29	35	—	MICS 2000	—	—	—	—	—	
Bahamas	—	—	—	—	—		—	—	—	—	—	
Bahrain	—	—	—	—	—		—	—	—	—	—	
Bangladesh	37	34	57	24	73	DHS 2007	22	22	19	17	28	MICS 2006
Barbados	—	—	—	—	—		—	—	—	—	—	
Belarus	90	78	94	79	93	MICS 2005	67	69	66	83	65	MICS 2005
Belgium	—	—	—	—	—		—	—	—	—	—	
Belize	71	73	69	—	—	MICS 2006	44	50	36	—	—	MICS 2006
Benin	36	36	36	—	—	DHS 2006	—	—	—	—	—	
Bhutan	74	74	74	64	82	MICS 2010	49	47	58	41	66	MICS 2010
Bolivia (Plurinational State of)	51	43	60	40	70	DHS 2008	64	52	76	44	83	DHS 2008
Bosnia and Herzegovina	91	90	95	97	96	MICS 2005–2006	73	72	76	—	—	MICS 2005–2006
Botswana	14	13	15	11	18	MICS 2000	—	—	—	—	—	
Brazil	50	50	50	—	—	Other 2007	—	—	—	—	—	
Brunei Darussalam	—	—	—	—	—		—	—	—	—	—	
Bulgaria	—	—	—	—	—		—	—	—	—	—	
Burkina Faso	56	53	65	—	—	DHS 2010[a]	15	14	23	10	25	MICS 2006
Burundi	55	54	60	—	—	DHS 2010	26	26	31	23	36	MICS 2005
Cambodia	64	64	68	61	65	DHS 2010	39	38	49	33	57	DHS 2010
Cameroon	30	26	36	—	—	DHS 2010[a]	38	27	58	26	63	MICS 2006
Canada	—	—	—	—	—		—	—	—	—	—	
Cape Verde	—	—	—	—	—		—	—	—	—	—	
Central African Republic	32	28	37	25	42	MICS 2006	39	28	55	22	73	MICS 2006
Chad	26	20	51	14	50	MICS 2010[a]	31	23	62	19	63	MICS 2010[a]
Chile	—	—	—	—	—		—	—	—	—	—	
China	—	—	—	—	—		—	—	—	—	—	
Colombia	64	57	67	54	64	DHS 2010	—	—	—	—	—	
Comoros	56	53	71	—	—	MICS 2000	—	—	—	—	—	
Congo	48	37	57	35	57	DHS 2005	—	—	—	—	—	
Cook Islands	—	—	—	—	—		—	—	—	—	—	
Costa Rica	—	—	—	—	—		—	—	—	—	—	
Côte d'Ivoire	35	27	57	21	71	MICS 2006	19	16	26	14	34	MICS 2006
Croatia	—	—	—	—	—		—	—	—	—	—	
Cuba	—	—	—	—	—		—	—	—	—	—	

Pneumonia treatment, by background characteristic

Country or territory	Careseeking for suspected pneumonia						Antibiotic treatment for suspected pneumonia					
	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Cyprus	—	—	—	—	—		—	—	—	—	—	
Czech Republic	—	—	—	—	—		—	—	—	—	—	
Democratic People's Republic of Korea	80	74	85	—	—	MICS 2009	88	80	93	—	—	MICS 2009
Democratic Republic of the Congo	40	38	43	33	45	MICS 2010[a]	42	37	56	24	58	MICS 2010[a]
Denmark	—	—	—	—	—		—	—	—	—	—	
Djibouti	62	50	62	—	—	MICS 2006	43	20	43	—	—	MICS 2006
Dominica	—	—	—	—	—		—	—	—	—	—	
Dominican Republic	70	70	70	65	—	DHS 2007	57	57	57	51	—	DHS 2007
Ecuador	—	—	—	—	—		—	—	—	—	—	
Egypt	73	69	78	70	81	DHS 2008	58	54	63	52	60	DHS 2008
El Salvador	67	—	—	—	—	Other 2008	51	—	—	—	—	Other 2008
Equatorial Guinea	—	—	—	—	—		—	—	—	—	—	
Eritrea	44	40	57	33	63	DHS 2002	—	—	—	—	—	
Estonia	—	—	—	—	—		—	—	—	—	—	
Ethiopia	27	25	47	16	62	DHS 2011	7	7	1	3	6	DHS 2011
Fiji	—	—	—	—	—		—	—	—	—	—	
Finland	—	—	—	—	—		—	—	—	—	—	
France	—	—	—	—	—		—	—	—	—	—	
Gabon	48	34	52	—	—	DHS 2000	—	—	—	—	—	
Gambia	69	72	64	68	68	MICS 2005–2006	61	62	60	65	60	MICS 2006
Georgia	74	—	—	—	—	MICS 2005	56	—	—	—	—	MICS 2005
Germany	—	—	—	—	—		—	—	—	—	—	
Ghana	51	—	—	—	—	DHS 2008	24	—	—	—	—	DHS 2008
Greece	—	—	—	—	—		—	—	—	—	—	
Grenada	—	—	—	—	—		—	—	—	—	—	
Guatemala	64	—	—	—	—	Other 2002	—	—	—	—	—	
Guinea	42	38	58	30	59	DHS 2005	—	—	—	—	—	
Guinea-Bissau	52	46	60	46	49	MICS 2010[a]	35	31	41	28	38	MICS 2010[a]
Guyana	65	—	—	—	—	DHS 2009[a]	20	11	40	—	—	MICS 2006
Haiti	31	—	—	—	—	DHS 2005–2006	3	—	—	—	—	DHS 2005–2006
Holy See	—	—	—	—	—		—	—	—	—	—	
Honduras	56	49	67	46	74	DHS 2005–2006	54	49	62	42	63	DHS 2005–2006
Hungary	—	—	—	—	—		—	—	—	—	—	
Iceland	—	—	—	—	—		—	—	—	—	—	
India	69	66	78	61	80	NFHS 2005–2006	13	12	16	6	19	NFHS 2005–2006
Indonesia	66	65	67	54	77	DHS 2007	—	—	—	—	—	
Iran (Islamic Republic of)	93	—	—	—	—	Other 2000	—	—	—	—	—	
Iraq	82	79	84	—	—	MICS 2006	82	78	85	—	—	MICS 2006
Ireland	—	—	—	—	—		—	—	—	—	—	
Israel	—	—	—	—	—		—	—	—	—	—	
Italy	—	—	—	—	—		—	—	—	—	—	
Jamaica	75	76	73	—	—	MICS 2005	52	53	55	—	—	MICS 2005

Pneumonia treatment, by background characteristic

	Careseeking for suspected pneumonia						Antibiotic treatment for suspected pneumonia					
Country or territory	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Japan	—	—	—	—	—		—	—	—	—	—	
Jordan	75	83	74	66	—	DHS 2007	79	81	79	71	—	DHS 2007
Kazakhstan	71	—	—	—	—	MICS 2006	32	31	32	50	14	MICS 2006
Kenya	56	54	66	57	63	DHS 2008–2009	50	50	47	48	38	DHS 2008–2009
Kiribati	—	—	—	—	—		—	—	—	—	—	
Kuwait	—	—	—	—	—		—	—	—	—	—	
Kyrgyzstan	62	58	68	—	74	MICS 2006	45	27	70	—	81	MICS 2006
Lao People's Democratic Republic	32	30	—	28	—	MICS 2006	52	49	—	45	—	MICS 2006
Latvia	—	—	—	—	—		—	—	—	—	—	
Lebanon	74	—	—	—	—	MICS 2000	—	—	—	—	—	
Lesotho	66	65	—	58	—	DHS 2009	—	—	—	—	—	
Liberia	62	59	73	59	—	DHS 2007	—	—	—	—	—	
Libya	—	—	—	—	—		—	—	—	—	—	
Liechtenstein	—	—	—	—	—		—	—	—	—	—	
Lithuania	—	—	—	—	—		—	—	—	—	—	
Luxembourg	—	—	—	—	—		—	—	—	—	—	
Madagascar	42	39	59	33	68	DHS 2008–2009	—	—	—	—	—	
Malawi	70	71	67	62	75	DHS 2010	30	28	38	—	—	MICS 2006
Malaysia	—	—	—	—	—		—	—	—	—	—	
Maldives	22	—	—	—	—	MICS 2001	—	—	—	—	—	
Mali	38	34	51	28	60	DHS 2006	—	—	—	—	—	
Malta	—	—	—	—	—		—	—	—	—	—	
Marshall Islands	—	—	—	—	—		—	—	—	—	—	
Mauritania	45	36	53	33	64	MICS 2007	24	19	30	17	45	MICS 2007
Mauritius	—	—	—	—	—		—	—	—	—	—	
Mexico	—	—	—	—	—		—	—	—	—	—	
Micronesia (Federated States of)	—	—	—	—	—		—	—	—	—	—	
Monaco	—	—	—	—	—		—	—	—	—	—	
Mongolia	87	—	—	—	—	MICS 2010	72	—	—	—	—	MICS 2010
Montenegro	89	—	87	—	—	MICS 2005	57	—	60	—	—	MICS 2005
Morocco	38	25	50	—	—	DHS 2003–2004	—	—	—	—	—	
Mozambique	65	65	66	57	70	MICS 2008	22	19	29	13	28	MICS 2008
Myanmar	69	67	74	62	69	MICS 2009–2010	34	34	35	29	32	MICS 2009–2010
Namibia	53	49	63	—	—	DHS 2000	14	11	23	10	31	DHS 2006–2007
Nauru	69	—	—	—	—	DHS 2007	47	—	—	—	—	DHS 2007
Nepal	50	47	69	—	—	DHS 2011	25	27	14	32	—	DHS 2006
Netherlands	—	—	—	—	—		—	—	—	—	—	
New Zealand	—	—	—	—	—		—	—	—	—	—	
Nicaragua	58	51	65	—	—	DHS 2001	—	—	—	—	—	
Niger	47	45	62	40	66	MICS 2006	—	—	—	—	—	
Nigeria	45	45	46	32	—	DHS 2008	23	22	24	12	—	DHS 2008
Niue	—	—	—	—	—		—	—	—	—	—	

Pneumonia treatment, by background characteristic

Country or territory	Careseeking for suspected pneumonia						Antibiotic treatment for suspected pneumonia					
	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Norway	—	—	—	—	—		—	—	—	—	—	
Occupied Palestinian Territory	65	—	—	—	—	Other 2000	—	—	—	—	—	
Oman	—	—	—	—	—		—	—	—	—	—	
Pakistan	69	65	80	58	86	DHS 2006–2007	50	49	55	40	62	DHS 2006–2007
Palau	—	—	—	—	—		—	—	—	—	—	
Panama	—	—	—	—	—		—	—	—	—	—	
Papua New Guinea	63	62	73	—	—	DHS 2006	—	—	—	—	—	
Paraguay	—	—	—	—	—		—	—	—	—	—	
Peru	68	65	71	66	—	DHS 2010	51	46	53	45	47	DHS 2010
Philippines	50	47	54	—	—	DHS 2008	42	—	—	—	—	DHS 2008
Poland	—	—	—	—	—		—	—	—	—	—	
Portugal	—	—	—	—	—		—	—	—	—	—	
Qatar	—	—	—	—	—		—	—	—	—	—	
Republic of Korea	—	—	—	—	—		—	—	—	—	—	
Republic of Moldova	60	53	67	42	68	DHS 2005	—	—	—	—	—	
Romania	—	—	—	—	—		—	—	—	—	—	
Russian Federation	—	—	—	—	—		—	—	—	—	—	
Rwanda	50	45	76	40	75	DHS 2010	13	13	14	8	13	DHS 2007–2008
Saint Kitts and Nevis	—	—	—	—	—		—	—	—	—	—	
Saint Lucia	—	—	—	—	—		—	—	—	—	—	
Saint Vincent and the Grenadines	—	—	—	—	—		—	—	—	—	—	
Samoa	—	—	—	—	—		—	—	—	—	—	
San Marino	—	—	—	—	—		—	—	—	—	—	
Sao Tome and Principe	75	77	—	—	—	DHS 2008–2009	—	—	—	—	—	
Saudi Arabia	—	—	—	—	—		—	—	—	—	—	
Senegal	50	—	—	—	—	DHS 2010–2011[a]	—	—	—	—	—	
Serbia	90	89	90	83	96	MICS 2010	82	80	83	80	83	MICS 2010
Seychelles	—	—	—	—	—		—	—	—	—	—	
Sierra Leone	46	45	50	39	46	DHS 2008	27	25	41	26	56	DHS 2008
Singapore	—	—	—	—	—		—	—	—	—	—	
Slovakia	—	—	—	—	—		—	—	—	—	—	
Slovenia	—	—	—	—	—		—	—	—	—	—	
Solomon Islands	73	—	—	—	—	DHS 2007	23	—	—	—	—	DHS 2007
Somalia	13	8	24	5	28	MICS 2006	32	24	49	14	53	MICS 2006
South Africa	65	65	65	—	—	DHS 2003	—	—	—	—	—	
South Sudan	48	44	59	33	66	MICS 2010	33	29	43	18	53	MICS 2010
Spain	—	—	—	—	—		—	—	—	—	—	
Sri Lanka	58	58	54	—	—	DHS 2006–2007	—	—	—	—	—	
Sudan	56	52	67	40	71	MICS 2010	66	64	73	55	76	MICS 2010
Suriname	74	54	81	—	—	MICS 2006	37	14	47	—	—	MICS 2006
Swaziland	58	57	61	62	—	MICS 2010	61	59	68	57	—	MICS 2010
Sweden	—	—	—	—	—		—	—	—	—	—	

Pneumonia treatment, by background characteristic

Country or territory	Careseeking for suspected pneumonia						Antibiotic treatment for suspected pneumonia					
	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Switzerland	—	—	—	—	—		—	—	—	—	—	
Syrian Arab Republic	77	72	81	72	86	MICS 2006	71	66	75	72	81	MICS 2006
Tajikistan	64	67	58	81	75	MICS 2005	41	34	55	32	65	MICS 2005
Thailand	84	85	80	85	78	MICS 2005–2006	65	64	68	66	58	MICS 2005–2006
The former Yugoslav Republic of Macedonia	93	92	94	93	—	MICS 2005	74	72	76	73	—	MICS 2005
Timor-Leste	71	69	74	—	—	DHS 2009–2010	45	48	38	—	—	DHS 2009–2010
Togo	23	22	24	18	28	MICS 2006	41	33	64	—	—	MICS 2010[a]
Tonga	—	—	—	—	—		—	—	—	—	—	
Trinidad and Tobago	74	—	—	—	—	MICS 2006	34	—	—	—	—	MICS 2006
Tunisia	59	48	64	—	—	MICS 2006	—	—	—	—	—	
Turkey	41	—	—	—	—	Other 2003	—	—	—	—	—	
Turkmenistan	83	81	88	—	—	MICS 2006	50	47	64	—	—	MICS 2006
Tuvalu	—	—	—	—	—		—	—	—	—	—	
Uganda	73	74	68	80	78	DHS 2006	47	47	53	45	58	DHS 2006
Ukraine	—	—	—	—	—		—	—	—	—	—	
United Arab Emirates	—	—	—	—	—		—	—	—	—	—	
United Kingdom	—	—	—	—	—		—	—	—	—	—	
United Republic of Tanzania	71	65	86	57	93	DHS 2010	—	—	—	—	—	
United States	—	—	—	—	—		—	—	—	—	—	
Uruguay	—	—	—	—	—		—	—	—	—	—	
Uzbekistan	68	65	74	—	—	MICS 2006	56	51	64	—	—	MICS 2006
Vanuatu	—	—	—	—	—		—	—	—	—	—	
Venezuela (Bolivarian Republic of)	72	—	—	76	77	MICS 2000	—	—	—	—	—	
Viet Nam	83	80	—	—	—	MICS 2006	55	53	—	—	—	MICS 2006
Yemen	47	—	—	—	—	Other 2003	38	34	49	30	38	MICS 2006
Zambia	68	69	67	78	—	DHS 2007	47	39	63	37	—	DHS 2007
Zimbabwe	48	49	—	52	—	DHS 2010–2011	16	14	25	13	17	MICS 2009
Memorandum												
Sudan and South Sudan[b]	—	—	—	—	—		—	—	—	—	—	

Pneumonia treatment, by background characteristic

UNICEF regions[c]	Careseeking for suspected pneumonia, 2006–2011[d] Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Antibiotic treatment for suspected pneumonia, 2006–2011[d] Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Africa	50	47	55	43	66		33	30	40	28	45	
Sub-Saharan Africa	48	46	53	40	65		30	28	36	—	—	
Eastern and Southern Africa	53	51	63	45	71		28	27	33	22	29	
West and Central Africa	43	40	46	—	—		28	26	35	—	—	
Middle East and North Africa	69	65	74	—	—		62	56	70	49	64	
Asia[e]	66	63	74	57	80		23	19	25	13	26	
South Asia	66	63	76	57	80		18	17	22	11	25	
East Asia and Pacific[e]	67	64	66	60	77		50	—	—	—	—	
Latin America and Caribbean	55	—	56	—	—		—	—	—	—	—	
Central and Eastern Europe/Commonwealth of Independent States	—	—	—	—	—		—	—	—	—	—	
Industrialized countries	—	—	—	—	—		—	—	—	—	—	
Developing countries[e]	60	57	65	53	75		29	25	36	19	33	
Least developed countries	47	45	57	37	66		30	28	39	22	39	

Notes

Subnational estimates are often bracketed by large confidence intervals and results should be interpreted with caution.
DHS is Demographic and Health Survey.
MICS is Multiple Indicator Cluster Survey.
NFHS is National Family Health Survey.
— Data are not available.

a Preliminary report.
b Because of the cession in July 2011 of the Republic of South Sudan by the Republic of the Sudan, and its subsequent admission to the United Nations on 14 July 2011, disaggregated data for the Sudan and South Sudan as separate States are not yet available for most indicators. Aggregated data presented are for the Sudan pre-cession (see Memorandum item).
c For a complete list of countries and territories in the regions, subregions and country categories, see page 124 of *The State of the World's Children 2012*.
d Country-level estimates outside the year range of 2006–2011 are not included in the regional aggregates.
e Excludes China.

Definitions

Care-seeking for suspected pneumonia – Percentage of children under age 5 with suspected pneumonia (cough and fast or difficult breathing due to a problem in the chest) in the two weeks preceding the survey who were taken to an appropriate health care provider.

Antibiotic treatment for suspected pneumonia – Percentage of children under age 5 with suspected pneumonia (cough and fast or difficult breathing due to a problem in the chest) in the two weeks preceding the survey who received antibiotics.

STATISTICAL TABLE 4

Diarrhoea treatment, by background characteristic

Country or territory	Diarrhoea treatment with oral rehydration therapy and continued feeding (%)						Diarrhoea treatment with ORS (%)					
	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Afghanistan	—	—	—	—	—		30	24	43	—	—	MICS 2003
Albania	63	63	64	—	—	DHS 2008–2009	54	—	—	—	—	DHS 2008–2009
Algeria	24	23	26	19	23	MICS 2006	19	19	18	15	19	MICS 2006
Andorra	—	—	—	—	—		—	—	—	—	—	
Angola	—	—	—	—	—		40	31	43	24	50	MICS 2001
Antigua and Barbuda	—	—	—	—	—		—	—	—	—	—	
Argentina	—	—	—	—	—		—	—	—	—	—	
Armenia	59	56	62	53	78	DHS 2005	33	—	—	—	—	DHS 2010[a]
Australia	—	—	—	—	—		—	—	—	—	—	
Austria	—	—	—	—	—		—	—	—	—	—	
Azerbaijan	31	41	21	27	28	DHS 2006	21	—	—	—	—	DHS 2006
Bahamas	—	—	—	—	—		—	—	—	—	—	
Bahrain	—	—	—	—	—		—	—	—	—	—	
Bangladesh	68	68	70	57	70	DHS 2007	77	76	81	69	82	DHS 2007
Barbados	—	—	—	—	—		—	—	—	—	—	
Belarus	54	56	53	—	—	MICS 2005	36	33	38	—	—	MICS 2005
Belgium	—	—	—	—	—		—	—	—	—	—	
Belize	26	—	—	—	—	MICS 2006	27	—	—	—	—	MICS 2006
Benin	42	41	43	40	47	DHS 2006	23	22	27	15	32	DHS 2006
Bhutan	62	62	60	61	60	MICS 2010	61	60	64	60	56	MICS 2010
Bolivia (Plurinational State of)	54	52	56	48	64	DHS 2003	35	32	38	31	35	DHS 2008
Bosnia and Herzegovina	53	58	42	58	47	MICS 2005–2006	35	35	34	—	41	MICS 2005–2006
Botswana	7	—	—	—	—	MICS 2000	49	—	—	—	—	MICS 2000
Brazil	—	—	—	—	—		—	—	—	—	—	
Brunei Darussalam	—	—	—	—	—		—	—	—	—	—	
Bulgaria	—	—	—	—	—		—	—	—	—	—	
Burkina Faso	42	41	52	38	53	MICS 2006	17	13	27	15	32	MICS 2006
Burundi	23	23	27	22	27	MICS 2005	38	38	33	—	—	DHS 2010[a]
Cambodia	48	48	45	50	43	DHS 2010	34	34	33	32	34	DHS 2010
Cameroon	22	18	29	16	45	MICS 2006	17	12	27	—	—	DHS 2011[a]
Canada	—	—	—	—	—		—	—	—	—	—	
Cape Verde	—	—	—	—	—		—	—	—	—	—	
Central African Republic	47	43	52	39	55	MICS 2006	13	—	—	6	27	MICS 2006
Chad	23	19	39	14	41	MICS 2010[a]	13	10	27	5	29	MICS 2010[a]
Chile	—	—	—	—	—		—	—	—	—	—	
China	—	—	—	—	—		—	—	—	—	—	
Colombia	52	45	55	46	64	DHS 2010	54	49	57	47	61	DHS 2010
Comoros	31	27	48	31	—	MICS 2000	19	17	25	16	24	MICS 2000
Congo	39	38	40	36	45	DHS 2005	18	15	22	13	18	DHS 2005
Cook Islands	—	—	—	—	—		—	—	—	—	—	
Costa Rica	—	—	—	—	—		—	—	—	—	—	
Côte d'Ivoire	45	43	48	44	60	MICS 2006	10	9	14	6	12	MICS 2006
Croatia	—	—	—	—	—		—	—	—	—	—	
Cuba	—	—	—	—	—		—	—	—	—	—	

Diarrhoea treatment, by background characteristic

Country or territory	Diarrhoea treatment with oral rehydration therapy and continued feeding (%)						Diarrhoea treatment with ORS (%)					
	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Cyprus	—	—	—	—	—		—	—	—	—	—	
Czech Republic	—	—	—	—	—		—	—	—	—	—	
Democratic People's Republic of Korea	67	63	71	—	—	MICS 2009	74	73	75	—	—	MICS 2009
Democratic Republic of the Congo	37	38	36	39	38	MICS 2010[a]	26	26	25	26	26	MICS 2010[a]
Denmark	—	—	—	—	—		—	—	—	—	—	
Djibouti	33	63	32	—	—	MICS 2006	62	—	61	—	—	MICS 2006
Dominica	—	—	—	—	—		—	—	—	—	—	
Dominican Republic	55	51	58	54	57	DHS 2007	41	39	42	41	38	DHS 2007
Ecuador	—	—	—	—	—		—	—	—	—	—	
Egypt	19	20	17	21	14	DHS 2008	28	29	28	34	23	DHS 2008
El Salvador	—	—	—	—	—		58	56	60	—	—	Other 2008
Equatorial Guinea	36	37	34	33	28	MICS 2000	29	19	43	24	37	MICS 2000
Eritrea	54	49	67	—	—	DHS 2002	45	39	59	—	—	DHS 2002
Estonia	—	—	—	—	—		—	—	—	—	—	
Ethiopia	25	25	29	24	34	DHS 2011	26	24	45	18	45	DHS 2011
Fiji	—	—	—	—	—		—	—	—	—	—	
Finland	—	—	—	—	—		—	—	—	—	—	
France	—	—	—	—	—		—	—	—	—	—	
Gabon	44	37	46	37	45	DHS 2000	25	29	23	—	—	DHS 2000
Gambia	38	40	32	34	33	MICS 2006	40	—	—	37	43	MICS 2006
Georgia	37	32	41	—	—	MICS 2005	40	36	44	—	—	MICS 2005
Germany	—	—	—	—	—		—	—	—	—	—	
Ghana	45	40	53	34	—	DHS 2008	45	42	49	41	—	DHS 2008
Greece	—	—	—	—	—		—	—	—	—	—	
Grenada	—	—	—	—	—		—	—	—	—	—	
Guatemala	—	—	—	—	—		34	34	32	—	—	Other 2002
Guinea	38	37	40	32	45	DHS 2005	33	28	52	18	59	DHS 2005
Guinea-Bissau	53	52	55	62	62	MICS 2010[a]	19	13	28	16	37	MICS 2010[a]
Guyana	28	—	—	—	—	MICS 2006–2007	50	—	—	—	—	DHS 2009
Haiti	43	—	—	—	—	DHS 2005–2006	40	35	51	29	50	DHS 2005–2006
Holy See	—	—	—	—	—		—	—	—	—	—	
Honduras	49	49	51	45	52	DHS 2005–2006	56	56	55	56	47	DHS 2005–2006
Hungary	—	—	—	—	—		—	—	—	—	—	
Iceland	—	—	—	—	—		—	—	—	—	—	
India	33	31	38	29	45	NFHS 2005–2006	26	24	33	19	43	NFHS 2005–2006
Indonesia	54	56	52	55	48	DHS 2007	35	35	33	32	27	DHS 2007
Iran (Islamic Republic of)	—	—	—	—	—		—	—	—	—	—	
Iraq	64	67	62	—	—	MICS 2006	31	32	30	—	—	MICS 2006
Ireland	—	—	—	—	—		—	—	—	—	—	
Israel	—	—	—	—	—		—	—	—	—	—	
Italy	—	—	—	—	—		—	—	—	—	—	
Jamaica	39	—	—	—	—	MICS 2005	40	—	—	—	—	MICS 2005

Diarrhoea treatment, by background characteristic

Country or territory	Diarrhoea treatment with oral rehydration therapy and continued feeding (%)						Diarrhoea treatment with ORS (%)					
	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Japan	—	—	—	—	—		—	—	—	—	—	
Jordan	32	36	31	32	35	DHS 2007	20	20	20	18	30	DHS 2007
Kazakhstan	48	—	—	—	—	MICS 2006	74	—	—	—	—	MICS 2006
Kenya	43	42	44	49	41	DHS 2008–2009	39	39	40	40	37	DHS 2009
Kiribati	—	—	—	—	—		—	—	—	—	—	
Kuwait	—	—	—	—	—		—	—	—	—	—	
Kyrgyzstan	22	21	26	49	20	MICS 2006	20	22	—	—	—	MICS 2006
Lao People's Democratic Republic	49	47	—	50	—	MICS 2006	39	36	73	32	73	MICS 2006
Latvia	—	—	—	—	—		—	—	—	—	—	
Lebanon	—	—	—	—	—		24	—	26	—	—	MICS 2006
Lesotho	48	47	49	49	52	DHS 2009	51	50	57	51	—	DHS 2009
Liberia	47	46	50	40	56	DHS 2007	53	52	57	41	64	DHS 2007
Libya	—	—	—	—	—		—	—	—	—	—	
Liechtenstein	—	—	—	—	—		—	—	—	—	—	
Lithuania	—	—	—	—	—		—	—	—	—	—	
Luxembourg	—	—	—	—	—		—	—	—	—	—	
Madagascar	49	47	62	46	65	DHS 2008–2009	17	14	32	12	29	DHS 2008–2009
Malawi	48	47	49	45	53	DHS 2010	69	69	72	67	73	DHS 2010
Malaysia	—	—	—	—	—		—	—	—	—	—	
Maldives	63	—	—	—	—	DHS 2009	57	—	—	—	—	DHS 2009
Mali	38	37	43	32	51	DHS 2006	14	11	26	8	29	DHS 2006
Malta	—	—	—	—	—		—	—	—	—	—	
Marshall Islands	—	—	—	—	—		—	—	—	—	—	
Mauritania	32	28	39	25	37	MICS 2007	20	—	—	10	34	MICS 2007
Mauritius	—	—	—	—	—		—	—	—	—	—	
Mexico	—	—	—	—	—		—	—	—	—	—	
Micronesia (Federated States of)	—	—	—	—	—		—	—	—	—	—	
Monaco	—	—	—	—	—		—	—	—	—	—	
Mongolia	56	56	56	51	66	MICS 2010	38	36	41	34	—	MICS 2005
Montenegro	64	—	—	—	—	MICS 2005	16	—	—	—	—	MICS 2005
Morocco	46	41	51	37	50	DHS 2003–2004	23	18	28	18	25	DHS 2003–2004
Mozambique	47	45	51	41	55	MICS 2008	46	45	47	40	50	MICS 2008
Myanmar	50	47	57	44	65	MICS 2009–2010	61	56	72	52	75	MICS 2009–2010
Namibia	48	45	52	32	47	DHS 2006–2007	63	60	67	50	59	DHS 2006–2007
Nauru	68	—	—	—	—	DHS 2007	—	—	—	—	—	
Nepal	47	46	54	47	54	DHS 2011	39	39	44	39	36	DHS 2011
Netherlands	—	—	—	—	—		—	—	—	—	—	
New Zealand	—	—	—	—	—		—	—	—	—	—	
Nicaragua	49	47	51	44	63	DHS 2001	59	55	64	53	64	DHS 2006–2007
Niger	34	32	47	31	46	DHS 2006	18	16	31	14	32	DHS 2006
Nigeria	25	22	34	17	41	DHS 2008	26	21	41	15	53	DHS 2008
Niue	—	—	—	—	—		—	—	—	—	—	

Diarrhoea treatment, by background characteristic

Country or territory	Diarrhoea treatment with oral rehydration therapy and continued feeding (%)						Diarrhoea treatment with ORS (%)					
	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Norway	—	—	—	—	—		—	—	—	—	—	
Occupied Palestinian Territory	—	—	—	—	—		—	—	—	—	—	
Oman	—	—	—	—	—		—	—	—	—	—	
Pakistan	37	36	38	32	45	DHS 2006–2007	41	40	44	41	44	DHS 2006–2007
Palau	—	—	—	—	—		—	—	—	—	—	
Panama	—	—	—	—	—		—	—	—	—	—	
Papua New Guinea	—	—	—	—	—		—	—	—	—	—	
Paraguay	—	—	—	—	—		—	—	—	—	—	
Peru	64	57	68	59	72	DHS 2010	32	24	37	27	42	DHS 2010
Philippines	60	56	64	59	65	DHS 2008	47	36	58	37	55	DHS 2008
Poland	—	—	—	—	—		—	—	—	—	—	
Portugal	—	—	—	—	—		—	—	—	—	—	
Qatar	—	—	—	—	—		—	—	—	—	—	
Republic of Korea	—	—	—	—	—		—	—	—	—	—	
Republic of Moldova	48	56	43	43	51	DHS 2005	33	—	—	—	—	DHS 2005
Romania	—	—	—	—	—		—	—	—	—	—	
Russian Federation	—	—	—	—	—		—	—	—	—	—	
Rwanda	21	21	20	22	22	DHS 2010	29	30	26	22	37	DHS 2010
Saint Kitts and Nevis	—	—	—	—	—		—	—	—	—	—	
Saint Lucia	—	—	—	—	—		—	—	—	—	—	
Saint Vincent and the Grenadines	—	—	—	—	—		—	—	—	—	—	
Samoa	—	—	—	—	—		68	—	—	—	—	DHS 2009
San Marino	—	—	—	—	—		—	—	—	—	—	
Sao Tome and Principe	63	62	64	66	64	MICS 2006	49	52	45	62	—	DHS 2009
Saudi Arabia	—	—	—	—	—		—	—	—	—	—	
Senegal	43	42	44	40	44	DHS 2005	22	21	24	—	—	DHS 2010–2011[a]
Serbia	60	62	57	46	60	MICS 2010	36	22	50	24	38	MICS 2010
Seychelles	—	—	—	—	—		—	—	—	—	—	
Sierra Leone	57	56	59	47	60	DHS 2008	68	65	78	53	80	DHS 2008
Singapore	—	—	—	—	—		—	—	—	—	—	
Slovakia	—	—	—	—	—		—	—	—	—	—	
Slovenia	—	—	—	—	—		—	—	—	—	—	
Solomon Islands	—	—	—	—	—		—	—	—	—	—	
Somalia	7	6	9	5	11	MICS 2006	13	9	25	7	31	MICS 2006
South Africa	—	—	—	—	—		40	32	41	—	—	DHS 2003
South Sudan	23	23	22	23	25	MICS 2010	39	37	44	27	52	MICS 2010
Spain	—	—	—	—	—		—	—	—	—	—	
Sri Lanka	67	—	—	—	—	DHS 2006–2007	50	50	57	—	—	DHS 2006–2007
Sudan	12	12	13	11	17	MICS 2010	22	22	23	21	16	MICS 2010
Suriname	28	29	26	23	31	MICS 2006	44	60	24	58	—	MICS 2006
Swaziland	48	46	57	34	54	MICS 2010	57	55	65	58	60	MICS 2010
Sweden	—	—	—	—	—		—	—	—	—	—	

Diarrhoea treatment, by background characteristic

Country or territory	Diarrhoea treatment with oral rehydration therapy and continued feeding (%)						Diarrhoea treatment with ORS (%)					
	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Switzerland	—	—	—	—	—		—	—	—	—	—	
Syrian Arab Republic	34	35	33	37	38	MICS 2006	50	44	56	45	59	MICS 2006
Tajikistan	22	20	28	20	26	MICS 2005	73	78	70	—	—	Other 2009
Thailand	46	48	42	43	45	MICS 2005–2006	57	59	50	56	54	MICS 2005–2006
The former Yugoslav Republic of Macedonia	45	23	61	20	—	MICS 2005	24	30	19	34	—	MICS 2005
Timor-Leste	63	64	59	66	62	DHS 2009–2010	71	74	65	70	71	DHS 2009–2010
Togo	24	24	23	—	—	MICS 2010[a]	10	—	—	9	19	MICS 2006
Tonga	—	—	—	—	—		—	—	—	—	—	
Trinidad and Tobago	—	—	—	—	—		—	—	—	—	—	
Tunisia	62	63	61	—	—	MICS 2006	71	—	—	—	—	MICS 2006
Turkey	22	22	22	20	33	DHS 2008	—	—	—	—	—	
Turkmenistan	25	22	31	27	36	MICS 2006	40	45	32	45	30	MICS 2006
Tuvalu	—	—	—	—	—		—	—	—	—	—	
Uganda	39	39	48	39	44	DHS 2006	40	39	41	46	38	DHS 2006
Ukraine	—	—	—	—	—		—	—	—	—	—	
United Arab Emirates	—	—	—	—	—		—	—	—	—	—	
United Kingdom	—	—	—	—	—		—	—	—	—	—	
United Republic of Tanzania	50	49	55	45	59	DHS 2010	44	44	44	41	38	DHS 2010
United States	—	—	—	—	—		—	—	—	—	—	
Uruguay	—	—	—	—	—		—	—	—	—	—	
Uzbekistan	28	—	—	—	—	MICS 2006	28	—	—	—	—	MICS 2006
Vanuatu	43	43	45	38	—	MICS 2007	23	—	—	—	—	MICS 2007
Venezuela (Bolivarian Republic of)	51	—	—	—	—	MICS 2000	38	—	—	—	—	MICS 2000
Viet Nam	65	—	—	—	—	MICS 2006	26	—	—	—	—	MICS 2006
Yemen	48	47	50	41	54	MICS 2006	33	34	30	31	37	MICS 2006
Zambia	56	55	59	53	65	DHS 2007	60	60	59	61	61	DHS 2007
Zimbabwe	46	43	51	35	46	DHS 2010–2011	21	18	26	18	28	DHS 2010–2011
Memorandum												
Sudan and South Sudan[b]	—	—	—	—	—		—	—	—	—	—	

Diarrhoea treatment, by background characteristic

UNICEF regions[c]	Diarrhoea treatment with oral rehydration therapy and continued feeding, 2006–2011[d] (%)						Diarrhoea treatment with ORS, 2006–2011[d] (%)					
	Total	Rural	Urban	Poorest 20%	Richest 20%	Source	Total	Rural	Urban	Poorest 20%	Richest 20%	Source
Africa	33	33	37	30	41		30	29	35	25	38	
Sub-Saharan Africa	34	34	39	31	44		30	29	37	25	40	
Eastern and Southern Africa	39	37	44	37	45		37	36	43	34	42	
West and Central Africa	32	31	38	27	45		25	22	35	17	40	
Middle East and North Africa	32	31	34	24	25		30	29	29	29	27	
Asia[e]	41	39	45	36	48		35	33	41	28	45	
South Asia	37	35	41	32	47		33	31	38	27	46	
East Asia and Pacific[e]	56	54	56	53	54		41	41	47	38	39	
Latin America and Caribbean	—	—	—	—	—		—	—	—	—	—	
Central and Eastern Europe/Commonwealth of Independent States	—	—	—	—	—		—	—	—	—	—	
Industrialized countries	—	—	—	—	—		—	—	—	—	—	
Developing countries[e]	39	37	42	34	46		34	32	39	28	43	
Least developed countries	42	41	45	38	48		39	37	44	34	45	

Notes

Subnational estimates are often bracketed by large confidence intervals and results should be interpreted with caution.
DHS is Demographic and Health Survey.
MICS is Multiple Indicator Cluster Survey.
NFHS is National Family Health Survey.
— Data are not available.

a Preliminary report.
b Because of the cession in July 2011 of the Republic of South Sudan by the Republic of the Sudan, and its subsequent admission to the United Nations on 14 July 2011, disaggregated data for the Sudan and South Sudan as separate States are not yet available for most indicators. Aggregated data presented are for the Sudan pre-cession (see Memorandum item).
c For a complete list of countries and territories in the regions, subregions and country categories, see page 124 of *The State of the World's Children 2012*.
d Country-level estimates outside the year range of 2006–2011 are not included in the regional aggregates.
e Excludes China.

Diarrhoea treatment with oral rehydration therapy and continued feeding – Percentage of children under age 5 who had diarrhoea in the two weeks preceding the survey and who received oral rehydration therapy (oral rehydration salts, recommended home-made fluids or increased fluids) and continued feeding.
Diarrhoea treatment with ORS – Percentage of children under age 5 who had diarrhoea in the two weeks preceding the survey and who received oral rehydration salts (ORS packets or pre-packaged ORS fluids).

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