

Countdown to 2015: tracking intervention coverage for child survival



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Summary

Background The fourth Millennium Development Goal (MDG) calls for a two-thirds' reduction between 1990 and 2015 in deaths of children younger than five years; achieving this will require widespread use of effective interventions, especially in poor countries. We present the first report of the Child Survival Countdown, a worldwide effort to monitor coverage of key child-survival interventions in 60 countries with the world's highest numbers or rates of child mortality.

Methods In 2005, we developed a profile for each of the 60 countries to summarise information on coverage with essential child survival interventions. The profiles also present information on demographics, nutritional status, major causes of death in children under 5 years of age, and the status of selected health policies. Progress toward the fourth MDG is summarised by comparing the average annual rate of reduction in under-5 mortality in each country with that needed to achieve the goal. The profiles also include a comparison of the proportions of children in the poorest and richest quintiles of the population who received six or more essential prevention interventions. Each country's progress (as measured by defined indicators of intervention coverage) was put into one of three groups created on the basis of international targets: "on track"; "watch and act"; and "high alert". For indicators without targets, arbitrary thresholds for high, middle, and low performance across the 60 countries were used as a basis for categorisation.

Findings Only seven countries are on track to met MDG-4, 39 countries are making some progress, although they need to accelerate the speed, and 14 countries are cause for serious concern. Coverage of the key child survival interventions remains critically low, although some countries have made substantial improvements in increasing the proportion of mothers and children with access to life saving interventions by as much as ten percentage points in 2 years. Children from the poorest families were less likely than those from wealthier families to have received at least six essential prevention interventions.

Interpretation Our results show that tremendous efforts are urgently needed to achieve the MDG for child survival. Profiles for each country show where efforts need to be intensified, and highlight the extent to which prevention interventions are being delivered equitably and reaching poor families. This first report also shows country-specific improvements in coverage and highlights missed opportunities. The "Countdown to 2015" will report on progress every 2 years as a strategy for increasing accountability worldwide for progress in child survival.

Introduction

In 2000, governments worldwide committed to improving the health and nutrition of children by adopting the Millennium Declaration. Within the ten Millennium Development Goals (MDGs),¹ child survival is the focus of the fourth MDG, that calls for a reduction of two-thirds in under-5 deaths from the 1990 baseline.² Several other goals, and the indicators defined to track progress, are also related to child mortality. For example, MDG-5 calls for reductions in maternal mortality and other MDGs call for attention to major infectious diseases and nutrition.

We now have a solid base of evidence that showing that a set of about 20 proven interventions could reduce child mortality by over 60%, if they were made available to all mothers and children who need them.³⁻⁵ Regular updates on the proportion of individuals who need an intervention and actually receive it, referred to as "coverage", are central to good programme management and, therefore, to progress in improving child survival. Governments and

their partners need up-to-date information about whether programmes are reaching mothers and children younger than 5 years, including newborns (defined as children in the first 4 weeks of life). An increase in coverage would show that interventions are being delivered successfully to children and mothers; no increase in coverage would be a cause for urgent concern. Low coverage rates would merit careful investigation by governments and their partners into how interventions are being delivered and why they are not reaching those who need them.

Here, we report key results from the Child Survival Countdown, a collaboration of scientists, policymakers, activists, and health programme managers. The Countdown aims to gather data on countries' progress in achieving adequate coverage of interventions effective in reducing deaths in children under 5 years to help governments, local partners and international bodies document accomplishments and revitalise failing efforts.⁶ At the first Child Survival Countdown meeting in

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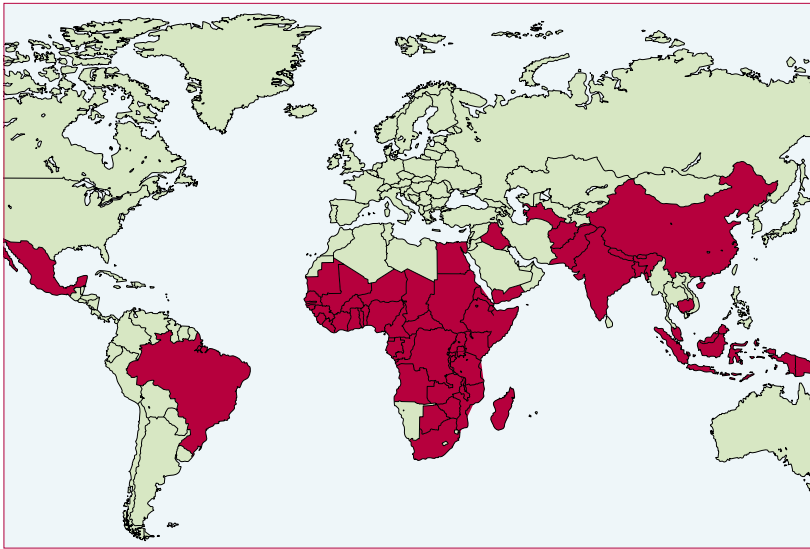


Figure 1: The 60 countries with the highest numbers or rates worldwide of child mortality*

*Defined as deaths of more than 50 000 children under age 5 years or an under-5 mortality rate of 90 per one thousand live births or greater, in 2004. Source: *The State of the World's Children 2006* report.

December 2005,⁶ the group pledged to meet every 2 years until 2015 (the deadline for achieving the MDGs). These meetings will provide a forum for taking stock of progress in preventing child deaths, sharing new evidence and experience, and holding international and national institutions accountable if the rate of progress is not satisfactory.

Methods

We focused on the 60 countries with the highest burden of child mortality in 2004 (figure 1). Criteria for inclusion were having more than 50 000 child deaths per year (n=42) or having an annual under-five mortality rate of 90 per thousand live births or higher (n=18) (regardless of the absolute number of deaths), or both. In 2004, these 60 countries had 94% of all deaths in under-5s worldwide.⁷

Selection of indicators

The country profiles were designed to summarise coverage levels along with information useful in their interpretation. Figure 2 shows an example (Bangladesh) of the template for the profiles. Country data on demographic indicators and MDG targets were taken from the *State of the World's Children 2006*,⁷ with the exception of the neonatal mortality rate, which was taken from the *World Health Report 2005*.⁸ Under-5 mortality data represent current best estimates, and are derived by fitting a curve to all available data points and extrapolating to a common reference year. This process is described elsewhere,⁹ as is information about the specific surveys used in the estimates.

Standardised country-specific information on the causes of child deaths was not available for all 60 countries

at the time the profiles were developed. Thus, we used the five cause-of-death profiles in *The Lancet* child survival series¹⁰ for the 42 countries representing 90% of under-5 deaths in 2000, and applied the same procedures to the 18 other countries included here.¹¹ Data were insufficient to assign a profile to Congo, Djibouti, Gabon, and Liberia. WHO has now completed cause of death estimates for children under 5 years for all countries.¹²

We obtained country estimates related to nutrition from *The State of the World's Children 2006*.⁷

Our aim was to identify indicators of population coverage for as many of the proven interventions from the 2003 and 2004 *Lancet* series on child and neonatal survival^{3,4} as possible that met basic criteria of validity (including reliability) and for which data were available for most of the 60 countries. We selected 16 indicators from a list of 19 recommended by international organisations monitoring progress toward MDG-4.¹³ If two were available for an intervention, we selected the one we considered more valid and relevant.

Population-based surveys are the primary source of data for intervention coverage in most low-income countries. Protocols for measuring indicators are included in both the UNICEF-supported Multiple Indicator Cluster Surveys (MICS) and the USAID-supported Demographic and Health Surveys (DHS). The indicators for postnatal visits within 3 days of delivery, and antibiotic treatment for pneumonia are included in the country profile template because they will be measured in future DHS and MICS, and results will therefore be available for use in the 2007 Child Survival Countdown country profiles.

There are two exceptions to the sole use of sample surveys as a source of coverage data: (1) estimated coverage rates for vaccinations draw on both surveys and routine data;¹⁴ and (2) estimated coverage for interventions to prevent mother-to-child transmission of HIV/AIDS (PMTCT) is assessed through routine data and programme reporting.¹⁵

UNICEF global databases are updated annually after rigorous quality assessment of all nationally-representative data including those from DHS and MICS, and then published in *The State of the World's Children*. The Child

Panel 1: Three categories of indicator coverage

- On track: coverage for this indicator, in this country, meets the established target or is high compared with that of other countries
- Watch and act: coverage for this indicator, in this country, falls in the middle range compared with other countries (but in most cases falls far short of either the stated target or the broader goal of universal coverage)
- High alert: indicating that coverage for this indicator, in this country, falls far short of the target and is very low compared with the rest of the 60 countries.

For the Multiple Indicator Cluster Surveys (MICS) see <http://www.childinfo.org/index2.htm>

For the Demographic and Health Surveys (DHS) see <http://www.childinfo.org/index2.htm>

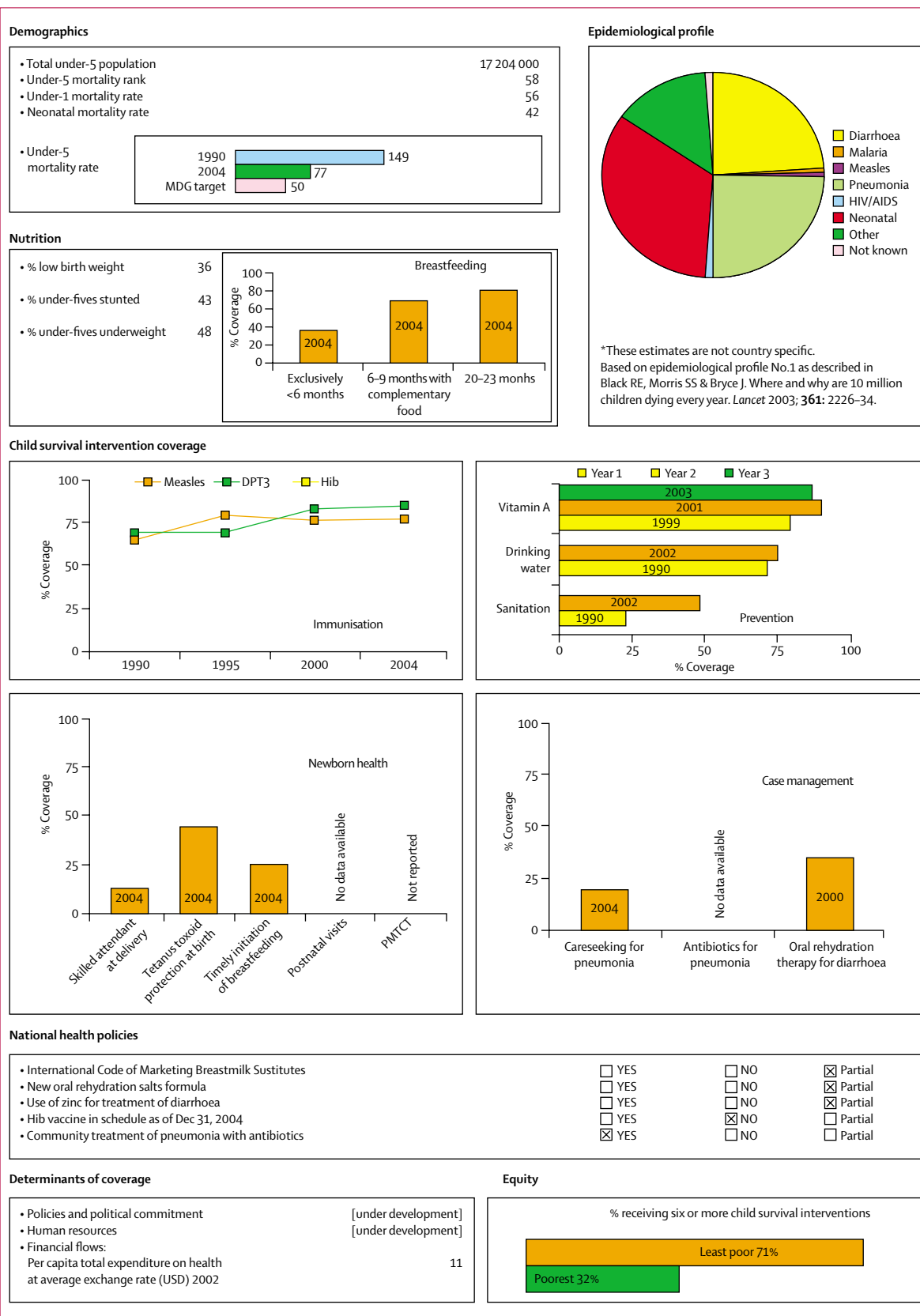


Figure 2: Example of template for country profiles
Data are shown for Bangladesh because that country was the first in the alphabetical list with complete indicator data.

	Status			Targets	
	Under-5 mortality rate 1990	Under-5 mortality rate 2004	Estimated average annual rate of reduction 1990–2004	MDG target under-5 mortality rate 2015	Average annual rate of reduction needed between 2004 and 2015 to meet target
Afghanistan	260	257	0.1	87	9.9
Angola	260	260	0.0	87	10.0
Azerbaijan	105	90	1.1	35	8.6
Bangladesh	149	77	4.7	50	4.0
Benin	185	152	1.4	62	8.2
Botswana	58	116	-5.0	19	16.3
Brazil	60	34	4.1	20	4.8
Burkina Faso	210	192	0.6	70	9.2
Burundi	190	190	0.0	63	10.0
Cambodia	115	141	-1.5	38	11.8
Cameroon	139	149	-0.5	46	10.6
Central African Rep	168	193	-1.0	56	11.2
Chad	203	200	0.1	68	9.8
China	49	31	3.3	16	5.8
Congo	110	108	0.1	37	9.8
Congo, Dem Rep	205	205	0.0	68	10.0
Côte d'Ivoire	157	194	-1.5	52	11.9
Djibouti	163	126	1.8	54	7.7
Egypt	104	36	7.6	35	0.3
Equatorial Guinea	170	204	-1.3	57	11.6
Ethiopia	204	166	1.5	68	8.1
Gabon	92	91	0.1	31	9.9
Gambia	154	122	1.7	51	7.9
Ghana	122	112	0.6	41	9.2
Guinea	240	155	3.1	80	6.0
Guinea-Bissau	253	203	1.6	84	8.0
Haiti	150	117	1.8	50	7.7
India	123	85	2.6	41	6.6
Indonesia	91	38	6.2	30	2.1
Iraq	50	125	-6.5	17	18.3
Kenya	97	120	-1.5	32	11.9
Liberia	235	235	0.0	78	10.0
Madagascar	168	123	2.2	56	7.2
Malawi	241	175	2.3	80	7.1
Mali	250	219	0.9	83	8.8
Mauritania	133	125	0.4	44	9.4
Mexico	46	28	3.5	15	5.5
Mozambique	235	152	3.1	78	6.0
Myanmar	130	106	1.5	43	8.1
Nepal	145	76	4.6	48	4.1
Niger	320	259	1.5	107	8.1
Nigeria	230	197	1.1	77	8.6
Pakistan	130	101	1.8	43	7.7
Papua New Guinea	101	93	0.6	34	9.2
Philippines	62	34	4.3	21	4.5
Rwanda	173	203	-1.1	58	11.4
Senegal	148	137	0.6	49	9.3
Sierra Leone	302	283	0.5	101	9.4

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Survival Countdown adopted these 2006 estimates for the 2005 country profiles.⁷

The country profiles include coverage for multiple years for some indicators if these country level data are available; the year of data collection is also included. A full listing of the available data sources by country and indicator is available at <http://www.childinfo.org>.

Indicators for five aspects of a comprehensive child health policy were assessed as a proxy for the overall status of national child health policy and implementation. They include the International Code of Marketing of Breast-milk Substitutes adopted by WHO Member States in 1981 as a minimum recommendation to protect, promote, and support breastfeeding.¹⁶ New global policy recommendations on the management of diarrhoea with low osmolarity oral rehydration salts and zinc,¹⁷ the prevention of pneumonia and meningitis with Hib (*Haemophilus influenzae* type b) vaccine,¹⁸ and delivery channels to increase coverage for community-based management of suspected pneumonia¹⁹ were included as markers of country responsiveness to new evidence and policies on interventions and delivery strategies.

Information on the implementation of these five policies was obtained from UNICEF staff at national and international levels. We then coded each policy as: “fully in place”, when the policies were fully implemented at the national level; “partly in place”, when some action had been taken towards adoption or it had been adopted at a regional level; or “not in place” when no action had been taken to adopt the policy.

The organising committee of the Child Survival Countdown identified three factors they believe have particular importance in determining national coverage levels: political commitment, human resources, and financial flows. Working groups of technical experts in each area were commissioned to identify and if necessary develop and test indicators related to each factor that could be used in the tracking effort. This work is underway and will be reported on as it progresses. For financial flows to child survival a proxy indicator (per capita total expenditure on health at average exchange rate (US\$) in 2002 as reported in the World Health Report 2005⁸) was included as a placeholder and may be replaced in the future.

For the country profiles, we aggregated data carefully because summaries can often mask important differences in measures within and across countries. We summarised the coverage indicators in two ways. The first was to identify median coverage levels and ranges for the 60 priority countries. The second was to broadly categorise countries into three groups (panel 1), based on progress towards global coverage targets, or on indicator-specific threshold levels. The categories for each indicator were created out of a compromise between the need to highlight country successes in a particular area and a desire to separate out countries in particular need of assistance (webtable).

Role of the funding source

Funding for this work came from the regular budgets of the co-authors' institutions, primarily in the form of in-kind contributions of staff time. All of these institutions were therefore involved through their staff in the analysis and interpretation of the data contained in the country profiles, in the writing of the report, and in the decision to submit the paper for publication. However, the views expressed in this report are those of the authors and do not necessarily represent the policies or views of their institutions.

Results

The webappendix contains the 60 individual country profiles.

Table 1 shows estimates for each country: under-five mortality rates in 1990 and 2004; the estimated average annual rate of reduction (AARR) in the under-5 mortality rate between 1990 and 2004; the MDG target for under-5 mortality rates to be achieved by 2015 (two-thirds of the 1990 rate); and the AARR needed from 2004 to 2015 to meet the country-specific MDG target. Countries for which the AARR in the period from 1990 to 2004 exceeds that needed to achieve MDG-4 are labelled as "on track"—seven at this time (represented in bold, table 1).

Table 2 shows the medians for the 19 coverage indicators across the 60 countries. Here we present detailed results for eight coverage indicators related to interventions with the highest potential impact on child mortality at universal coverage^{3,4} (for details see the full country profiles in the webappendix).

Of the nutrition indicators, we focus on exclusive breastfeeding under 6 months of age. Of the 57 countries with data for this indicator (table 2), ten had "on track" coverage of 50% or higher, and 23 were on "high alert" with rates of 20% or lower.⁸ The International Code of Marketing of Breastmilk Substitutes has been fully adopted in 15 of the 60 countries, and partly adopted in 40. Somalia, Chad, and the Central African Republic have not yet made significant progress toward the adoption of the code; no information was available for Equatorial Guinea and Liberia.

Coverage for measles immunisations and DPT3 (against diphtheria, pertussis, and tetanus) (table 2 and figure 3) exceeded the international 90% target for 2010²⁰ in ten of the 60 priority countries. 22 countries had increases in DPT3 coverage of 10 or more percentage points between 2000 and 2004, and 23 had increases of the same magnitude for measles. Six countries reported measles coverage of 50% or lower (Central African Republic, Côte d'Ivoire, Liberia, Nigeria, Papua New Guinea, and Somalia). The same six also had DPT3 coverage rates under 50%, along with four others (Chad, Equatorial Guinea, Gabon, and Haiti). Three (Côte d'Ivoire, Liberia, and Papua New Guinea) had a decrease in coverage of 10% or more for both measles and DPT3.

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Somalia	225	225	0.0	75	10.0
South Africa	60	67	-0.8	20	11.0
Sudan	120	91	2.0	40	7.5
Swaziland	110	156	-2.5	37	13.2
Tajikistan	128	118	0.6	43	9.2
Tanzania, United Rep	161	126	1.8	54	7.8
Togo	152	140	0.6	51	9.2
Turkmenistan	97	103	-0.4	32	10.5
Uganda	160	138	1.1	53	8.6
Yemen	142	111	1.8	47	7.8
Zambia	180	182	-0.1	60	10.1
Zimbabwe	80	129	-3.4	27	14.3

Bold represents on track to meet the 2015 target. Source: Division of Health Policy and Planning, UNICEF, December 2005.

Table 1: Under-5 mortality rates in the 60 countries in 1990 and 2004, and progress needed to meet the 2015 target

Indicator (year of estimate)	Number of countries where the indicator is relevant	Number of countries with available information	Coverage level Median (range)
Nutrition			
Exclusive breastfeeding at <6 months of age (2004)	60	57	24 (1-84)
Breastfeeding plus complementary food at 6-9 months of age (1996-2004)	60	57	66 (13-94)
Continued breastfeeding at 20-23 months of age (1996-2004)	60	56	54 (8-94)
Immunisation*			
DPT immunisation (2004)	60	60	73 (25-98)
Measles immunisation (2004)	60	60	74 (35-99)
Hib immunisation (2004)	60	11	89 (73-98)
Other prevention interventions			
Vitamin A supplementation (2003)	56	41	80 (1-98)
Use of improved drinking water sources (2002)	60	60	69 (13-98)
Use of improved sanitation facilities (2002)	60	60	41 (6-80)
Insecticide-treated bednets (2004)	45	28	3 (0-44)
Newborn health			
Skilled attendant at delivery (1996-2004)	60	59	51 (6-97)
Tetanus toxoid protection at birth (2004)	60	50	59 (10-90)
Timely initiation of breastfeeding‡ (1996-2004)	60	38	36 (9-72)
Postnatal visit within 3 days of delivery	60	0	..
Prevention of mother-to-child transmission of HIV§ (2004)	46	34	3 (0-50)
Case management			
Care-seeking for pneumonia (1998-2004)	60	54	47 (14-76)
Antibiotic treatment for pneumonia	60	0	..
Oral rehydration therapy for diarrhoea (1996-2004)	60	50	38 (7-80)
Antimalarial treatment for fever (1999-2004)	45	31	45 (1-69)

*Percentage of children aged 12-23 months immunised before their first birthday; †percentage of children given at least one high dose vitamin A supplement in the 6 months before the survey; ‡defined as being put to the breast within 1 hour of birth; §percentage of all HIV-positive pregnant women given antiretroviral treatment prophylaxis.

Table 2: Median coverage rates for essential interventions in the 60 countries

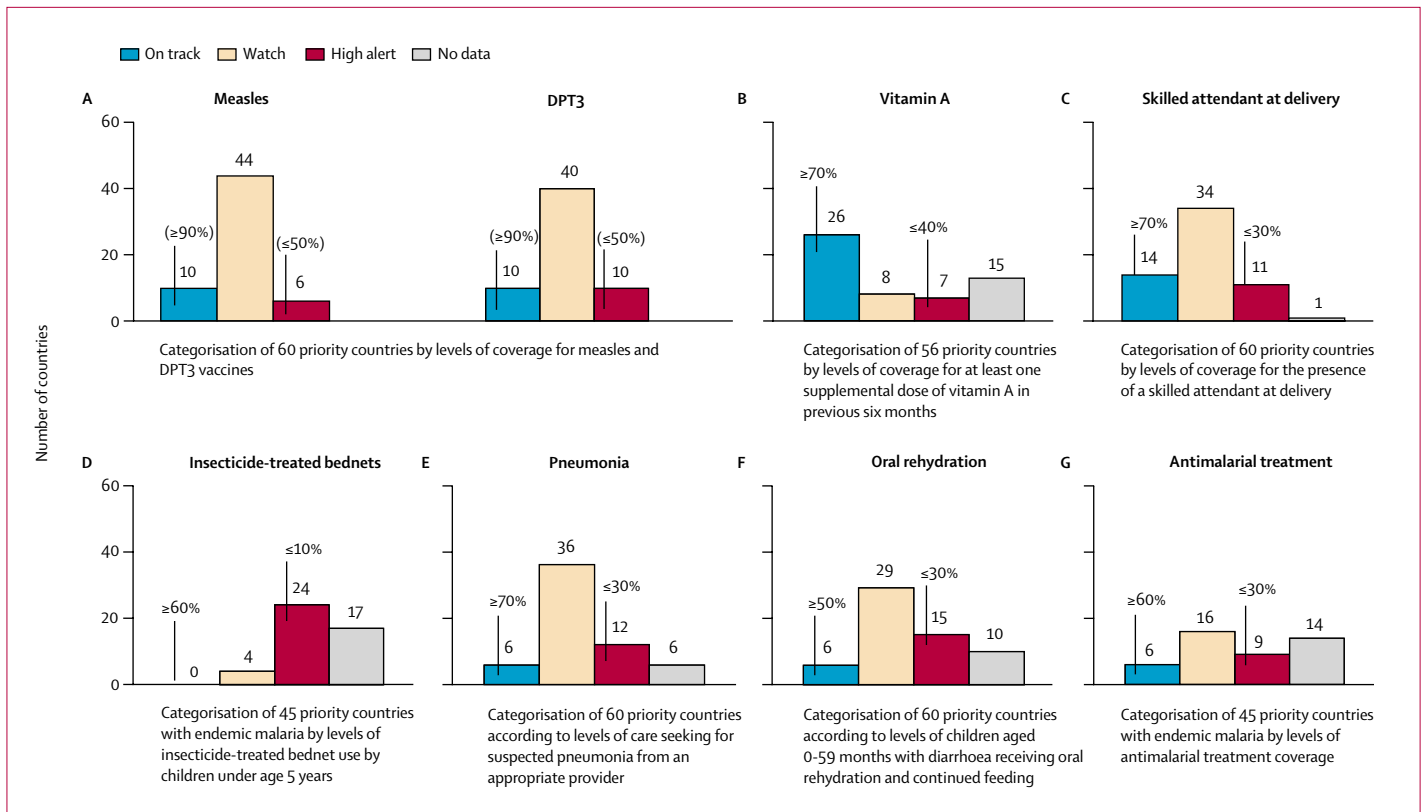


Figure 3: Categorisation of priority countries by levels of coverage of immunisation (A), vitamin A supplementation (B); use of insecticide-treated bednets (C); skilled attendant at delivery (D); careseeking for pneumonia (E); oral rehydration for diarrhoea (F); and antimalarial treatment (G)

Sources: The State of the World's Children 2006; in D, data for Malawi came from: The Centre for Social Research, University of Malawi. The coverage and utilisation of insecticide-treated bednets and malaria prevention and treatment practices at the community level in Malawi, December, 2004; data for Togo came from the US Centers for Disease Prevention and Control. Distribution of insecticide-treated bednets during an integrated nationwide immunization coverage, Togo, December, 2004. *MMWR* 2005; 54: 994-96.

Thresholds for indicators with no global targets are based on the relative coverage levels for each indicator across the 60 countries and do not reflect the adequacy of the absolute coverage levels. See the webtable for threshold levels for the categorisation of each indicator.

56 countries had national vitamin A supplementation programmes (table 2, figure 3).²¹ Seven were classified as “high alert”, with vitamin A supplementation coverage rates of 40% or below (Gabon 30%, Haiti 25%, Kenya 33%, Nigeria 27%, Papua New Guinea 1%, Sudan 34%, and Yemen 36%).

Use of insecticide-treated nets in the 45 countries with endemic malaria²² is shown in table 2 and figure 3. No countries are close to the target of 80% for this MDG-6 indicator, which was set in the Roll Back Malaria Global Strategic Plan 2005–2015 for achievement by 2010.²² Only four countries have national coverage rates of 10% or above: the Gambia (15%), Malawi (36%), Tanzania (26%), and Togo (44%).

Table 2 and figure 3 also show coverage results for newborn health interventions. Ten countries did not have adequate data to report on tetanus protection at birth. Of the remaining 50 countries, 17 had coverage rates of 70% or more, and eight reported coverage rates under 40%. 14 countries report delivery by a skilled attendant in at least 70% of births. 11 countries reported skilled attendants

at 30% or less of deliveries (Afghanistan, Bangladesh, Burundi, Ethiopia, Chad, Haiti, Nepal, Niger, Pakistan, Somalia, and Yemen).

Coverage rates for correct case management of pneumonia, diarrhoea, and malaria are summarised in table 2 and figure 2. Six countries report levels of appropriate careseeking for pneumonia of 70% or above, and 12 countries report such rates of 30% or lower. These rates were 20% or lower in four countries: Bangladesh (20%), Botswana (14%), Ethiopia (16%), and Rwanda (20%). 17 countries now have policies that allow for community management of pneumonia.

Six countries have appropriate management of diarrhoea in at least 50% of children, and 15 countries report rates of 30% or lower (figure 3). 17 countries have adopted a policy or have already begun using the new, low osmolarity oral rehydration salts. As of November, 2005, only seven countries had adopted the 2004 WHO/UNICEF recommendation to include zinc in the treatment of diarrhoea.

For malaria case management, the global target is that by 2010, 80% of malaria patients (all ages and we report

Panel 2: Equity in Countdown coverage monitoring

In this analysis we focus on socioeconomic inequities in coverage, “equity” being defined as the absence of systematic differences in one or more aspects of health status across different economic, political, social, or demographic groups, and “inequities” as systematic differences that are unfair or avoidable.²³

Coverage rates for effective newborn and child survival interventions are not only low in most developing countries—within every country, rates consistently reflect socioeconomic inequities, and often disparities by gender or across ethnic groups. Children born into poor families are much less likely to be given basic healthcare than those from richer families.²⁴ The Countdown indicator for socioeconomic equity used in 2005 was the proportion of children under 5 years receiving six or more child survival interventions, out of a basic set of eight to nine key interventions being scaled up at country level. The choice of interventions for these analyses was based on data availability across multiple surveys as well as on evidence of effectiveness.^{3,4}

This “co-coverage”²⁵ indicator was calculated for five household wealth quintiles, as assessed through the ownership of selected household assets, a widely-accepted procedure for measuring wealth.²⁶ Equity analyses were restricted to the 28 priority countries with a recent DHS including data on family assets. Describing the simultaneous coverage of several interventions received by individual children provides a more accurate picture of the inequity pattern in a country than looking at each intervention separately.

In figure 4 we show the proportions of children, ranging from poorest to richest, receiving six or more of eight interventions: antenatal care, tetanus toxoid protection at birth, skilled attendant at delivery, safe water, BCG vaccination, DPT3 vaccination, measles vaccination, or vitamin A supplementation (A); and, in countries affected by malaria, insecticide-treated bednets was a ninth possible intervention (B).

The bars start at the coverage level in poorest children and end at richest; the width of the bar represents the percentage gap between rich and poor. Chad has the smallest gap of 22.6 percentage points, with only 0.2% of the poorest receiving six or more interventions, compared with 22.8% of the least poor. Eritrea had the widest gap of 71.2 percentage points. The relative position of the bars on the horizontal scale shows how well rich and poor are doing in terms of achieving universal coverage. In Chad, despite the fact that the gap was small, the bar is to the extreme left of the graph indicating low coverage even among the better off. Nicaragua, Egypt, Brazil and Ghana have co-coverage rates of 40% or higher among the poorest, which doubles for the richest.

Future Countdown reports will include equity assessments for additional countries, drawing on MICS and other data sources. Coverage levels in vulnerable subgroups of the population, such as urban slum dwellers and ethnic minorities, could also be monitored in this way. Monitoring both the length and relative position of the bars in this figure will allow us to track inequalities over time in a systematic way, and hopefully prompt remedial action by national and international decision makers.

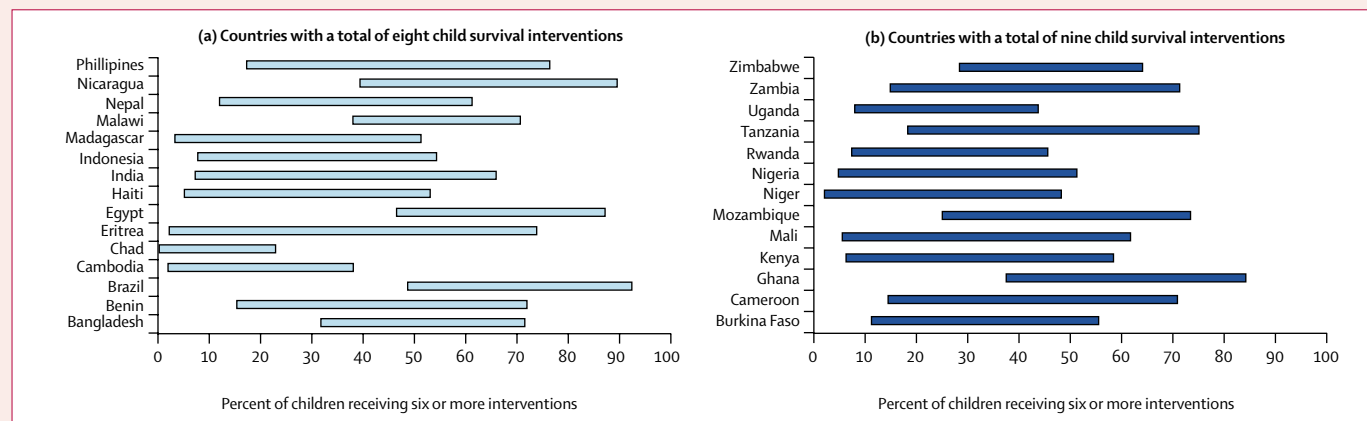


Figure 4: Percent of under-5 children in the poorest and least-poor quintiles reported to have received six or more of a total of eight (a) or nine (b) essential preventive interventions

here on correct antimalarial treatment among children under 5 years) will be diagnosed and treated with effective antimalarial medicines within 1 day of the onset of illness.²² Six countries met the previous treatment target set in Abuja of 60% coverage by 2005: Angola (63%), Benin (60%), Central African Republic (69%), Ghana (63%), Sierra Leone (61%), and Togo (60%) (figure 2). 22 have achieved over 30% coverage with antimalarial treatment.

Panel 2 shows the results on socioeconomic inequities in coverage from countries with a recent DHS that included an assessment of family assets.

Discussion

Only seven of the 60 countries with the highest burden of

under-5 mortality in 2004 are on track to achieve MDG-4: Bangladesh, Brazil, Egypt, Indonesia, Mexico, Nepal, and the Philippines. Mortality rates increased between 1990 and 2004 in 14 (23%) countries. Most countries with rising child mortality rates are affected by armed conflict or generalised epidemics of HIV (eg, Zimbabwe, Rwanda, Kenya, Iraq, Cote d'Ivoire, Central African Republic, and Botswana).

The disappointing rates of progress in child survival are no surprise given the findings on levels of coverage with interventions effective in reducing child mortality. Median coverage rates range between a low of 3% for insecticide-treated bednets and PMTCT and a high of 89% for Hib immunisation, which only 11 countries have

implemented so far. Of the 17 indicators with available data, eight had median values below 50%. Coverage rates also vary widely in some countries by intervention. In the Central African Republic, for example, almost three-quarters of children with fever receive antimalarials, whereas only about one-third receive immunisations for measles and DPT3.

Results on coverage for specific groups of interventions indicate a need for renewed efforts by the national and international health and nutrition communities. In the nutrition area, results on the prevalence of exclusive breastfeeding illustrate the need to improve family behaviours. With respect to immunisation, our results show that 50 of the 60 countries with the highest burden of under-5 mortality will need vastly intensified efforts to achieve the 90% coverage target for both measles and DPT3 by 2010.²⁰

Strategies for delivering essential interventions to mothers and children must be re-examined in situations with high prevalence of HIV. Some countries in southern Africa were making reasonable progress in reducing under-5 mortality before the arrival of the HIV epidemic,⁷ and despite huge losses in human resources might be capable of salvaging the situation provided that delivery strategies are reassessed and strengthened.

Coverage for other interventions is mixed. For vitamin A supplementation, our findings are consistent with reports in the past few years of substantial increases in coverage, although further efforts are needed to ensure that two doses are used, rather than one.²¹ Results on coverage with insecticide-treated bednets show that the potential benefit of this intervention was widely recognised only after the Abuja meeting in 2000 and that resources for their distribution have been slow in reaching countries.²² The target of 80% by 2010²² will require massive increases in coverage levels—currently below 10% for most countries.

The use of neonatal interventions must become more widespread. Mortality can be reduced by eliminating neonatal deaths from tetanus, incorporating essential newborn care into ongoing maternal and child health efforts, and improving home care.

Proper case management of major childhood infectious diseases, which has been neglected in recent years, must become a key focus of child survival efforts. Pneumonia, for example, kills more children under the age of 5 years than any other disease.²⁷ Our results are consistent with a recent UNICEF report indicating that only one in five caregivers in developing countries can identify the early signs of pneumonia, and only about half of children under 5 with suspected pneumonia are taken to an appropriate health-care provider.²⁸ Treatment rates for children with malaria are also low. Our results show that only about two-thirds of the 45 countries with endemic malaria have national data for the proportion of children with fever or presumed malaria who received effective antimalarial treatment. Only a handful of countries met

the Abuja target of 60% coverage of antimalarial treatment by 2005.²⁹ Results on coverage of oral rehydration therapy for children with diarrhoea must be interpreted with care due to differences in indicator definitions across different surveys and over time.³⁰ Regardless of the definition used, however, most countries show low coverage levels.

These first results of the Child Survival Countdown show that tremendous efforts are needed to achieve the MDGs. But they also show that we are on the brink of unprecedented opportunities. In a very short time, some countries have made substantial improvements in coverage, increasing the proportion of mothers and children who have access to life-saving interventions by as much as ten percentage points in 2 years. Other countries are struggling, and have been ranked as “high alert” on numerous indicators. Extraordinary efforts are needed in these countries to save the lives of mothers and their infants and to progress toward national and international targets.

Our coverage results are not equivalent to estimates of effectiveness, because they do not include assessments of quality or impact. Countdown monitoring is not an end in itself. Real improvements in child survival will require accelerated efforts on all fronts, including strengthening health systems and management capacity, improved commodity security at national and regional levels, and increased and rationalised financial flows to child survival as described in a companion paper in this issue.³¹ We hope that by keeping a spotlight on the provision of these interventions, we will increase attention, awareness, and support to country implementation efforts in child survival.

The 2003³ and 2005⁴ *Lancet* series on child and neonatal survival, respectively, highlighted the potential effect of sets of interventions on mortality. Further research is needed to determine intervention-specific and coverage level-specific impacts within different epidemiological and health system contexts, and to provide governments and their partners with evidence-based options for achieving MDG-4.

The Child Survival Countdown tracking mechanisms draw on best available country-level coverage estimates. The availability of such data for child-survival interventions has improved greatly during the 1990s, largely as a result of efforts spearheaded by UNICEF to monitor progress toward the World Summit for Children goals.³² Further effort will be needed, however, to help governments and their partners in child survival collect and use monitoring information on a regular basis to improve their programmes between now and 2015. Most of our country profiles represent coverage levels in 2002–04, and for some countries, the most recent data date from the late 1990s. Governments and international partners should consider both undertaking more frequent surveys, and designing strategies for shortening the delay between each step of the process of data collection, publication of results, compilation of national data sets, quality reviews,

statistical correction, and reporting at international level. In addition, the measurement of existing indicators needs to be improved, and in a few cases, coverage indicators for additional interventions need to be defined and assessed to be incorporated into the DHS and MICS protocols. Panel 3 summarises areas for improvement in the Child Survival Countdown tracking effort and its next report in 2007.

The Child Survival Countdown 2-yearly meetings reinforce ongoing efforts to track country-specific progress toward international goals, including those set by the World Summit on Children in 2000,³² and the World Fit for Children.³³ Unpacking aggregate statistics to show what is happening in individual countries, and presenting them in a context of accountability, highlights opportunities (many already missed) for targeted efforts to reach mothers and children with life-saving interventions.

Monitoring efforts make sense only if they produce results that are used to improve programme implementation and effective coverage. The Countdown aims to contribute to these broader efforts by promoting coverage as a key measure of progress, signalling areas in which efforts need to be accelerated. Improving the availability, quality, and use of information at country level is a goal shared by WHO and UNICEF, and through partnerships by the Health Metrics Network and other projects and institutions.

We, as individuals working on the Child Survival Countdown, renew our pledge to increase accountability by tracking intervention coverage for newborn and child survival. We invite and encourage others to join us in this movement.

We call on all child-survival technical assistance partners, including worldwide initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria, and the Partnership for Maternal, Newborn and Child Health, to continue and increase their efforts in child survival. International support for child survival and other essential health programmes is way below that needed to achieve the MDGs. Countries cannot plan for long-term activities, particularly those involving the expansion of services, unless the financing is secure at least within a political lifetime. The failure to achieve high coverage with some interventions is not only the fault of national governments. Difficulties in obtaining steady long-term financing or stocks of commodities, or in meeting eligibility criteria for assistance, can be major barriers to national efforts to achieve high and sustained coverage.

We also call on countries worldwide to review coverage for key child-survival interventions as well as for other interventions of particular importance in their own setting, and take action to improve them. These national countdowns should also review the status of policies and strategies for intervention delivery to ensure that all needed supports are in place to scale up coverage and

Panel 3: Learning by doing—plans for technical improvements for the Child Survival Countdown 2007

Tracking and reporting

Priority countries

Retain 60 countries as priority for monitoring, but invite all countries to participate

Substantive areas

Add supply and logistics for key child-survival commodities

Indicators

Support a consultative process to review and update, including:

- Addition, deletion, or modification of indicators selected for inclusion
- Inclusion of trend data where feasible
- Selection and use of information on determinants of coverage
- Update of the approach to tracking equity

Data sources and summary

- Develop more action-oriented label for the “watch and act” category.
- Include country-specific cause of death distributions from the WHO
- Provide uncertainty estimates for coverage results
- Review and improve procedures for data summary, including categorisation of countries and setting of thresholds
- Develop mechanisms for promoting more in-depth analysis of country-specific results

Complementary research and other issues

Scaling up

- Programme-oriented research on packaging and scaling-up in different epidemiological and health system settings
- Greater focus on delivery channels, and their effectiveness in specific settings
- How to address determinants of coverage (eg, political commitment, human resources, and financing)

Greater engagement of countries

- Involve countries from the start in the preparation of the report
- Encourage country-specific Countdowns
- Include countries with national-level success stories as resources in Countdown report and conference

achieve the MDGs.

Contributors

J Bryce prepared the first draft of the manuscript, drawing on the 2005 Countdown Report coordinated by N Terreri and J Bryce with input from T Wardlaw, C G Victora, E Mason, and B Daelmans. All authors revised this first draft together in a workshop in Gex, France in April, 2006. The final version was reviewed and approved by all authors.

The Child Survival Countdown core organising committee members defined the scope of the tracking effort and reviewed the penultimate of this report.

Conflict of interest statement

During the preparation of this report, J Bryce worked as a consultant to both UNICEF and WHO on this and other work related to child survival, and C G Victora worked as a consultant to WHO on similar issues.

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References

- 1 United Nations Millennium Declaration. <http://www.un.org/millennium/declaration/ares552e.htm> (accessed July 22, 2006).
- 2 United Nations Millennium Development Goals. <http://www.un.org/millenniumgoals/> (accessed July 24, 2006).
- 3 Jones G, Steketee R, Black RE, Bhutta ZA, Morris SS, and the Bellagio Child Survival Study Group. How many child deaths can we prevent this year? *Lancet* 2003; **362**: 65–71.
- 4 Darmstadt GL, Bhutta ZA, Cousens S, Adam T, Walker N, de Bernis L. Evidence-based, cost-effective interventions: how many newborn babies can we save? *Lancet* 2004; **365**: 977–88.
- 5 Bhutta ZA, Darmstadt GL, Hasan BS, Haws RA. Community-based interventions for improving perinatal and neonatal health outcomes in developing countries: a review of the evidence. *Pediatrics* 2005; **115** (suppl 2): 519–617.
- 6 Tracking progress in Child Survival Countdown to 2015. <http://cs.server2.textor.com/programme.html> (accessed July 23, 2006).
- 7 UNICEF. The State of the World's Children 2006. New York: UNICEF, 2005.
- 8 WHO. World Health Report 2005: Make Every Mother and Child Count. Geneva: World Health Organization, 2005.
- 9 Child Mortality Coordination Group. Tracking progress on child mortality. *Bull World Health Organ* 2006; **84**: 225–32.
- 10 Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year? *Lancet* 2003; **361**: 2226–34.
- 11 Morris SS, Black RE, Tomaskovic L. Predicting the distribution of under-five deaths by cause in countries without vital registration systems. *Int J Epidemiol* 2003; **32**: 1041–51.
- 12 WHO. World Health Statistics 2006. <http://www.who.int/whosis/whostat2006-mortality.pdf> (accessed Aug 31, 2006).
- 13 UNICEF. UNICEF/WHO Meeting on Child Survival Survey-based Indicators, New York, June 17–18, 2004. Summary list of child survival indicators. Available at: http://www.childinfo.org/areas/mdgmonitoring/Child%20Survival%20Indicators_UNICEF%20WHO%20Mtg_June2004.pdf (accessed July 24, 2006).
- 14 WHO/UNICEF. Consensus meeting on assessment and monitoring of vaccine-preventable diseases. <http://www.unicef.org/health/files/www513.pdf> (accessed May 1, 2006).
- 15 UNICEF. PMTCT report card 2005: monitoring progress on the implementation of mother to child transmission of HIV. December, 2005: <http://www.unicef.org/uniteforchildren/knowmore/files/reportcard2005.pdf> (accessed Aug 31, 2006).
- 16 International Code of Marketing Breast-milk Substitutes. http://www.who.int/nutrition/publications/code_english.pdf (accessed April 20, 2006).
- 17 WHO/UNICEF Joint Statement on Clinical Management of Acute Diarrhoea. http://www.who.int/child-adolescent-health/New_Publications/CHILD_HEALTH/Acute_Diarrhoea.pdf (accessed April 20, 2006).
- 18 WHO. Introduction of Haemophilus influenzae type b vaccine into immunization programmes: management guidelines, including information for health workers and parents. 2000: <http://www.who.int/vaccines-documents/DocsPDF99/www9940.pdf> (accessed July 24, 2006).
- 19 WHO. Department of Child and Adolescent Health: evidence base for the community management of pneumonia—WHO/FCH/CAH/02.23, meeting report. Geneva: World Health Organization, 2002.
- 20 WHO/UNICEF. Global Immunization Vision and Strategy, April 2005. <http://www.who.int/immunization/givs/en/index.html> (accessed July 24, 2006).
- 21 UNICEF. Vitamin and mineral deficiency: a global progress report. New York: UNICEF, 2006. Available at <http://www.unicef.org/media/files/vmd.pdf> (accessed July 24, 2006).
- 22 Roll Back Malaria Partnership. Global Strategic Plan Roll Back Malaria 2005–2015. Available at: http://www.rollbackmalaria.org/forumV/docs/gsp_en.pdf (accessed July 24, 2006).
- 23 Starfield B. Basic concepts in population health and health care. *J Epidemiol Community Health* 2001; **55**: 452–54.
- 24 Victora CG, Wagstaff A, Schellenberg JA, Gwatkin D, Claeson M, Habicht JP. Applying an equity lens to child health and mortality: more of the same is not enough. *Lancet* 2003; **362**: 233–41.
- 25 Victora CG, Fenn B, Bryce J, Kirkwood BR. Co-coverage of preventive interventions and implications for child-survival strategies: evidence from national surveys. *Lancet* 2005; **366**: 1460–66.
- 26 Filmer D, Pritchett L. Estimating wealth effects without expenditure data or tears: An application to educational enrolments in states of India. *Demography* 2001; **38**: 115–32.
- 27 Bryce J, Boschi-Pinto C, Shibuya K, Black RE; WHO Child Health Epidemiology Reference Group. WHO estimates of the causes of death in children. *Lancet* 2005; **365**: 1147–52.
- 28 Wardlaw T, Salama P, White Johansson E, Mason E. Pneumonia: the leading killer of children. *Lancet* 2006; published online Sept 18. DOI:10.1016/S0140-6736(06)69334-3
- 29 WHO/UNICEF. World Malaria Report 2005. Geneva: World Health Organization, 2005.
- 30 Victora CG, Bryce J, Fontaine O, Monasch R. Reducing deaths from diarrhoea through oral rehydration therapy. *Bull World Health Organ* 2000; **78**: 1246–55.
- 31 Powell-Jackson T, Borghi J, Mueller D, Patouillard E, Mills A. Donor support to maternal, newborn and child health—what is being given and is it enough? *Lancet* 2006; published online Sept 18. DOI:10.1016/S0140-6736(06)69334-3
- 32 World Summit on Children in 2000. <http://www.unicef.org/wsc/> (accessed July 24, 2006).
- 33 UNICEF. A World Fit for Children. <http://www.unicef.org/specialsession/wffc/> (accessed July 24, 2006).