Why Should 5000 Children Die in India Every Day? Major Causes and Managerial Challenges

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Working Paper

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Abstract:

Globally, more than 10 million children under 5 years of age, die every year (20 children per minute), most from preventable causes, and almost all in poor countries. Major causes of child death include neonatal disorders (death within 28 days of birth), diarrhea, pneumonia, and measles. Malnutrition accounts for almost 35 % of childhood diseases.

India alone accounts for almost 5000 child deaths under 5 years old (U5) every day. India's child heath indicators are poor even compared with our Asian neighbors, namely Malaysia, Sri Lanka, Thailand, Vietnam, China, Nepal and Bangladesh. Within India, the states of Bihar, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh account for almost 60 % of all child deaths.

India's neonatal mortality, which accounts for almost 50 % of U5 deaths, is one of the highest in the world. India launched the Universal Immunization Program in 1985, but the status of full immunization in India has reached only 43.5 % by 2005-06. India started the Integrated Child Development Scheme (ICDS) in 1975 to provide supplementary nutrition to children, but 50 % of our children are still malnourished; nearly double that of Sub-Saharan Africa. The WHO/UNICEF training program on Integrated Management of Neonatal and Childhood Illnesses, known as IMNCI, started in India a few years ago, but the progress is very slow.

What is unfortunate is the fact that most of these deaths are preventable through proven interventions: preventive interventions and/or treatment interventions, but the management of childhood illnesses is very poor.

In this working paper, we bring out the nature and magnitude of child deaths in India (Chapter 1) and then share with you in Chapters 2, 3 and 4 our observations on the management of some of national programs of the government of India such as

The Universal Immunization Program (UIP)
The Integrated Child Development Scheme (ICDS)
The Integrated Management of Neonatal and Child Illnesses (IMNCI)

In the final chapter (Chapter 5), we highlight certain managerial challenges to satisfactorily address the child mortality and morbidity in our country.

Key words: Neonatal mortality, Infant mortality, U5 mortality, malnutrition, Immunization, childhood illnesses.

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Acronyms

ARI	Acute Respiratory Infection
CDHO	Chief District Health Officer
CMR	Child Mortality Rate
CSSM	Child Survival and Safe Motherhood
DALY	Disability-adjusted Life Year
DDT	Dichlorodiphenyltrichloroethane
DLHS	District Level Household Survey
EPI	Extended Programme on Immunization
GoI	Government of India
ICDS	Integrated Child Development Scheme
IEC	Information Education and Communication
IMR	Infant Mortality Rate
IMCI	Integrated Management of Childhood Illnesses
IMNCI	Integrated Management of Neonatal and Childhood Illnesses
KSY	Kishori Shakti Yojana
MDG	Millennium Development Goals
MEP	Malaria Eradication Programme
MPW	Multi Purpose Worker
NFHS	National Family and Health Survey
NMR	Neo-natal Mortality Rate
ORS	Oral Dehydration Solution
PHC	Primary Health Centre
SNP	Supplementary Nutrition Programme
SRS	Sample Registration System
UIP	Universal Immunization Programme
U-5 MR	Under - 5 Mortality Rate
VPD	Vaccine Preventable Diseases
WHO	World Health Organization

Chapter 1
Why should so many children die?

1.1 Child Health - A Global Scenario: Globally, more than 10 million children under 5 years of age, die every year (20 children per minute), most from preventable causes, and almost all in poor countries. A few countries account for a large proportion of child deaths. In the year 2000, eight countries in the world accounted for 60 % of all child deaths (Table 1.1), while 42 countries accounted for 90 % of child deaths (Black et al, 2003). About 40 % of all child deaths occurred in 25 Sub Saharan African Countries. Another 40 % of these deaths occurred in the 4 Asian countries, namely, India, China, Pakistan, and Bangladesh.

Table 1.1
Countries with highest number of child deaths: 2000

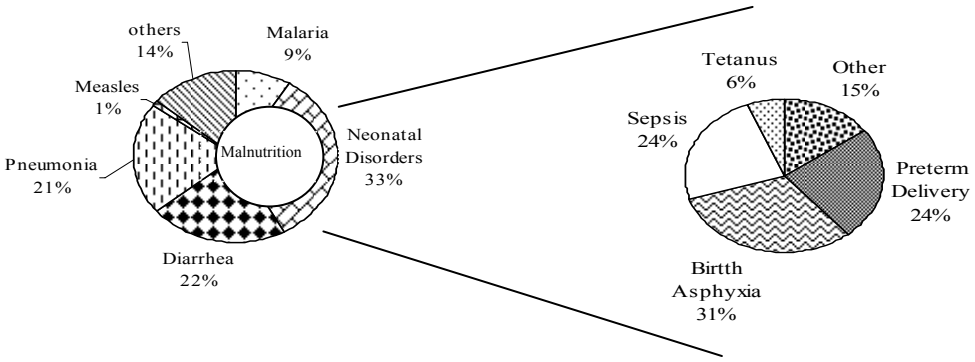
Country	Total Population (millions)	Annual Births (millions)	Number of Child deaths (millions)
India	1014	25	2.40
Nigeria	123	5	0.83
China	1262	20	0.78
Pakistan	141	4.5	0.57
D R Congo	2.8	0.13	0.48
Ethiopia	64	3	0.47
Bangladesh	129	3.3	0.34
Afghanistan	26	1	0.25
Total	2763	62	6.12

Figure 1.1 below (Jones et al 2003): shows the major causes for child death, with malnutrition as the underlying cause for disease burden in children. It can be seen that

- Diarrhea and Pneumonia together account for almost 45 % of all Under-5 child deaths, and

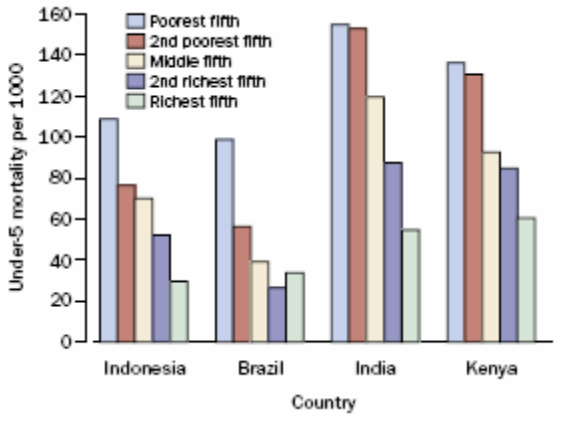
- Neonatal deaths account for almost 1/3rd of all child deaths, with birth asphyxia as the major cause of neonatal deaths.

Figure 1.1
Causes of Under-Five Mortality



Socio-economic inequities in child survival exist. Child mortality gaps between the rich and the poor countries are growing. High-income countries have achieved an under-5 mortality rate of less than 10 per 1000 live births, while the corresponding figure in poor countries is a staggering 100 per 1000 live births. Inequities exist between the rich and the poor even within countries, as can be seen from Figure 1.2 (Victoria et al 2003).

Figure 1.2
U5 Mortality rates by socioeconomic quintile of the household for selected countries



1.2. Child Health in India:

Child health is usually described across three commonly used indicators: Neonatal Mortality Rate (NMR), Infant Mortality Rate (IMR), and Under-5 Mortality Rate (U5MR). These mortality rates vary considerably among world's regions.

Table 1.2
NMR Comparison
(Global)

NMR Per 1000 Live Births	Number of Countries
1-10	74
11-20	43
21-30	24
31- 38	16
39 (India)	**3**
40-50	21
51-60	7
61-70	3
Total	191

Source: WHO, 2008

Table 1.3
IMR Comparison
(Global)

IMR Per 1000 Live Births	Number of Countries
1-10	51
11-20	30
21-40	37
41-61	20
62 (India)	**1**
63-80	21
81-100	9
>100	23
Total	192

Source: WHO, 2006

Table 1.4
U5 MR Comparison
(Global)

U5MR Per 1000 Live Births	Number of Countries
1-10	45
11-20	32
21-40	30
41-84	33
85 (India)	**1**
86- 100	6
101-150	26
> 151	21
Total	

Source: WHO, 2006

It can be seen from Tables 1.2, 1.3, and 1.4 that India is ranked 159, 139 and 139 out of 192 WHO countries on NMR, IMR, and U5MR respectively, the most recent year for which WHO published data is available.

A comparison of India with a few Asian countries on the status of child heath is given below in Tables 1.5, 1.6, and 1.7 for the year 2004.

Table 1.5
NMR Comparison
(Asia)

Country	NMR Per 1000 Live Birth
Malaysia	5
Sri Lanka	8
Thailand	9
Vietnam	12
Philippines	15
Indonesia	17
China	18
Bhutan	30
Nepal	32
Bangladesh	36
India	39
Cambodia	48
Myanmar	49
Pakistan	53
Afghanistan	60

Source: WHO, 2008

Table 1.6
IMR Comparison
(Asia)

Country	IMR Per 1000 Live Births
Malaysia	10
Sri Lanka	12
Vietnam	17
Thailand	18
China	26
Philippines	26
Indonesia	30
Bangladesh	56
Nepal	59
India	62
Bhutan	67
Myanmar	75
Pakistan	80
Cambodia	97
Afghanistan	165

Source: WHO, 2006

Table 1.7
U5MR comparison
(Asia)

Country	U5MR Per 1000 Live Births
Malaysia	12
Sri Lanka	14
Thailand	21
Vietnam	23
China	31
Philippines	34
Indonesia	38
Nepal	76
Bangladesh	77
Bhutan	80
India	85
Pakistan	101
Myanmar	105
Cambodia	141
Afghanistan	257

Source: WHO, 2006

It can be seen from the above tables that Malaysia and Sri Lanka, whose economy is comparable with that of India, have excellent child health indicators. Countries poorer than India, namely Bangladesh and Nepal also have better child health indicators.

India is a large country, and so there are wide variations across the states on NMR, IMR, and U5MR. On the one hand, we have states like Kerala and Tamil Nadu which have excellent indicators of child health, comparable with those of many developed countries. On the other hand, we have states like Orissa, Madhya Pradesh, UP, Rajasthan and Bihar whose child health indicators are very poor. These 5 states put together account for almost 40 % of India's total population and 60 % of Child deaths.

Data on child health status in India are mostly available from SRS[1], NFHS[2], and DLHS[3]reports.

As per SRS of 1999, NMR was as high as 45, IMR was 70 and U5MR was 90 per 1000 live births. SRS data on child health (NMR, IMR, U-5 MR) is given in Exhibits 1.1 for the last few years. It can be seen that NMR has remained constant at 37 deaths per 1000 live births, decline in IMR to 55 deaths per 1000 live births, and a decline in U5MR to 71 deaths per 1000 live births. Similar observations can be drawn for NMR, IMR and U5MR for each state from Exhibit 1.1 for the last few years.

NFHS estimates on differences between urban and rural status on Neonatal, Infant and U5 mortality rates are given in Exhibit 1.2, classified under Education of mother, religion, caste/tribe, and wealth index. Inequities across male Vs female infant mortality can be seen, classified under mother's age at birth, birth order, previous birth interval.

DLHS-3 data on child health gives only statistics on immunization coverage, and not on mortality.

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[1] Sample Registration System (SRS), Registrar General of India (RGI) is the largest demographic survey in the world covering about 1.3 million households and over 6.8 million populations. It provides reliable annual estimates of birth rate, death rate and other fertility and mortality indicators at the national and state levels from 1971 onwards. National and State level estimates are available at an aggregate level.

[2] National Family Health Survey (NFHS), started in 1992-93, is a large-scale, multi-round survey conducted every 5 years in a representative sample of households throughout India. NFHS reports carry information on population, health, family planning services, anemia and nutrition, etc classified by socio economic groups, mother's level of literacy, gender etc. The first National Family Health Survey (NFHS-1) was conducted in 1992-93, followed by NFHS-2 in 1998-99 and NFHS-3 in 2005-06. NFHS-3 data is obtained from interviewing 124,385 women in the age group 15-49 years and 74,369 men in the age group 15-54 years.

[3] District Level Household Surveys (DLHS) started in 1997-98, as a part of the decentralized planning to meet the RCH needs. DLHS is the only source for district level information for each district in the country. DLHS is designed to provide information on family planning, maternal and child health, reproductive health of ever married women and adolescent girls, utilization of maternal and child healthcare services at the district level. DLHS is conducted every 5 years, and covers all districts in India. The total number of households representing a district varies from 1000 to 1500 households.

1.3. Conclusion:

Child mortality rates have declined over the years. Yet, about 2 million children in India die every year before reaching the age of 5.

Why should so many children die every year?

Exhibit 1.1

Early NMR, Late NMR, IMR, CMR and U5MR across the States of India

States	Year 2004					Year 2005					Year 2006					Year 2007				
	Early NMR	Late NMR	IMR	CMR	U5MR	Early NMR	Late NMR	IMR	CMR	U5MR	Early NMR	Late NMR	IMR	CMR	U5MR	Early NMR	Late NMR	IMR	CMR	U5MR
Andhra P	23	13	59	14	73	26	9	57	15	72	26	7	56	15	71	26	7	54	15	69
Assam	24	11	66	21	87	25	8	68	20	88	26	9	67	20	87	28	6	66	18	84
Bihar	23	10	61	17	78	28	5	61	20	81	28	4	60	19	79	27	4	58	19	77
Chhattisgarh	37	6	60	19	79	36	8	63	20	83	36	7	61	18	79	36	5	59	17	76
Delhi	16	4	32	8	40	16	4	35	8	43	18	4	37	9	45	16	4	36	8	44
Gujarat	24	13	53	16	69	28	8	54	16	70	27	11	53	16	69	29	8	52	15	67
Haryana	17	14	61	18	79	24	11	60	18	78	22	12	57	16	73	23	11	55	15	70
Himachal P	21	10	51	12	63	19	15	53	14	67	20	10	50	10	60	19	12	47	10	57
J&K	23	15	49	12	61	29	7	50	12	62	30	9	52	12	64	31	8	51	12	63
Jharkhand	19	7	49	14	63	22	6	50	16	66	22	7	49	15	64	24	4	48	14	62
Karnataka	21	4	49	13	62	23	5	50	13	63	20	8	48	13	61	20	6	47	12	59
Kerala	8	1	12	3	15	9	2	14	3	17	8	2	15	3	18	6	1	13	3	16
Madhya P	33	17	79	27	106	38	13	76	25	101	40	11	74	24	98	38	11	72	24	96
Maharashtra	19	7	36	9	45	20	5	36	9	45	21	6	35	9	44	21	4	34	8	42
Orissa	36	13	77	22	99	41	12	75	21	96	38	13	73	22	95	37	12	71	20	91
Punjab	20	10	45	12	57	18	12	44	11	55	17	13	44	11	55	20	9	43	11	54
Rajasthan	32	10	67	21	88	33	10	68	20	88	33	11	67	22	89	34	10	65	19	84
Tamil Nadu	21	8	41	10	51	19	7	37	9	46	18	6	37	9	46	17	6	35	8	43
Uttar P	32	18	72	24	96	32	13	73	25	98	35	11	71	24	95	36	12	69	22	91
West Bengal	20	9	40	10	50	23	7	38	10	48	20	8	38	10	48	23	5	37	9	46
Total (India)	26	11	58	17	75	28	9	58	17	75	28	9	57	17	74	29	8	55	16	71

Source: SRS 2004-2007

Exhibit 1.2
Childhood Mortality by background characteristics: NFHS III

Table 7.2 Early childhood mortality rates by background characteristics

Neonatal, postneonatal, infant, child, and under-five mortality rates for the five-year period preceding the survey, by background characteristics and residence, India, 2005-06, and for NFHS-2 and NFHS-1

Background characteristic	Neonatal mortality (NN)	Postneonatal mortality[1] (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
		URBAN			
Education					
No education	38.2	23.1	61.3	21.4	81.4
<5 years complete	39.9	13.4	53.3	6.5	59.4
5-7 years complete	31.4	16.7	48.1	7.5	55.2
8-9 years complete	25.8	5.4	31.2	4.7	35.7
10-11 years complete	16.2	8.3	24.5	4.3	28.7
12 or more years complete	19.4	4.2	23.6	4.7	28.2
Religion					
Hindu	30.9	13.3	44.3	10.9	54.7
Muslim	21.6	13.9	35.5	9.6	44.8
Christian	11.3	5.0	16.3	9.4	25.5
Sikh	*	*	*	*	*
Buddhist/Neo-Buddhist	*	*	*	*	*
Other	*	*	*	*	*
Caste/tribe					
Scheduled caste	35.0	15.7	50.7	15.5	65.4
Scheduled tribe	29.0	14.8	43.8	10.4	53.8
Other backward class	26.4	15.8	42.2	12.9	54.5
Other	27.5	8.6	36.1	6.2	42.1
Wealth index					
Lowest	39.4	25.4	64.8	29.2	92.1
Second	40.8	21.6	62.4	21.5	82.5
Middle	32.0	17.8	49.8	16.4	65.3
Fourth	31.3	14.9	46.2	8.0	53.9
Highest	21.1	6.3	27.4	5.6	32.8
Total	28.5	13.0	41.5	10.6	51.7
NFHS-2	31.7	15.4	47.0	16.9	63.1
NFHS-1	34.1	22.0	56.1	19.6	74.6
		RURAL			
Education					
No education	47.0	24.1	71.1	27.8	97.0
<5 years complete	50.5	18.6	69.2	15.8	83.8
5-7 years complete	35.8	14.4	50.1	13.3	62.8
8-9 years complete	35.1	11.6	46.7	6.1	52.5
10-11 years complete	35.0	10.5	45.5	3.0	48.3
12 or more years complete	20.0	9.6	29.6	2.3	31.8

Continued...

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Exhibit 1.2 (Contd)

Table 7.2 Early childhood mortality rates by background characteristics—*Continued*

Background characteristic	Neonatal mortality (NN)	Postneonatal mortality[1] (PNN)	Infant mortality ($_1q_0$)	Child mortality ($_4q_1$)	Under-five mortality ($_5q_0$)
Religion					
Hindu	43.3	19.7	63.0	20.9	82.5
Muslim	40.1	20.3	60.4	23.1	82.2
Christian	42.0	12.8	54.8	12.9	67.0
Sikh	34.3	11.7	46.0	8.7	54.3
Buddhist/Neo-Buddhist	(36.7)	(10.0)	(46.6)	(17.3)	(63.2)
Other	44.7	42.0	86.7	49.2	131.7
Caste/tribe					
Scheduled caste	49.6	21.4	71.0	25.6	94.7
Scheduled tribe	40.9	23.0	63.9	38.3	99.8
Other backward class	42.1	19.1	61.1	18.7	78.7
Other	38.1	17.5	55.7	13.3	68.2
Wealth index					
Lowest	48.8	21.9	70.7	32.5	100.9
Second	44.9	24.2	69.2	22.8	90.4
Middle	41.2	19.4	60.6	13.8	73.6
Fourth	32.4	9.9	42.3	7.1	49.1
Highest	24.3	9.2	33.6	2.7	36.2
Total	42.5	19.7	62.2	21.0	82.0
NFHS-2	46.7	26.6	73.3	32.8	103.7
NFHS-1	52.9	32.2	85.0	37.6	119.4
		TOTAL			
Education					
No education	45.7	24.0	69.7	26.9	94.7
<5 years complete	48.4	17.6	66.0	13.8	78.8
5-7 years complete	34.5	15.1	49.5	11.5	60.5
8-9 years complete	32.0	9.5	41.5	5.6	46.9
10-11 years complete	26.9	9.6	36.5	3.6	40.0
12 or more years complete	19.6	6.3	25.9	3.9	29.7
Religion					
Hindu	40.3	18.2	58.5	18.5	76.0
Muslim	34.1	18.2	52.4	18.6	70.0
Christian	31.5	10.1	41.7	11.6	52.8
Sikh	35.9	9.7	45.6	6.8	52.1
Buddhist/Neo-Buddhist	43.0	9.8	52.8	17.1	69.0
Other	43.3	41.4	84.6	50.4	130.7
Caste/tribe					
Scheduled caste	46.3	20.1	66.4	23.2	88.1
Scheduled tribe	39.9	22.3	62.1	35.8	95.7
Other backward class	38.3	18.3	56.6	17.3	72.8
Other	34.5	14.5	48.9	10.8	59.2
Wealth index					
Lowest	48.4	22.0	70.4	32.3	100.5
Second	44.6	24.0	68.5	22.6	89.6
Middle	39.3	19.1	58.3	14.4	71.9
Fourth	31.9	12.1	44.0	7.5	51.2
Highest	22.0	7.2	29.2	4.8	33.8
Total	39.0	18.0	57.0	18.4	74.3
NFHS-2	43.4	24.2	67.6	29.3	94.9
NFHS-1	48.6	29.9	78.5	33.4	109.3

Note: All estimates are for the five years preceding the survey (approximately 1988-1992 for NFHS-1, 1994-1998 for NFHS-2, and 2001-2005 for NFHS-3). Totals include Jains, cases with missing information on education, religion, and caste/tribe, and cases in which the respondent does not know the caste/tribe, which are not shown separately.
( ) Based on 250-499 unweighted children surviving to the beginning of the age interval.
* Rate not shown; based on fewer than 250 unweighted children surviving to the beginning of the age interval.
[1] Computed as the difference between the infant and neonatal mortality rates.

Chapter 2
How Universal is our Universal Immunization Program?

2.1. Introduction:

Immunization is a public health response to address concerns regarding mortality and morbidity of under-5 children. Immunization is one of the most cost effective interventions to prevent a series of major illnesses, particularly in environments where children are undernourished and may die from preventable diseases (World Bank, 1993). Immunization reduces the number of susceptible children in a community and thereby augments "herd immunity" making the spread of infectious disease more difficult. The fact that, in many countries, immunization services are largely the domain of the public sector accentuates concerns regarding unequal access for those who need it most. The status of child immunization is a good indicator of accessibility and outreach of healthcare services in a country.

The idea of eradicating diseases emerged at the beginning of the 20th century when the Rockefeller Foundation undertook Hookworm eradication activities in over 50 countries (Gounder 1998). This was followed by efforts to eradicate Yellow Fever, which initiated the first anti mosquito campaign in Cuba (Gounder 1998). The discovery of DDT in the 1940s encouraged efforts to control and eradicate anopheline mosquitoes and thereby eradicate Malaria. In 1955, the World Health Assembly (WHA) announced the Malaria Eradication program (MEP) to eradicate anophelines globally, but abandoned the MEP in 1969, because DDT resistant anopheline mosquitoes emerged and the insecticide lost its ability to control the malaria vector. In 1959, WHA undertook the task of eradicating Smallpox and certified its eradication in 1980. Smallpox could be eradicated because it has no non-human reservoir. The success of Smallpox eradication led to efforts for eradicating Polio and Measles. In 1974, WHO officially launched the Extended Program on Immunization (EPI) to protect all children of the world by 2000 against six Vaccine Preventable Diseases : Tuberculosis, Diphtheria, Pertussis (Whooping Cough), Tetanus, Polio and Measles. Encouraged by the success of polio eradication campaigns in the Americas, the WHO set out to eradicate polio globally by 2000 (WHO, 1988), by administering it a s a vertical program.

2.2. Immunization in India:

India's National Health Policy gives high priority to the health of women and children. Immunization has been one of the priority programs requiring special attention for child survival, since independence in 1947.

The Government of India initiated BCG immunization against Tuberculosis in 1948, and it picked up momentum in 1951 with BCG vaccinations conducted in mass campaigns in schools and vaccination centres. DPT immunization of infants and school children against

Diphtheria, Pertussis (Whooping Cough), Tetanus was taken up during the Fourth Five Year Plan period 1969-74 (Gaudin and Yazbeck, 2006 a). Extended Program on Immunization (EPI) was launched in India in January 1978 to reduce mortality and morbidity from vaccine preventable diseases (VPD); Immunization against Polio was included in EPI in 1979-80 (Gupta and Murali, 1989). Tetanus Toxoid (TT) immunization initiated for pregnant mothers in 1975-76 was integrated with EPI in 1978. Measles vaccine was added to the Indian EPI program in 1985. As a signatory to the UNICEF declaration in the UN 40th anniversary, India launched the Universal Immunization Program (UIP) in October 1985. The goal of UIP is to cover 85 % of all children and 100% of pregnant women by 1990. All districts in the country were reportedly served by the UIP (IIPS, 1995) by 1989-90. UIP became part of the CSSM (Child Survival and Safe Motherhood) program in 1992 and the RCH program in 1997. India launched the Pulse Polio Immunization (PPI) Campaign in 1995 as a vertical program (AIIMS, 2000) with a high degree of political commitment. A major component of PPI is the organization of mass immunization on National Immunization Day. The campaign mode program of PPI, though led to increased coverage of OPV, it is cited as one of the reasons for the under-achievement of routine immunization goals (Bonu et al).

The WHO/UNICEF review (WHO/UNICEF: 2008) of India's National Immunization program for the period 1980-2007 is given in Exhibit 2.1. This report gives the UNICEF and Government Official estimates at the national level for BCG, DPT1, DPT3, OPV3, and Measles coverage for the above period. We mention a few important observations from this report. Trends in officially reported data show an increase in coverage beginning in the early 1980s reflecting the phased geographic expansion of the EPI program. Inclusion of the national immunization program in India's Technology Mission (one of 5 missions directly reporting to the Prime Minister) in 1985 and the UIP launched later in the same year led to rapid increase in the coverage in the late 80s. However, it has not been possible to maintain this rate of coverage since the beginning of the 90s. Even the OPV coverage which increased initially following the launch of Pulse Polio Program in 1995 in a campaign mode has remained almost at the same level since 2000. The coverage of Measles Vaccine has been increasing since its introduction in 1985, touched a peak of 80 % coverage in 1997 and has remained between 60 % and 70 % in the last few years.

While the WHO-UNICEF report provides a trend of individual immunization coverage, it does not provide any trend of full immunization coverage. Neither does it provide any coverage of immunization at the state level. Hence, we turn our attention to NFHS data. NFHS reports give estimates of individual and full immunization coverage, both at the national and state levels for NFHS-1, 2 and 3. NFHS data also bring out the inequities in the immunization coverage across gender, socio-economic status, wealth index etc.

NFHS data on the national coverage of immunization is given in Table 2.1 below. It can be seen that we have achieved only 43.5 % immunization (ABV: All Basic Vaccines) against the 6 vaccine preventable diseases by 2006.

Table 2.1
Trend of vaccination coverage in India

Immunization/ vaccination	Immunization coverage		
	1992-93 (NFHS-1)	1998-99 (NFHS-2)	2005-06 (NFHS-3)
BCG	62.2	71.6	78.1
DPT-1	66.4	71.4	76.0
DPT-2	59.2	65.0	66.7
DPT-3	51.7	55.1	55.3
OPV-0	4.6	13.1	48.4
OPV-1	67.0	83.6	93.1
OPV-2	61.2	78.2	88.8
OPV-3	53.6	62.8	78.2
Measles	42.2	50.7	58.8
All Basic Vaccines	**35.5**	**42**	**43.5**
No Vaccination	30	14.4	5.1

Source: IIPS: NFHS-1 (pp 252), NFHS-2 (pp 209) & NFHS-3 (pp 231).

Pulse Polio Immunization coverage was much better than other programs. WHO Assembly laid emphasis on PPI in a way that would strengthen routine immunization (WHO, 1988). As a result, significant improvement in non-polio RI was expected. Has the high profile campaign mode of PPI led to the neglect of other immunization coverage in the country? (see Figure 2.1)

Figure 2.1
Comparison of coverage: BCG, DPT-3, OPV-3, and Measles

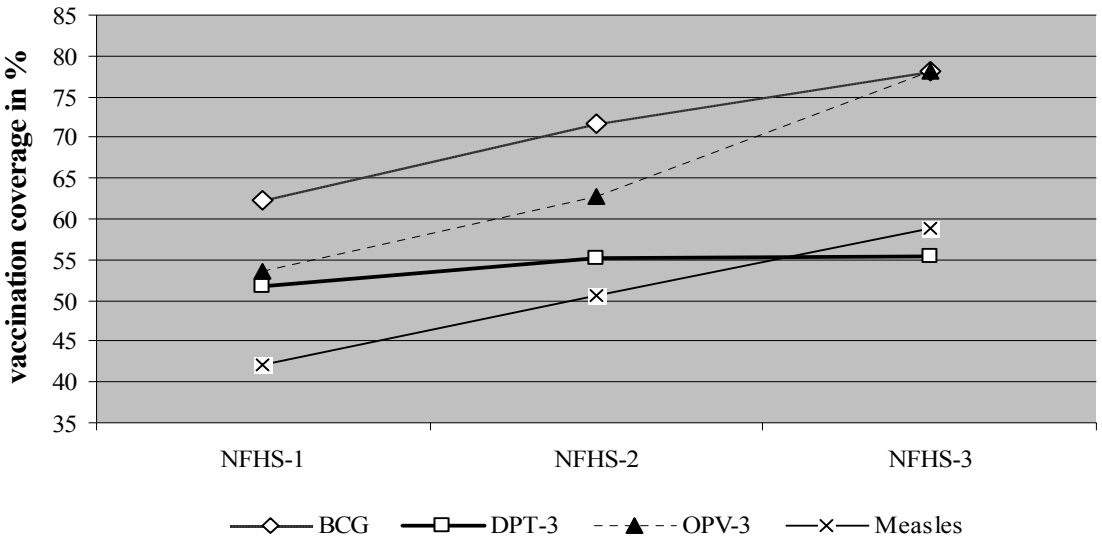


Exhibit 2.2 from NFHS-3 gives data on inequities of immunization coverage across sex of the child, birth order, urban/rural, mother's education, religion, caste/tribe, and wealth index for the year 2005-06. Exhibit 2.3 gives NFHS-3 data on vaccination coverage across all states.

One of the important and essential requirements for the success of the immunization program is to make people aware, get them interested and ultimately motivate them to get their children protected against the 6 VPD. To achieve the goal of protecting the target population and reduce the incidence of diseases, it is necessary to generate demand and also to make potent, effective vaccine and immunization services available and accessible.

Parents need to be convinced that immunization is valuable; they should know where and when services are available and should understand when their children should receive the vaccines. Different methods and strategies are adopted to undertake the Information, Education and Communication (IEC) services. It can be seen from Exhibit 2.2 that mothers, if educated, would get their children immunized.

Adequate and reliable information on the occurrence of VPD is critical to help the program managers to effectively plan the program strategies and take appropriate remedial measures whenever necessary. Information is also required to assess the impact of the program.

The organizational structure for immunization in the state department of Health could also explain the reasons for under-achievement of UIP targets (Streefland, 1995). For example, the working relationships between the CDHO, PHC staff, MPW, and the Village workers , the existing system of supply of vaccines to the villages, the level of program monitoring at the district level etc are all to be examined in detail to understand the strengths and weaknesses of the immunization program management.

As already mentioned earlier, the status of full immunization in India has only reached 43.5 % by 2005-06, as against the UIP target of full immunization by 2000.

How universal is our Universal Immunization Program?

Exhibit 2.1
WHO/UNICEF Review of National Immunization Coverage 1980-2007

World Health Organization

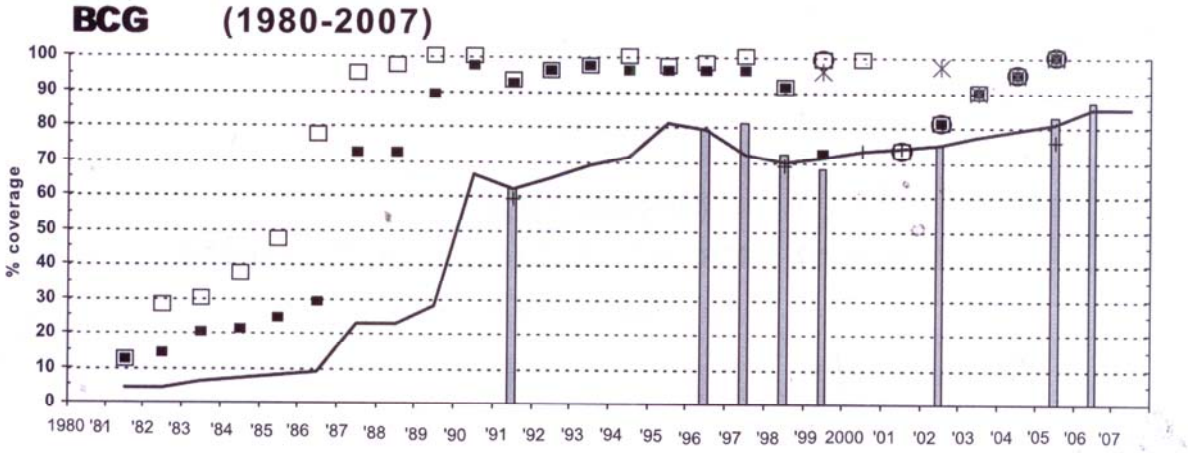
unicef

WHO/UNICEF
Review of National Immunization Coverage
1980-2007

India

August, 2008

India



Description of trend

Trends in officially reported data show an increase in coverage beginning in the early 1980s reflecting the phased geographic expansion of the EPI programme. In 1985 the Universal Immunization Programme, the inclusion of immunization in India's Technology Mission (one of 5 missions reporting directly to the Prime Minister) and the infusion of resources associated with the global Universal Childhood Immunization (UCI) goal resulted in rapidly increasing coverage in the late 1980s.

While official reports describe sustained high levels of coverage following 1990, survey data suggests significantly lower coverage beginning in the late 1980s. Coverage for 1990 and 1991 was estimated to have been 66% and 62% respectively based on an extensive sub-national Immunization Coverage Survey of 1991 and results from the 1992 National Family Health Survey (NFHS). Estimates prior to 1990 were established by calibrating the data reported to UNICEF by the 1990 estimate established by an evaluation of the 1991 and 1992 surveys. Coverage prior to 1990 is below that of DPT3, probably due to the number of home deliveries.

Estimates for 1993 through 1995 are interpolated between the levels established by the 1991 and 1996 surveys and sub-national surveys. The estimates for the periods following 1995 are based primarily on the surveys.

Estimates for 2000 - 2001 are interpolated between the 1999 and 2002 survey data. Review of the NFHS and CES methods suggest CES methodology may overestimate coverage. The 2003-2004 estimates are based on 2002/2004 National District and the average between the 2005 CES and the 2006 NFHS. Estimates for 2006 and 2007 are based on the CES 2006 adjusted for potential overestimation. National data for 2004 and 2005 for nine months only.

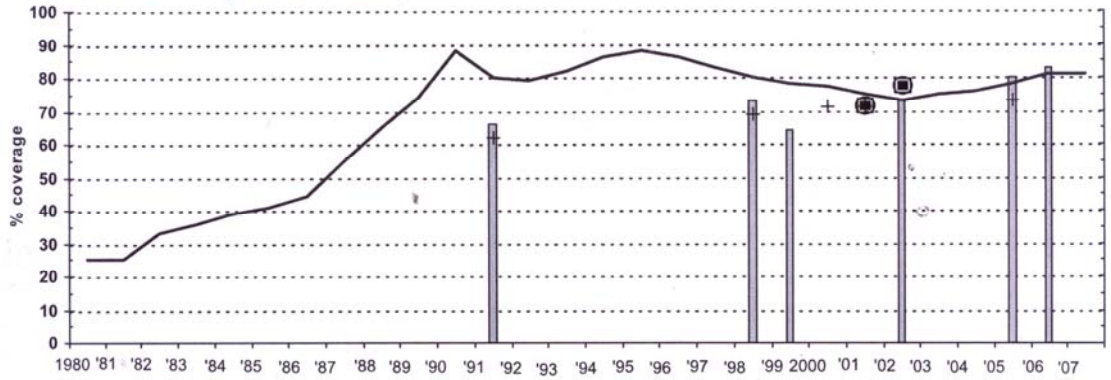
Data presented in chart

Year	WHO/ UNICEF estimate (%)	Reported to:*		Government official estimate (%)	Reported doses administered (%)**	Survey data (%)***	
		WHO (%)	UNICEF (%)			Survey 12-23 months	Survey <12 months
	—	□	■	○	✳	▮	+
1980							
1981	4	12	12				
1982	4	28	14				
1983	6	30	20				
1984	7	37	21				
1985	8	47	24				
1986	9	77	29				
1987	23	95	72				
1988	23	97	72				
1989	28	100	89				
1990	66	100	97				
1991	62	93	92			62	59
1992	65	96	96				
1993	69	97	97				
1994	71	100	96				
1995	81	97	96				
1996	79	98	96			79	
1997	72	100	96			81	
1998	70	91	91			72	69
1999	71	99	72	99	96	68	
2000	73	99		103	103		73
2001	74	73		73	103		74
2002	75	81	81	81	97	75	
2003	77	90	90		90		
2004	79	95	95	95	95		
2005	81	100	100	100	100	83	76
2006	85	101	101	101	101	87	
2007	85						

*Prior to 1998 national reports to WHO/UNICEF did not specify whether information was derived from administrative records, surveys or other sources.
**Coverage based on registration of doses administered by health care providers.
***In case more than one survey was implemented in a certain year the highest value is presented. Details of all data are presented in the second section of this report.

India

DTP1 (1980-2007)



Description of trend

WHO and UNICEF began requesting data on DTP1 coverage in 2001 and have received national reports reflecting DTP1 coverage from 2000 onward. The DTP1 estimates from 2001-2002 are based on these reports. For the year 2000 estimates are based on survey, for the years prior to 2000 the estimates are derived from the WHO UNICEF estimates of DTP3 and the relationship between the levels of DTP3 coverage and the dropout between DTP1 and DTP3. This relationship results from an analysis of 282 surveys conducted in 101 countries which were published between 1980 and 2004.

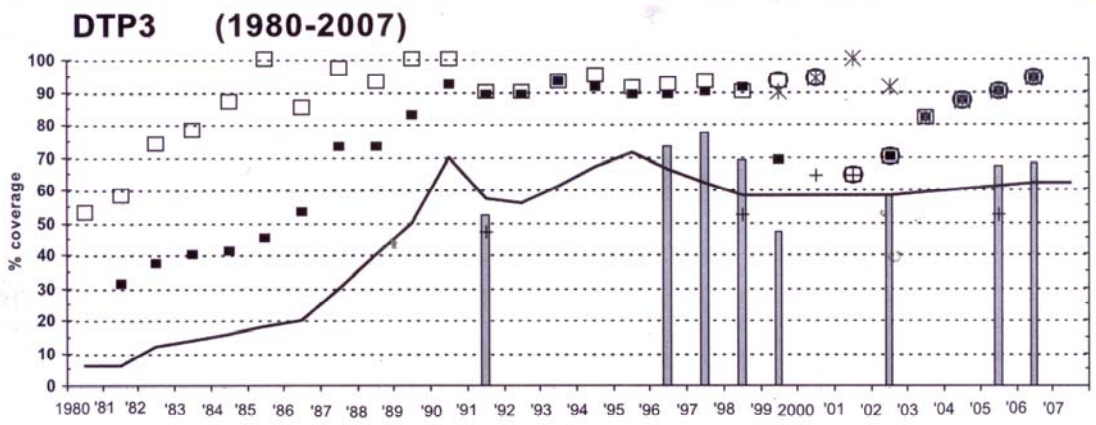
The estimate for 2002 is based on the 2002 survey data. Review of the NFHS and CES methods suggest CES methodology may overestimate coverage. The 2003-2004 estimates are based on 2002/2004 National District Level Survey and the average between the 2005 CES and the 2006 NFHS. Estimates for 2006 and 2007 are based on the CES 2006 adjusted for potential overestimation.

Data presented in chart

Year	WHO/ UNICEF estimate (%)	Reported to:*		Government official estimate (%)	Reported doses administered (%)**	Survey data (%)***	
		WHO (%)	UNICEF (%)			Survey 12-23 months	Survey <12 months
	—	□	■	○	✳	▯	+
1980	25						
1981	25						
1982	33						
1983	36						
1984	39						
1985	41						
1986	44						
1987	55						
1988	65						
1989	74						
1990	88						
1991	80					66	62
1992	79						
1993	82						
1994	86						
1995	88						
1996	86						
1997	83						
1998	80					73	69
1999	78					64	
2000	77						71
2001	75	71	71	71			71
2002	73	77	77	77		73	
2003	75						
2004	76						
2005	78					80	73
2006	81					83	
2007	81						

*Prior to 1998 national reports to WHO/UNICEF did not specify whether information was derived from administrative records, surveys or other sources.
**Coverage based on registration of doses administered by health care providers.
***In case more than one survey was implemented in a certain year the highest value is presented. Details of all data are presented in the second section of this report.

India



Description of trend

Trends in officially reported data show an increase in coverage beginning in the early 1980s reflecting the phased geographic expansion of the EPI programme. In 1985 the Universal Immunization Programme, the inclusion of immunization in India's Technology Mission (one of 5 missions reporting directly to the Prime Minister) and the infusion of resources associated with the global Universal Childhood Immunization goal resulted in rapidly increasing coverage in the late 1980s.

While official reports describe sustained high coverage following 1990, survey data suggests significantly lower coverage beginning in the late 1980s. Coverage for 1990 & 1991 was estimated to have been 70% and 57% respectively based on an extensive sub-national Immunization Coverage Survey of 1991 and results from the 1992 National Family Health Survey (NFHS). Estimates prior to 1990 were established by calibrating the data reported to UNICEF by the 1990 estimate established by an evaluation of the 1991 & 1992 surveys.

Estimates for 1993 through 1995 are interpolated between the levels established by the 1991 and 1996 surveys. The estimates for the periods following 1995 are based on the Coverage Evaluation Surveys (CES), MICSs, and a second NFHS (1997/98) and show a marked decline in coverage during this period. The estimate for 1995-1997 are based an evaluation of the survey data. Results from previous Demographic and Health Surveys (similar to the NFHS and MICS) suggest that coverage values based on mother's history are effected by a recall bias for the multi-antigen vaccines (i.e., OPV 1,2,3 and DPT 1,2,3.) and to most likely occur in longer surveys covering a variety of indicators. It does not appear to be a problem in surveys focused on immunization coverage such as the EPI 30 cluster surveys and the CES. To control for this bias we have adjusted the DPT3 card or history value by calculating the dropout rate from DPT1 to DPT3 based on card results and applying this multiplier to the DPT1 card or history value. This adjustment may result in an overestimate since children without a card are less likely to be immunized than children with a card.

The 1996 and 1997 results of the CES seem to estimate the upper range of actual coverage. The dropout rate of 6% from DPT1 to DPT3 in the 1998/1999 CES is unusually low (dropout from the NFHS 98/99 is 13% based on card only data). The estimate of 1997 is based on an adjustment of the NFHS (1997/98) results to account for recall bias and the CES. The estimate of 62% is supported by results from the 1997 Reproductive and Child Health Survey.

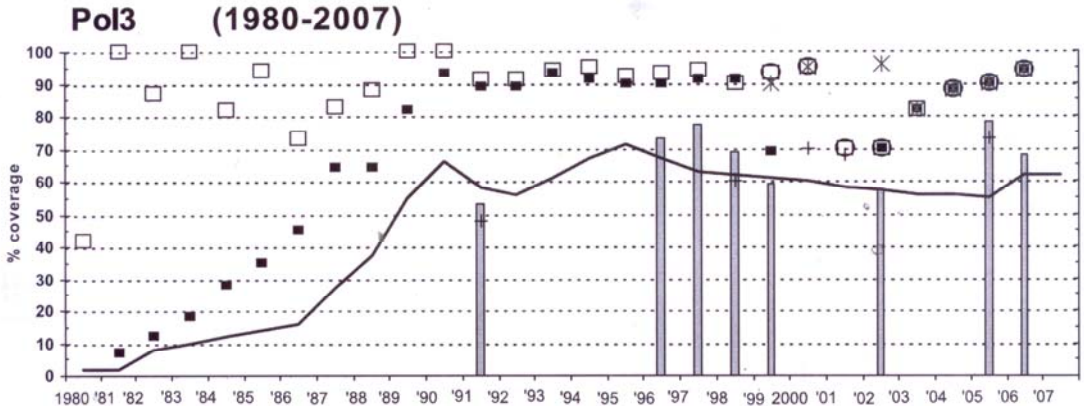
The 1999 estimate is based on the MICS adjusted for recall bias. Estimates from 2000 -2002 are interpolated between the 1999 and 2002. Estimates for 2000 - 2001 are interpolated between the 1999 and 2002 survey data. Review of the NFHS and CES methods suggest CES methodology may overestimate coverage. The 2003-2004 estimates are based on 2002/2004 National District Level Survey and the average between the 2005 CES and the 2006 NFHS. Estimates for 2006 and 2007 are based on the CES 2006 adjusted for potential overestimation. National data for 2004 and 2005 are for nine months only.

Data presented in chart

Year	WHO/ UNICEF estimate (%)	Reported to:*		Government official estimate (%)	Reported doses administered (%)**	Survey data (%)***	
		WHO (%)	UNICEF (%)			Survey 12-23 months	Survey <12 months
	—	□	■	○	✳	▮	+
1980	6	53					
1981	6	58	31				
1982	12	74	37				
1983	14	78	40				
1984	16	87	41				
1985	18	100	45				
1986	20	85	53				
1987	30	97	73				
1988	40	93	73				
1989	50	100	83				
1990	70	100	92				
1991	57	90	89			52	47
1992	56	90	89				
1993	61	93	93				
1994	67	95	91				
1995	71	91	89				
1996	66	92	89			73	
1997	62	93	90			77	
1998	58	90	91			69	52
1999	58	93	69	93	90	47	
2000	58	94		94	94		64
2001	58	64		64	100		64
2002	58	70	70	70	91	58	
2003	59	82	82		82		
2004	60	87	87	87	87		
2005	61	90	90	90	90	67	52
2006	62	94	94	94	94	68	
2007	62						

*Prior to 1998 national reports to WHO/UNICEF did not specify whether information was derived from administrative records, surveys or other sources.
**Coverage based on registration of doses administered by health care providers.
***In case more than one survey was implemented in a certain year the highest value is presented. Details of all data are presented in the second section of this report.

India



Description of trend

Trends in officially reported data show an increase in coverage beginning in the early 1980s reflecting the phased geographic expansion of the EPI programme. In 1985 the Universal Immunization Programme, the inclusion of immunization in India's Technology Mission (one of 5 missions reporting directly to the Prime Minister) and the infusion of resources associated with the global Universal Childhood Immunization goal resulted in rapidly increasing coverage in the late 1980s.

While official reports describe sustained high levels of coverage following 1990, survey data suggests significantly lower coverage beginning in the late 1980s. Coverage for 1990 and 1991 was estimated to have been 66% and 58% respectively based on an extensive sub-national Immunization Coverage Survey of 1991 and results from the 1992 National Family Health Survey (NFHS). Estimates prior to 1990 were established by calibrating the data reported to UNICEF by the 1990 estimate established by an evaluation of the 1991 and 1992 surveys.

Estimates for 1993 through 1995 are interpolated between the levels established by the 1992 and 1996 surveys. The estimates for the periods following 1995 are based primarily on the Coverage Evaluation Surveys (CES), MICSs, and a second National Family & Health Survey (1997/98) and show a marked decline in coverage during this period. The estimate for 1995 - 1997 are based an evaluation of the survey data. Results from previous Demographic and Health Surveys (similar to the NFHS and MICS) suggest that coverage values based on mother's history are effected by a recall bias for the multi-antigen vaccines (i.e., OPV 1,2,3 and DPT 1,2,3.) and to most likely occur in longer surveys covering a variety of indicators. It does not appear to be a problem in surveys focused on immunization coverage such as the EPI 30 cluster surveys and the CES. To control for this bias we have adjusted the OPV3 card or history value by calculating the dropout rate from OPV1 to OPV3 based on card results and applying this multiplier to the OPV1 card or history value. This adjustment may result in an overestimate since children without a card are less likely to be immunized than children with a card.

The 1996 and 1997 results of the CES surveys seem to estimate the upper range of actual coverage. The dropout rate of 6% from OPV1 to OPV3 in the 1998/1999 CES is unusually low (dropout from the NFHS 98/99 is 13% based on card only data). The estimate of 1997 is based on an adjustment of the NFHS (1997/98) results to account for recall bias and the CES. The estimate of 63% is supported by results from the 1997 Reproductive and Child Health Survey.

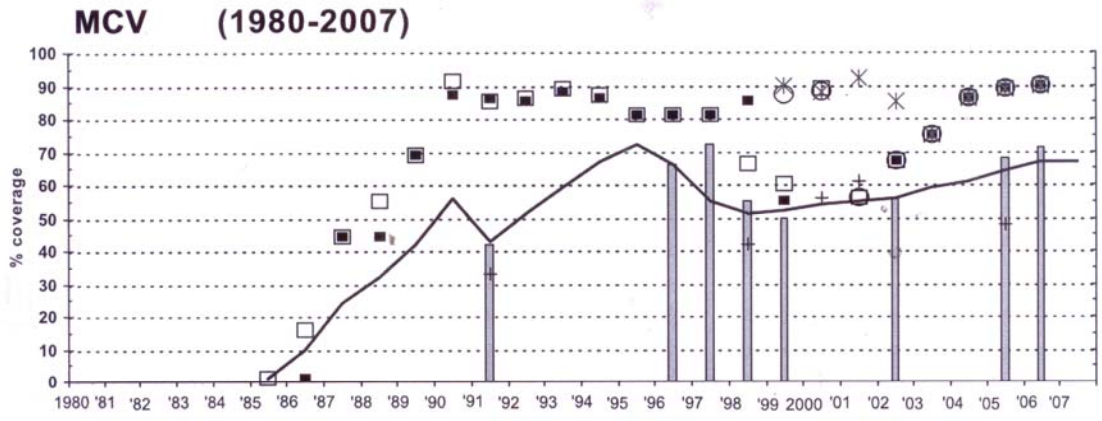
The 1999 estimate is based on the MICS adjusted for recall bias. Estimates for 2000 - 2001 are interpolated between the 1999 and 2002 survey data. Review of the NFHS and CES methods suggest CES methodology may overestimate coverage. The 2005 NFHS data include campaign doses. The 2003-2005 estimates are based on 2002/2004 National District and the 2005 CES adjusted with the difference between CES 2005 and NFHS DTP3 results. Estimates for 2006 and 2007 are based on the adjusted CES 2006. National data for 2004 and 2005 are for nine months only.

Data presented in chart

Year	WHO/ UNICEF estimate (%)	Reported to:*		Government official estimate (%)	Reported doses administered (%)**	Survey data (%)***	
		WHO (%)	UNICEF (%)			Survey 12-23 months	Survey <12 months
	—	□	■	○	✳	▯	+
1980	2	42					
1981	2	100	7				
1982	8	87	12				
1983	10	100	18				
1984	12	82	28				
1985	14	94	35				
1986	16	73	45				
1987	27	83	64				
1988	37	88	64				
1989	55	100	82				
1990	66	100	93				
1991	58	91	89			53	48
1992	56	91	89				
1993	61	94	93				
1994	67	95	91				
1995	71	92	90				
1996	67	93	90			73	
1997	63	94	91			77	
1998	62	90	91			69	60
1999	61	93	69	93	90	59	
2000	60	95		95	95		70
2001	58	70		70			68
2002	57	70	70	70	96	57	
2003	56	82	82		82		
2004	56	88	88	88	88		
2005	55	90	90	90	90	78	73
2006	62	94	94	94	94	68	
2007	62						

*Prior to 1998 national reports to WHO/UNICEF did not specify whether information was derived from administrative records, surveys or other sources.
**Coverage based on registration of doses administered by health care providers.
***In case more than one survey was implemented in a certain year the highest value is presented. Details of all data are presented in the second section of this report.

India



Description of trend

Measles vaccine was introduced in 1985. Trends in officially reported data show a rapid increase in coverage reflecting the phased geographic expansion of the EPI programme. In 1985 the Universal Immunization Programme, the inclusion of immunization in India's Technology Mission (one of 5 missions reporting directly to the Prime Minister) and the infusion of resources associated with the global Universal Childhood Immunization goal resulted in rapidly increasing coverage in the late 1980s.

While official reports describe sustained high levels of coverage following 1990, survey data suggests significantly lower coverage beginning in the late 1980s. Coverage for 1990 and 1991 was estimated to have been 56% and 43% respectively based on an extensive sub-national Immunization Coverage Survey of 1991 and results from the 1992 National Family Health Survey (NFHS). Estimates prior to 1990 were established by calibrating the data reported to UNICEF by the 1990 estimate established by an evaluation of the 1991 and 1992 surveys.

Estimates for 1992 through 1995 are interpolated between the levels established by the 1991 and 1996 surveys. The estimates for the periods following 1995 are based primarily on the Coverage Evaluation Surveys (CES), MICSs, and a second National Family & Health Survey (1997/98) and show a marked decline in coverage during this period. The estimate for 1995 - 1997 are based an evaluation of the survey data.

The estimate of 1997 is based the CES. The estimate of 55% is supported by results from the 1997 Reproductive and Child Health Survey and NFHS (1997/98). The 1999 estimate is based on the MICS. Estimates for 2000 - 2001 are interpolated between the 1999 and 2002 survey data. Review of the NFHS and CES methods suggest CES methodology may overestimate coverage. The 2003-2004 estimates are based on 2002/2004 National District Level Survey and the average between the 2005 CES and the 2006 NFHS. Estimates for 2006 and 2007 are based on the CES 2006 adjusted for potential overestimation. National data for 2004 and 2005 are for nine months only. Estimates from 2003 onward are based on the survey data supported by the 2004 CES.

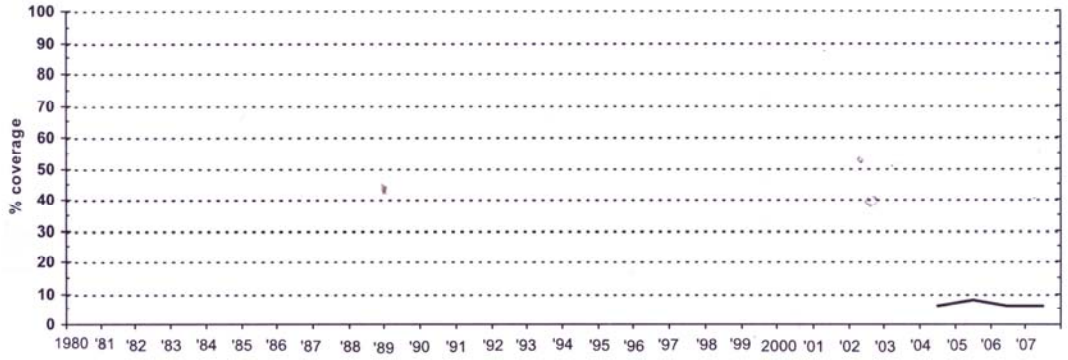
Data presented in chart

Year	WHO/ UNICEF estimate (%) —	Reported to:*		Government official estimate (%) ○	Reported doses administered (%)** ✳	Survey data (%)***	
		WHO (%) □	UNICEF (%) ■			Survey 12-23 months ▮	Survey <12 months +
1980							
1981							
1982							
1983							
1984							
1985	1	1					
1986	10	16	1				
1987	24	44	44				
1988	32	55	44				
1989	42	69	69				
1990	56	91	87				
1991	43	85	86			42	33
1992	51	86	85				
1993	59	89	88				
1994	67	87	86				
1995	72	81	81				
1996	66	81	81			66	
1997	55	81	81			72	
1998	51	66	85			55	42
1999	52	60	55	87	90	50	
2000	54	89		88	88		56
2001	55	56		56	92		61
2002	56	67	67	67	85	56	
2003	59	75	75	75	75		
2004	61	86	86	86	86		
2005	64	89	89	89	89	68	46
2006	67	90	90	90	90	71	
2007	67						

*Prior to 1998 national reports to WHO/UNICEF did not specify whether information was derived from administrative records, surveys or other sources.
**Coverage based on registration of doses administered by health care providers.
***In case more than one survey was implemented in a certain year the highest value is presented. Details of all data are presented in the second section of this report.

India

HepB3 (1980-2007)



Description of trend

Phased introduction of hepatitis B vaccine began in 2002. Coverage of 68% for 2004 is based on a target population of 1.65 million children under one year of age; 78% in 2005 on 2.3 million children under one year of age. For 2006 72% coverage in 8% of the national target population

Data presented in chart

Year	WHO/ UNICEF estimate (%)	Reported to:*		Government official estimate (%)	Reported doses administered (%)**	Survey data (%)***	
		WHO (%)	UNICEF (%)			Survey 12-23 months	Survey <12 months
	—	□	■	○	✳	‖	+
1980							
1981							
1982							
1983							
1984							
1985							
1986							
1987							
1988							
1989							
1990							
1991							
1992							
1993							
1994							
1995							
1996							
1997							
1998							
1999							
2000							
2001							
2002							
2003							
2004	6						
2005	8						
2006	6						
2007	6						

*Prior to 1998 national reports to WHO/UNICEF did not specify whether information was derived from administrative records, surveys or other sources.
**Coverage based on registration of doses administered by health care providers.
***In case more than one survey was implemented in a certain year the highest value is presented. Details of all data are presented in the second section of this report.

India

Details Survey Data

Year	Source	Antigen	Confirmation method	% coverage	Compliance with schedule	Age group	Sample size	% cards seen	Survey year	Comments
2006	India Coverage Evaluation Survey 2006									
			Card or History	87.4		12-23 m	22888		2007	BCG
			Card or History	83.4		12-23 m	22888		2007	DTP1
			Card or History	68.4		12-23 m	22888		2007	DTP3
			Card or History	67.5		12-23 m	22888		2007	Pol3
			Card or History	70.9		12-23 m	22888		2007	MCV
2005	India Coverage Evaluation Survey 2005									
			Card or History	83.4		12-23 m	15676		2005	BCG
			Card or History	80.4		12-23 m	15676		2005	DTP1
			Card or History	67.3		12-23 m	15676		2005	DTP3
			Card or History	61.3		12-23 m	15676		2005	Pol3
			Card or History	68.1		12-23 m	15676		2005	MCV
2005	India National Family Health Survey (NFHS-3) 2005-2006									
			Card or History	78.1		12-23 m	10419	38	2006	BCG
			C or H <12 months	75.6		12-23 m	10419	38	2006	BCG
			Card or History	76		12-23 m	10419	38	2006	DTP1
			C or H <12 months	72.8		12-23 m	10419	38	2006	DTP1
			Card or History	55.3		12-23 m	10419	38	2006	DTP3
			C or H <12 months	51.5		12-23 m	10419	38	2006	DTP3
			Card or History	78.2		12-23 m	10419	38	2006	Pol3
			C or H <12 months	73.2		12-23 m	10419	38	2006	Pol3
			Card or History	58.8		12-23 m	10419	38	2006	MCV
			C or H <12 months	48.4		12-23 m	10419	38	2006	MCV
2002	Reproductive and Child Health (District Level Household Survey 2002-2004) - India									
			Card or History	75		12-23 m	62505	31	2002/2004	BCG
			Card or History	73		12-23 m	62505	31	2002/2004	DTP
			Card or History	58		12-23 m	62505	31	2002/2004	DTP
			Card or History	57		12-23 m	62505	31	2002/2004	Pol3
			Card or History	56		12-23 m	62505	31	2002/2004	MCV
2001	Routine Immunization and Maternal Care, CES, 2002									
			C or H <12 months	74		12-23 m		53.8	2002	BCG
			C or H <12 months	70.6		12-23 m		53.8	2002	DTP1
			C or H <12 months	63.8		12-23 m		53.8	2002	DTP3
			C or H <12 months	68.3		12-23 m		53.8	2002	Pol3
			C or H <12 months	61.4		12-23 m		53.8	2002	MCV
2000	Routine Immunization and Maternal Care, CES, 2001									
			C or H <12 months	72.8		12-23 m		57.2	2001	BCG
			C or H <12 months	71.1		12-23 m		57.2	2001	DTP1
			C or H <12 months	63.6		12-23 m		57.2	2001	DTP3
			C or H <12 months	70.4		12-23 m		57.2	2001	Pol3
			C or H <12 months	55.6		12-23 m		57.2	2001	MCV
1999	India, Multiple Indicator Cluster Survey India (MICS-II) 2000									
			Card or History	67.7		12-23 m			2000	BCG

India

Details Survey Data

Year	Source	Antigen	Confirmation method	% coverage	Compliance with schedule	Age group	Sample size	% cards seen	Survey year	Comments	
			Card or History	64.4		12-23 m			2000		DTP1
			Card or History	46.6		12-23 m			2000		DTP3
			Card or History	58.9		12-23 m			2000		Pol3
			Card or History	50.4		12-23 m			2000		MCV
1998	Evaluation of Routine Immunization 1998-99										
				72.3					1998/99	Confirmation Method assumed	BCG
				72.8					1998/99	Confirmation Method assumed	DTP1
				68.6					1998/99	Confirmation Method assumed	DTP3
				68.6					1998/99	Confirmation Method assumed	Pol3
				55.2					1998/99	Confirmation Method assumed	MCV
1998	National Family Health Survey, India 1998-99										
			Card or History	71.6		12-23 m		33.7	1998/99		BCG
			C or H <12 months	69.1		12-23 m		33.7	1998/99		BCG
			C or H <12 months	65.2		24-35 m	9813	24	1998/99		BCG
			Card or History	71.4		12-23 m		33.7	1998/99		DTP1
			C or H <12 months	68.8		12-23 m		33.7	1998/99		DTP1
			C or H <12 months	64.1		24-35 m	9813	24	1998/99		DTP1
			Card or History	55.1		12-23 m		33.7	1998/99		DTP3
			C or H <12 months	52.1		12-23 m		33.7	1998/99		DTP3
			C or H <12 months	49.6		24-35 m	9813	24	1998/99		DTP3
			Card or History	62.8		12-23 m		33.7	1998/99		Pol3
			C or H <12 months	59.2		12-23 m		33.7	1998/99		Pol3
			C or H <12 months	59.6		24-35 m	9813	24	1998/99		Pol3
			Card or History	50.7		12-23 m		33.7	1998/99		MCV
			C or H <12 months	41.7		12-23 m		33.7	1998/99		MCV
			C or H <12 months	41.3		24-35 m	9813	24	1998/99		MCV
1997	Evaluation of Routine Immunization 1997-98										
				81					1997/98	Confirmation Method assumed	BCG
									1997/98	Confirmation Method assumed	DTP1
				77					1997/98	Confirmation Method assumed	DTP3
				77					1997/98	Confirmation Method assumed	Pol3
				72					1997/98	Confirmation Method assumed	MCV
1997	Evaluation of Routine Immunization 1998-99										
			Card or History	77		12-23 m			1996/97	as DPT3/OPV3 is the same in 1998/1999, it is assumed to be the same for 1997 too	DTP3
				77					1996/97	Confirmation Method assumed	Pol3
1996	Evaluation of Routine Immunization 1997-98										
				79					1997/98	Confirmation Method assumed	BCG
									1997/98	Confirmation Method assumed	DTP1
				73					1997/98	Confirmation Method assumed	DTP3
				73					1997/98	Confirmation Method assumed	Pol3
				66					1997/98	Confirmation Method assumed	MCV
1991	India, National Family Health Survey (MCH and Family Planning) 1992-93, 1995										
			Card or History	62.2		12-23 m	11853	30.6	1992/93		BCG
			C or H <12 months	58.7		12-23 m	11853	30.6	1992/93		BCG
			C or H <12 months	52.4		24-35 m	10646	21.6	1992/93		BCG

India

Details Survey Data

Year	Source	Antigen	Confirmation method	% coverage	Compliance with schedule	Age group	Sample size	% cards seen	Survey year	Comments	
			C or H <12 months	44		36-47 m	11342	13.2	1992/93		BCG
			Card or History	66.3		12-23 m	11853	30.6	1992/93		DTP1
			C or H <12 months	62.4		12-23 m	11853	30.6	1992/93		DTP1
			C or H <12 months	55.6		24-35 m	10646	21.6	1992/93		DTP1
			C or H <12 months	46.1		36-47 m	11342	13.2	1992/93		DTP1
			Card or History	51.7		12-23 m	11853	30.6	1992/93		DTP3
			C or H <12 months	46.9		12-23 m	11853	30.6	1992/93		DTP3
			C or H <12 months	43		24-35 m	10646	21.6	1992/93		DTP3
			C or H <12 months	36.1		36-47 m	11342	13.2	1992/93		DTP3
			Card or History	53.4		12-23 m	11853	30.6	1992/93		Pol3
			C or H <12 months	48.3		12-23 m	11853	30.6	1992/93		Pol3
			C or H <12 months	44.6		24-35 m	10646	21.6	1992/93		Pol3
			C or H <12 months	37.6		36-47 m	11342	13.2	1992/93		Pol3
			Card or History	42.2		12-23 m	11853	30.6	1992/93		MCV
			C or H <12 months	32.7		12-23 m	11853	30.6	1992/93		MCV
			C or H <12 months	29.3		24-35 m	10646	21.6	1992/93		MCV
			C or H <12 months	24.1		36-47 m	11342	13.2	1992/93		MCV

India

WHO/UNICEF Estimates of Protection at Birth (PAB) against tetanus

In countries where tetanus is recommended for girls and women coverage is usually reported as "TT2+", i.e. the proportion of (pregnant) women who have received their second or superior TT dose in a given year. TT2 + coverage, however, can under-represent the actual proportion of births that are protected against tetanus as it does not include women who have previously received protective doses, women who received one dose without documentation of previous doses, and women who received doses in TT (or Td) supplemental immunization activities (SIA). In addition, girls who have received DTP in their childhood and are entering childbearing age, may be protected with TT booster doses.

WHO and UNICEF have developed a model that takes into account the above scenarios, and calculates the proportion of births in a given year that can be considered as having been protected against tetanus - "Protection at Birth".

In this model, annual cohorts of women are followed from infancy through their life. A proportion receive DTP in infancy (estimated based on the WHO-UNICEF estimates of DTP3 coverage). In addition some of these women also receive TT through routine services when they are pregnant and may also receive TT during SIAs. The model also adjusts reported data, taking into account coverage patterns in other years, and/or results available through surveys. The duration of protection is then calculated, based on WHO estimates of the duration of protection by doses ever received. The proportion of births that are protected against tetanus as a result of maternal immunization reflects the tetanus immunization received by the mother throughout her life rather than simply the TT immunizations received during the current pregnancy.

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[1] This model is described in: Griffiths U., Wolfson L., Quddus A., Younus M., Hafiz R.. Incremental cost-effectiveness of supplementary immunization activities to prevent neo-natal tetanus in Pakistan. Bulletin of the World Health Organization 2004; 82:643-651.

India

Year	PAB coverage estimate (%)
1980	20
1981	26
1982	35
1983	38
1984	43
1985	49
1986	55
1987	65
1988	72
1989	70
1990	81
1991	82
1992	83
1993	84
1994	84
1995	83
1996	82
1997	84
1998	84
1999	85
2000	85
2001	83
2002	87
2003	87
2004	86
2005	86
2006	86
2007	86

Exhibit 2.2
Immunization by background characteristics

Table 9.4 Vaccinations by background characteristics

Percentage of children age 12-23 months who received specific vaccines at any time before the survey (according to a vaccination card or the mother's report), and percentage with a vaccination card seen by the interviewer, by background characteristics, India, 2005-06

Background characteristic	BCG	DPT 1	DPT 2	DPT 3	Polio[1] 0	Polio[1] 1	Polio[1] 2	Polio[1] 3	Measles	All basic vaccinations[2]	No vaccinations	Percentage with a vaccination card seen	Number of children
Sex													
Male	80.2	78.4	69.2	57.4	50.4	94.1	89.5	79.3	61.4	45.3	4.3	38.8	5,546
Female	75.8	73.2	63.8	53.0	46.2	91.9	88.0	77.1	55.8	41.5	6.0	36.1	4,873
Birth order													
1	86.6	84.9	77.6	66.9	57.8	94.9	91.0	81.3	69.5	54.6	3.7	47.9	3,273
2-3	80.8	78.6	69.5	57.9	50.2	93.4	89.1	77.7	60.7	45.3	4.7	36.5	4,632
4-5	68.3	64.9	53.8	40.5	34.5	91.4	86.5	75.7	46.3	29.9	7.0	30.4	1,618
6+	51.2	49.7	35.6	26.4	29.9	88.0	82.9	74.4	32.2	18.5	8.6	17.4	895
Residence													
Urban	86.9	84.4	78.1	69.1	68.5	94.8	91.1	83.1	71.8	57.6	3.3	46.2	2,723
Rural	75.1	73.0	62.6	50.4	41.3	92.5	88.0	76.5	54.2	38.6	5.7	34.5	7,696
Mother's education													
No education	64.7	61.4	49.9	36.9	32.5	90.3	84.9	74.1	41.0	26.1	7.4	25.1	4,976
<5 years complete	80.9	80.1	69.4	57.3	49.7	90.5	85.2	75.4	58.7	46.1	7.6	46.1	694
5-7 years complete	87.1	86.1	77.3	64.6	55.1	94.6	91.4	78.8	69.2	51.8	3.7	41.6	1,591
8-9 years complete	90.9	90.2	82.7	73.0	63.1	96.3	93.3	82.4	75.1	59.7	2.3	50.5	1,297
10-11 years complete	95.3	93.4	86.9	80.0	68.5	97.0	93.0	83.5	82.6	66.1	2.0	53.2	859
12 or more years complete	97.5	96.1	93.3	86.6	79.7	99.0	97.1	89.9	89.3	75.2	0.3	56.8	1,002
Religion													
Hindu	79.6	77.5	67.9	56.4	48.6	93.9	89.9	78.7	60.0	44.4	4.4	37.4	8,092
Muslim	69.7	66.9	58.3	47.8	45.0	90.3	84.5	76.6	49.6	36.3	7.3	36.4	1,814
Christian	82.1	81.6	76.3	65.1	52.9	90.0	87.3	77.6	68.0	56.3	9.4	44.0	234
Sikh	90.4	88.6	86.2	76.9	65.5	91.0	89.1	81.1	80.2	67.3	6.6	46.0	139
Buddhist/Neo-Buddhist	98.5	94.1	75.6	58.0	81.3	95.2	87.3	74.1	96.0	50.9	0.7	39.1	59
Other	69.3	75.3	53.8	42.3	20.7	91.9	84.3	79.5	41.4	27.2	7.9	25.8	52
Caste/tribe													
Scheduled caste	75.4	74.2	64.6	51.9	46.8	92.2	88.6	76.3	56.7	39.7	5.4	34.8	2,141
Scheduled tribe	71.7	65.9	53.2	40.9	30.9	86.8	79.8	64.6	46.1	31.3	11.5	27.4	972
Other backward class	76.4	74.1	63.9	52.6	46.2	94.4	90.3	81.4	55.4	40.7	3.9	34.5	4,120
Other	84.1	82.6	75.8	65.4	57.6	94.0	89.7	79.6	68.8	53.8	4.3	46.0	3,108
Don't know	(92.7)	(92.5)	(85.0)	(84.9)	(85.0)	(97.5)	(97.4)	(92.2)	(67.8)	(60.2)	(2.5)	(80.0)	47
Wealth index													
Lowest	64.0	60.0	46.9	33.9	30.2	87.6	81.4	69.7	39.9	24.4	9.1	25.5	2,580
Second	71.4	70.3	59.3	47.1	39.1	92.7	88.2	76.7	48.2	33.2	6.1	32.3	2,324
Middle	80.1	79.0	70.5	58.4	48.6	94.0	90.6	81.1	61.6	46.9	4.3	38.9	2,029
Fourth	88.8	86.5	79.3	68.5	60.4	96.0	92.7	81.0	72.0	55.3	2.9	43.0	1,840
Highest	95.6	93.5	89.3	81.9	76.7	97.9	94.7	87.2	85.2	71.0	0.9	55.9	1,646
Total	78.1	76.0	66.7	55.3	48.4	93.1	88.8	78.2	58.8	43.5	5.1	37.5	10,419

Note: Total includes Jain children and children with missing information on religion and caste/tribe, who are not shown separately.
( ) Based on 25-49 unweighted cases.
[1] Polio 0 is the polio vaccination given at birth.
[2] BCG, measles, and three doses each of DPT and polio vaccine (excluding polio vaccine given at birth).

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Exhibit 2.3
Immunization by State

Table 9.5 Vaccinations by state

Percentage of children age 12-23 months who received specific vaccines at any time before the survey (according to a vaccination card or the mother's report), and percentage with a vaccination card seen by the interviewer, by state, India, 2005-06

State	BCG	DPT			Polio[1]				Measles	All basic vaccinations[2]	No vaccinations	Percentage with a vaccination card seen
		1	2	3	0	1	2	3				
India	78.1	76.0	66.7	55.3	48.4	93.1	88.8	78.2	58.8	43.5	5.1	37.5
North												
Delhi	87.0	83.4	80.5	71.7	70.4	88.5	86.5	79.1	78.2	63.2	9.1	30.4
Haryana	84.9	83.8	81.0	74.2	52.7	92.2	91.3	82.8	75.5	65.3	7.8	27.0
Himachal Pradesh	97.2	96.6	91.9	85.1	67.1	96.8	94.6	88.6	86.3	74.2	1.9	57.5
Jammu & Kashmir	90.9	90.5	88.8	84.5	48.3	95.1	93.8	82.2	78.3	66.7	4.5	49.1
Punjab	88.0	85.9	80.4	70.5	65.6	90.1	86.7	75.9	78.0	60.1	6.6	38.5
Rajasthan	68.5	65.0	53.2	38.7	30.0	93.0	84.0	65.2	42.7	26.5	5.5	20.8
Uttaranchal	83.5	81.4	76.4	67.1	51.8	89.1	84.5	80.3	71.6	60.0	9.1	48.4
Central												
Chhattisgarh	84.6	87.2	77.4	62.8	37.0	96.7	93.8	85.1	62.5	48.7	2.5	33.1
Madhya Pradesh	80.5	76.0	63.7	49.8	41.3	94.0	88.4	75.6	61.4	40.3	5.0	25.4
Uttar Pradesh	61.0	55.7	43.6	30.0	34.4	94.6	92.3	87.6	37.7	23.0	2.7	20.3
East												
Bihar	64.7	65.2	55.5	46.1	30.5	90.6	87.5	82.4	40.4	32.8	7.0	34.4
Jharkhand	72.7	66.0	53.2	40.3	25.2	93.4	87.2	79.3	47.6	34.2	4.4	40.7
Orissa	83.6	83.6	77.6	67.9	38.5	85.7	80.3	65.1	66.5	51.8	11.6	54.5
West Bengal	90.1	89.7	83.2	71.5	53.4	93.2	88.6	80.7	74.7	64.3	5.9	71.9
Northeast												
Arunachal Pradesh	57.7	57.0	48.4	39.3	34.3	72.6	65.5	55.8	38.3	28.4	24.1	35.0
Assam	62.4	66.7	56.2	44.9	27.5	81.6	72.7	59.0	37.4	31.4	15.2	46.6
Manipur	80.0	77.4	72.3	61.2	23.1	93.5	90.2	77.5	52.8	46.8	6.5	51.3
Meghalaya	65.9	62.0	56.0	47.3	31.0	81.5	74.2	56.6	43.8	32.9	16.5	32.6
Mizoram	86.4	89.1	84.5	66.8	46.4	89.0	83.7	63.5	69.5	46.5	7.0	38.7
Nagaland	46.3	47.5	36.3	28.7	13.2	79.8	68.4	46.2	27.3	21.0	18.4	24.9
Sikkim	95.9	94.9	91.2	84.3	63.4	94.0	91.2	85.6	83.1	69.6	3.2	59.7
Tripura	81.1	80.2	76.0	60.2	56.0	84.7	77.8	65.3	59.9	49.7	14.7	67.7
West												
Goa	96.8	95.7	92.6	87.5	85.6	98.6	94.0	87.2	91.2	78.6	0.0	74.3
Gujarat	86.4	82.2	73.4	61.4	59.9	92.6	83.5	65.3	65.7	45.2	4.5	36.4
Maharashtra	95.3	94.3	86.8	76.1	71.7	95.9	91.7	73.4	84.7	58.8	2.8	46.1
South												
Andhra Pradesh	92.9	92.6	76.4	61.4	68.3	96.2	94.5	79.2	69.4	46.0	3.8	37.2
Karnataka	87.8	86.7	81.5	74.0	75.1	91.8	87.9	73.8	72.0	55.0	6.9	52.8
Kerala	96.3	94.0	90.8	84.0	86.7	94.5	88.6	83.1	82.1	75.3	1.8	75.3
Tamil Nadu	99.5	98.9	97.7	95.7	94.5	99.6	96.3	87.8	92.5	80.9	0.0	36.9

[1] Polio 0 is the polio vaccination given at birth.
[2] BCG, measles, and three doses each of DPT and polio vaccine (excluding polio vaccine given at birth).

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Chapter 3
Is ICDS the answer to malnourished children in India?

3.1. Introduction:

"The consequences of child undernutrition for morbidity and mortality are enormous- and there is, in addition, an appreciable impact of undernutrition on productivity so that a failure to invest in combating nutrition reduces potential economic growth. In India, with one of the highest percentages of undernourished children in the world, the situation is dire. Moreover, inequalities in undernutrition between demographic, socio-economic and geographic groups increased during the 1990s. More and better, investments are needed if India is to reach the nutrition MDG. Economic growth will not be enough." (The World Bank, 2005)

Nutritional adequacy is one of the key determinants of the health and well being of children. Globally, maternal and child undernutrition is the underlying cause of 3.5 million deaths every year, 35 % of the disease burden in children under 5 and 11% total DALYs. (Robert Black et al; 2008). Undernutrition occurs due to protein-energy malnutrition as well as micronutrient deficiencies[4]. Under-nourishment in children retards physical development and hampers the learning and cognitive processes leading to sluggish educational, social and economic development. Ignoring undernutrition puts the long-term health and development of populations at risk.

Most growth retardation occurs by the age of 2, in part because around 30 percent of Indian children are born with low birth weight[5], and is largely irreversible. The period from pregnancy to 24 months of age is a crucial window of opportunity for reducing under nutrition and its adverse effects (Jennifer Bryce, et al, 2008).

3.2. Child Development Program in India:

Poverty is both a cause and an outcome of poor human development, and investments in child nutrition are being promoted as a strategy for economic development (Cesar Victoria et al, 2008).

The Government of India (GoI) launched the Integrated Child Development Scheme (ICDS) in 1975 to provide an integrated package of services in a convergent manner for the holistic

[4] Protein-energy malnutrition weakens immune response and aggravates the effects of infection, and so, children who are malnourished tend to have more severe diarrhea episodes and are at a higher risk of pneumonia. Micronutrient deficiencies cause blindness (Vit A deficiency), anemia (Iron deficiency), and goiter (iodine deficiency). About 10 % of deaths and DALY in U-5children are attributable to micronutrient deficiencies, with nearly all this burden due to deficiencies of Vitamin A and Zinc; disease burden from iodine and iron is very less, perhaps due to effective interventions (Zulfiqar Bhutta, et al, 2008).

[5] Compared to India, Sub-Saharan Africa has only 16 % children born underweight (World bank, 2005)

development of children. Pregnant and nursing/lactating mothers were also included in the ICDS coverage since mothers play a very important role in child development. The objectives of ICDS are

- Improve the nutritional and health status of children below the age of 6 years
- Lay the foundation for proper psychological, physical, and social development of the child
- Reduce the incidence of mortality, morbidity, malnutrition, and school-dropouts
- Achieve effective coordination of policy and implementation among various departments to promote child development
- Enhance the capability of the mother to look after the normal health and nutrition needs of the child through proper health and nutrition education.

In order to meet the above objectives, ICDS offers a package of services which includes health check-ups, supplementary nutrition, pre-school education etc (Table 3.1).

These services are offered through community centres, known as Angan Wadi Centres (Aanganwadi means courtyard). The ICDS team consists of Angan Wadi helpers, Angan Wadi Workers (AWW), Supervisors, Child Development Project officers (CDPO), and District program officers (DPO). The organizational structure for delivery of services is given in Exhibit 3.1.

Starting with 33 projects across the country in 1975, ICDS has grown to be one of the world's largest programs for early childhood development, with more than 6000 operational projects, 10 lakh (1 million) AWCs, and providing supplementary nutrition to over 70 million children (in the age group 0-6 years) and 14 million pregnant and lactating mothers. (Exhibit 3.2 and Exhibit 3.3).

ICDS is a centrally sponsored scheme implemented through the state governments with 100% financial assistance by the centre to the states, except for Supplementary Nutrition service. However, beginning 2005-06, GoI provides central assistance to states for Supplementary Nutrition service to the extent of 50 % of the actual expenditure or 50 % of the financial norms, whichever is less. International donor agencies have also been involved in funding aspects of the program. UNICEF assisted in planning and implementation of ICDS in 1975. Since 1982, other international agencies for example, the World Food Program, Aga Khan Foundation, CARE, NORAD, USAID, and the World Bank, have been contributing in a variety of ways. World Bank assisted ICDS-IV (2008-09 to 2012-13) is currently underway (WCD, 2007).

Table 3.1
Integrated Package of ICDS Services

Services	Children under 6	Pregnant women	Lactating women
Health check-ups treatment, referral	Health check-ups, Treatment of diarrhoea Deworming , Basic treatment of minor ailments referral of severe illnesses	Ante-natal Check-ups	Post-natal check-ups
Immunization	Immunizations BCG,DPT, Polio, measles	TT	
Health and Nutrition Education		Infant feeding practices, Child care, Development, Use of health services, Family planning, Sanitation	Infant feeding practices, Child care, Development, Use of health services, Family planning, Sanitation
Supplemental Nutrition[6]	Hot meal or ready-to-eat snacks (300 calories and 8-10 g protein) Double for malnourished children	Hot meal or ready –to – eat snacks (500 calories and 20-25 g protein)	Hot meal or ready-to-eat snacks (500 calories and 20-25 g protein)
Growth Monitoring	Monthly weighing (0-3 yrs) Quarterly weighing(3-6 yrs) Weights recorded on growth charts		
Micronutrient Supplementation	IFA tablets for malnourished children	IFA supplementation	
Pre school education	Early childhood care and pre school Education(ECE) Consisting of early stimulation for under-3 yr olds, and education through the medium of play for 3-6 yr olds		

Source: Department of Women and Child Development, 2004

[6] Adolescent girls under Kishori Shakti Yojana also included

3.3. Child Malnutrition in India:

The prevalence of child malnutrition in India is among the highest in the world, nearly double that of Sub-Saharan Africa, with the dire consequences of morbidity, mortality, productivity, and thereby the economic growth.

Decline in child malnutrition over the last 15 years has been very slow; from 51.1 % in 1992-93 (NFHS-I) to 47 % in 1998-99 (NFHS-II) to 45.9 % in 2005-06 (NFHS-III). What is worse is that child malnutrition has gone up to 50 % in 2007-08 (Exhibit 3.4). Also, inequities in undernutrition do exist between demographic, socioeconomic and geographic groups in India, as an be seen from NFHS-I, II, and III data given in Exhibits 3.7 to 3.11. It may not be possible for India to achieve the nutrition MDG by 2015 in spite of economic growth, unless urgent measures are taken for more and better investments in child development.

Supplementary Nutrition: Under the Supplementary Nutrition Project (SNP) of ICDS, all families in the community are surveyed to identify children below the age of six as well as pregnant and lactating mothers. Supplementary nutrition is provided 300 days in a year, as per norms given in Table 3.2. Growth Monitoring and Nutrition Surveillance are two important activities to help detect growth faltering and nutritional status. Severely malnourished children are given special supplementary feeding and referred to health facilities. SNP also covers adolescent girls under the Kishori Shakti Yojana (KSY).

Table 3.2
Supplementary Nutrition Norms

Beneficiaries	Calories (cal)	Protein (gm)
Children (6 months-3 years)	300	8-10
Children (3-6 years)	300	8-10
Severely malnourished children	Double of the above	
Pregnant and lactating mothers	500	20-25
Adolescent Girls (KSY)	500	20-25

As mentioned earlier, the SNP expenditure was completely met by the states for the first 30 years. From 2005-06 onwards, the GoI provides 50 % of the SNP expenditure or 50 % of the actual cost norms whichever is less. The GoI guidelines regarding cost norms revised in 2004 are given below in Table 3.3.

Table 3.3
GoI guidelines on SNP cost norms (*)

Beneficiaries	Old Rates	Revise rates 2004
Children 6 months- 6 years	Rs 0. 95 per child/day	Rs 2.00 per child/day
Severely malnourished children (6 months-6 years)	Rs 1.35 per child/day	Rs 2.70 per child/day
Pregnant women and nursing mothers and adolescent girls	Rs 1.15 per beneficiary/day	Rs 2.30 per beneficiary/day

* GoI Letter No. 19-5/2003-CD-I (Pt.) dated 19-10-2004

The expenditure on ICDS (General) and SNP in particular over the last 3 years are given in Exhibit 3.5. It can be seen that SNP consumes more than 2/3rd of the total expenditure.

The staffing position in ICDS (sanctioned Vs in-place) as on March 31, 2008 is given in Exhibit 3.6, for each level of project staff at the block level. It can be seen that there is a shortage of staff at each level.

In spite of a well-conceived ICDS program to address child development, several concerns arise as to the effectiveness and efficiency in managing the SNP/ICDS program. As per the census of 2001, India has 170 million children below the age of 6 years. As per NFHS-III, about 25 % of children are born underweight, and another 50 % children are moderately underweight or severely underweight due to malnutrition (Exhibit 3.7). Underweight thus afflicts more than 75 % of children or approximately 125 million in the age group 0-6 years in India. What could explain the under achievement of SNP under the ICDS program in India?

Exhibit 3.1
Organizational Structure of ICDS at Block level

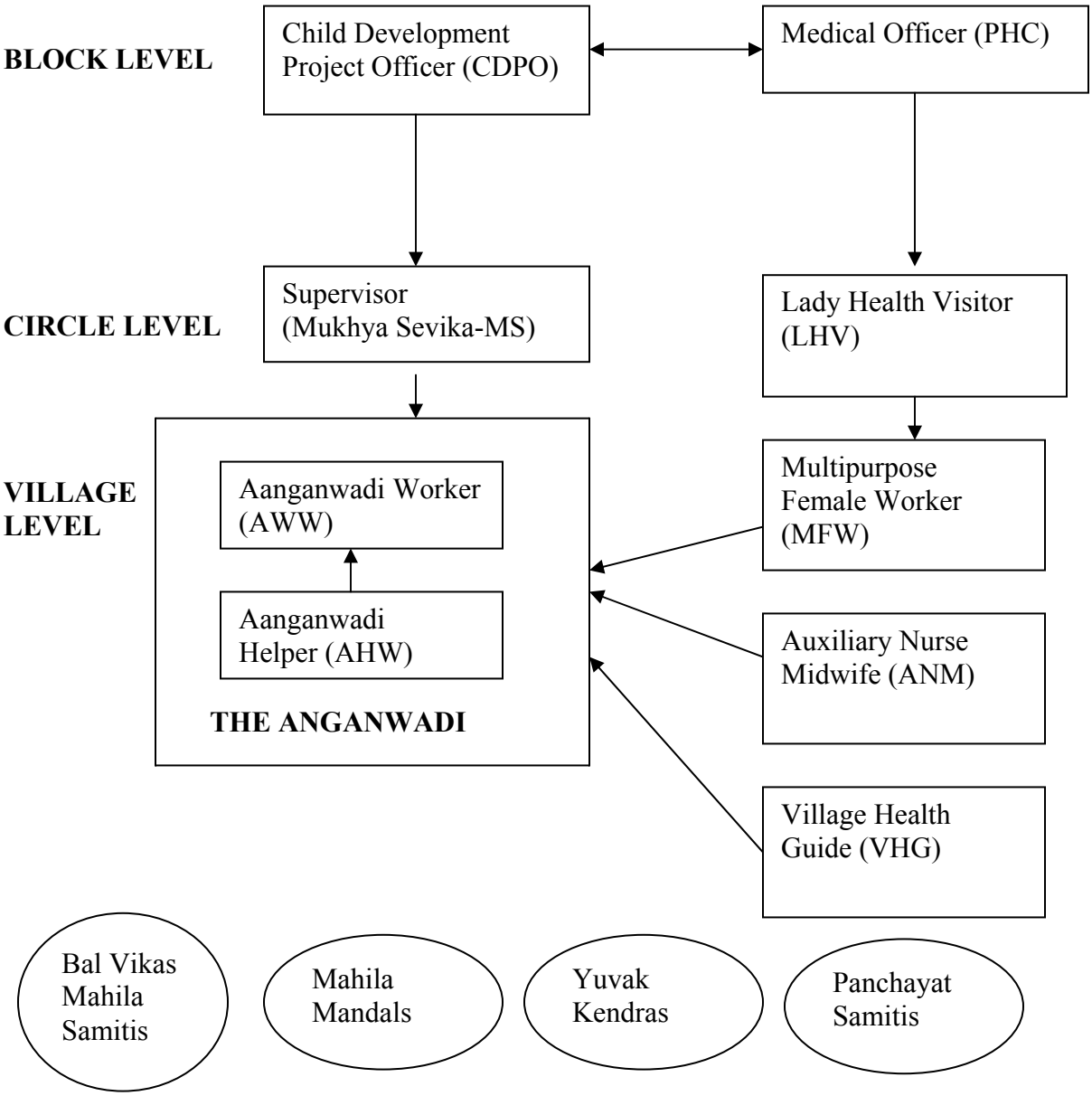


Exhibit 3.2
Number of ICDS Projects and Aanganwadi Centers

Sr No	Month of report	State/UT	Operational as on 29.2. 2008	
			ICDS Projects	No of AWCs
1	02/08	Andhra Pradesh	385	69611
2	02/08	Arunachal Pradesh	85	4277
3	02/08	Assam	223	36849
4	04/07	Bihar	394	80211
5	02/08	Chhattisgarh	158	29355
6	02/08	Goa	11	1112
7	02/08	Gujarat	260	43104
8	02/08	Haryana	137	17192
9	02/08	Himachal Pradesh	76	18248
10	05/07	Jammu & Kashmir	129	16409
11	10/07	Jharkhand	204	31074
12	02/08	Karnataka	185	54260
13	11/07	Kerala	163	32115
14	01/08	Madhya Pradesh	367	68306
15	02/08	Maharashtra	416	75741
16	12/07	Manipur	37	7621
17	01/08	Meghalaya	41	3195
18	02/08	Mizoram	23	1682
19	02/08	Nagaland	56	3194
20	02/08	Orissa	326	41697
21	02/08	Punjab	148	20169
22	02/08	Rajasthan	278	48363
23	12/07	Sikkim	11	988
24	02/08	Tamil Nadu	434	47265
25	02/08	Tripura	54	7351
26	02/08	Uttar Pradesh	889	146785
27	02/08	Uttarakhand	99	8834
28	01/08	West Bengal	411	87665
29	02/08	A&N islands	5	672
30	02/08	Chandigarh	3	370
31	12/07	Delhi	50	6106
32	12/07	Dadra& N Haveli	2	219
33	02/08	Daman & Diu	2	97
34	10/07	Lakshadweep	1	87
35	02/08	Puducheery	5	688
		All India	**6068**	**1010912**

Sources: www.wcd.nic.in

Exhibit 3.3
Beneficiaries for Supplementary Nutrition under ICDS

Sr No	State	Children (6 months -3 years)	Children (3-6 years)	Total Children (6 months-6 years)	Pregnant &Lactating Mothers (P&LM)	Total Beneficiaries (children 6 mo -6 years and P&LM)
1	Andhra Pradesh	1908652	2051959	3960611	994202	4954813
2	Arunachal Pradesh	96014	82100	178114	23552	201666
3	Assam	1519445	1661218	3180663	630644	3811307
4	Bihar	1786099	1721778	3507877	710378	4218255
5	Chhattisgarh	1009919	763706	1773625	478403	2252028
6	Goa	26137	20058	46195	11445	57640
7	Gujarat	1115906	1128080	2243986	392902	2636888
8	Haryana	594828	455288	1050116	283819	1333935
9	Himachal Pradesh	254285	192828	447113	99830	546943
10	Jammu &Kashmir	262197	211708	473905	113341	587246
11	Jharkhand	1019073	1119237	2138310	631892	2770202
12	Karnataka	1622885	1466020	3088905	739740	3828645
13	Kerala	521999	449617	971616	184428	1156044
14	Madhya Pradesh	2052138	2070104	4122242	931045	5053287
15	Maharashtra	2647312	3003567	5650879	932850	6583729
16	Manipur	158140	156516	314656	54530	369186
17	Meghalaya	141949	159978	301927	55367	357294
18	Mizoram	56652	38246	94898	26255	121153
19	Nagaland	169754	116108	285862	54535	340397
20	Orissa	2020295	2059276	4079571	772677	4852248
21	Punjab	505245	523693	1028938	279209	1308147
22	Rajasthan	1761532	1167724	2929256	780969	3710225
23	Sikkim	15821	947	16768	5489	22257
24	Tamil Nadu	975571	1195794	2171365	530114	2701479
25	Tripura	128366	146462	274828	48893	323721
26	Uttar Pradesh	9490615	8510655	18001270	3677541	21678811
27	Uttrakhand	258654	186642	445296	96134	541430
28	West Bengal	2563192	2533858	5097050	808417	5905467
29	A&N Island	10556	8805	19361	4305	23666
30	Chandigarh	17831	14183	32014	6909	38923
31	Delhi	341200	224909	566109	162375	728484
32	Dadra& N Haveli	9628	7947	17575	2975	20550
33	Daman & Diu	3798	3271	7069	1714	8783
34	Lakshadweep	3044	2512	5556	1782	7338
35	Puducheery	23018	5695	28713	9482	38195
	All India	**35091750**	**33460489**	**68552239**	**14538143**	**83090382**

Sources: www.wcd.nic.in

Exhibit 3.4
Malnutrition status in India

States/UTs	NFHS-1 1992-93	NFHS-2 1998-99	NFHS-3 2005-06	Grade-I	Grade-II	Grade-III-IV	Normal
				(As on 31st March 2007)			
Andhra Pradesh	45	37.7	36.5	33.49	19.61	0.13	46.77
Arunachal Pradesh	38.4	24.3	36.9	9.12	0.00	0.01	90.87
Assam	49.2	36	40.4	27.34	11.38	1.40	59.88
Bihar	62.5	54.3	58.4	-	-	-	-
Chhattisgarh	-	60.8	52.1	34.01	18.95	1.18	45.86
Goa	34.1	28.6	29.3	33.87	7.39	0.15	58.59
Gujarat	48.1	45.1	47.4	31.36	38.48	0.85	29.31
Haryana	34.6	34.6	41.9	34.12	11.11	0.11	54.66
Himachal Pradesh	43.7	43.6	36.2	29.44	9.27	0.15	61.14
J & k	-	34.5	29.4	25.70	6.13	0.78	67.39
Jharkhand	-	54.3	59.2	30.19	15.43	1.74	52.64
Karnataka	50.6	43.9	41.1	36.35	16.73	0.31	46.61
Kerala	27	26.9	28.8	31.53	7.21	0.07	61.20
Madhya Pradesh	48.5	53.5	60.3	32.17	16.69	0.75	50.39
Maharashtra	51.4	49.6	39.7	36.13	9.13	0.21	54.53
Manipur	26.8	27.5	23.8	5.02	4.84	0.19	89.94
Meghalaya	44.4	37.9	46.3	28.24	8.37	0.14	63.26
Mizoram	28.4	27.7	21.6	17.34	4.85	0.48	77.33
Nagaland	27.5	24.1	29.7	11.21	2.27	0.31	86.21
Orissa	52.4	54.4	44	37.55	18.16	0.82	43.46
Punjab	46	28.7	27	31.61	3.39	0.37	64.64
Rajasthan	44.3	50.6	44	33.32	20.50	0.27	45.91
Sikkim	-	20.6	22.6	22.31	4.78	0.08	72.83
Tamil Nadu	45.7	36.7	33.2	36.28	2.78	0.04	60.90
Tripura	45.2	42.6	39	10.63	4.01	0.19	85.17
Uttar Pradesh	47.2	51.8	47.3	31.81	20.46	1.09	46.64
Uttarakhand	-	41.8	38	32.26	13.22	0.23	54.29
West Bengal	54.8	48.7	43.5	36.68	15.39	0.68	47.25
A and N Islands	-	-	-	18.70	7.73	0.63	72.94
Chandigarh	-	-	-	29.45	5.79	0.00	64.76
Delhi	40.9	34.7	33.1	33.70	20.58	0.07	45.64
D and N Haveli	-	-	-	51.67	28.11	1.14	19.08
Daman and Diu	-		-	18.97	20.84	0.00	60.20
Lakshadweep	-	-	-	33.95	13.23	0.69	52.12
Pondicherry	-	-	-	37.60	7.74	0.00	54.65
India	**51.1**	**47**	**45.9**	**33.67**	**15.87**	**0.55**	**49.90**

Sources: (Nair, KRG, 2007), and (Indiastat.com)

http://www.indiastat.com/socialandwelfareschemes/27/integratedchilddevelopmentscheme icds/17919/physicalprogressundericds/449687/stats.aspx

Exhibit 3.5
ICDS Expenditure Statement

States/UT	Rs in lakh (07-08) (As on 31.3.08)		Rs in lakh (08-09) (As on 31.3.09)		Rs in lakh (09-10) (As on 15.5.09)	
	ICDS (General)	**ICDS (SNP)**	**ICDS (General)**	**ICDS (SNP)**	**ICDS (General)**	**ICDS (SNP)**
Andhra Pradesh	26015.86	13718.25	27163.56	18994.92	7253.82	3419.18
Arunachal Pradesh	3302.60	461.37	3395.68	326.68	668.70	613.56
Assam	8582.93	3376.61	26033.82	10541.20	3723.73	13239.86
Bihar	21909.01	19192.72	17508.23	15346.08	8345.54	5331.23
Chhattisgarh	9498.18	10452.14	8992.46	5429.43	3118.22	1519.54
Goa	507.00	169.52	406.56	123.83	405.46	110.75
Gujarat	11050.69	3855.01	16491.86	7464.33	4397.93	1815.69
Haryana	7115.76	5216.72	8455.60	5143.00	1899.06	854.05
Himachal Pradesh	3802.02	1017.58	8232.21	2282.58	1750.63	340.56
J&K	8001.09	917.69	4557.80	697.98	2283.63	297.96
Jharkhand	9191.01	6997.88	9776.60	6545.80	3306.29	1827.43
Karnataka	13934.16	9298.19	19473.26	10936.42	5042.61	2594.70
Kerala	9687.99	3979.14	15020.66	5597.50	3164.39	882.35
MP	26458.36	18263.25	29168.81	8290.06	6695.05	3971.28
Maharashtra	25105.71	16770.11	31996.55	20646.17	8109.83	4253.37
Manipur	3203.17	926.30	2888.69	1129.16	761.32	1107.73
Meghalaya	1289.14	1007.99	1817.13	1362.96	426.00	1258.87
Mizoram	1210.29	535.20	1603.55	766.71	677.88	1489.95
Nagaland	1697.65	991.99	2527.14	1303.31	454.37	1070.06
Orissa	15129.70	6295.06	16934.58	8729.46	4508.22	3191.64
Punjab	5316.95	1691.46	9125.15	2282.68	2160.11	875.03
Rajasthan	12885.03	11067.07	19486.76	10957.94	4956.80	2519.25
Sikkim	553.31	64.68	884.29	95.53	796.19	443.78
Tamil Nadu	15608.35	3521.89	18163.08	5428.14	5414.60	1087.03
Tripura	3406.26	759.54	2975.26	774.40	375.78	943.50
Uttar Pradesh	37189.40	47968.74	54349.16	57090.72	15269.10	14197.19
Uttarakhand	2690.52	2367.65	4627.72	1202.36	1205.67	439.49
West Bengal	23845.30	14392.25	33616.96	16810.6	8547.40	3638.30
A&N islands	241.55	67.45	299.10	108.78	238.66	38.04
Chandigarh	189.39	46.17	250.94	96.87	167.92	65.52
Delhi	1569.21	516.47	3885.71	1417.03	677.57	579.16
D&N Haveli	68.70	96.57	85.87	47.33	102.74	30.97
Daman &Diu	48.00		58.81	27.48	43.63	17.03
Lakshadweep	64.63	27.75	62.87	50.92	31.03	15.10
Pondicherry	234.36	200.64	332.37	82.97	222.47	87.50
Total	**310803.28**	**206231.05**	**400648.8**	**228131.33**	**107202.35**	**74166.65**

Sources: www.wcd.nic.in

Exhibit 3.6
Staff Position as on 29-2- 2008

States/UT	Month of report	No of CDPOs/ACDPOs		Supervisors		Anganwadi Workers		Anganwadi Helpers	
		Sanction	In Position	Sanction	In Position	Sanction	In Position	Sanction	In Position
A.P	02/08	647	307	3365	2351	73944	66980	73944	65761
Arun. P	02/08	85	79	195	188	4277	4277	4277	4277
Assam	02/08	306	201	1608	1296	37082	36833	37082	36835
Bihar	04/07	545	178	3295	342	81088	60041	81088	59797
Chhattisgarh	02/08	266	145	1615	646	34937	29024	34937	28273
Goa	02/08	14	10	61	47	1112	1093	1112	1050
Gujarat	02/08	500	272	2142	1527	44179	39012	44179	40452
Haryana	02/08	142	127	817	632	17192	17192	17192	17104
Hima Pradesh	02/08	107	77	808	351	18248	17618	18248	17540
J & K	05/07	159	127	1050	341	25483	16409	25483	16409
Jharkhand	10/07	192	148	1146	486	32097	30617	32097	30243
Karnataka	02/08	404	352	2435	1669	54260	50003	54260	52820
Kerala	11/07	243	162	1427	1136	32115	32115	32115	32115
M. P	01/08	493	322	2841	2091	69238	67947	69238	68633
Maharashtra	02/08	733	494	3723	2725	84867	74072	84867	72538
Manipur	12/07	48	38	298	298	7621	7639	7621	7639
Meghalaya	01/08	45	28	170	123	3388	3195	3388	3195
Mizoram	02/08	23	22	90	70	1682	1682	1682	1682
Nagaland	02/08	56	57	136	123	3194	3194	3194	3194
Orissa	02/08	326	304	2042	991	41697	40027	41697	40649
Punjab	02/08	157	120	941	624	20169	19768	20169	19765
Rajasthan	02/08	417	226	2235	1374	48372	47924	48372	47713
Sikkim	12/07	11	11	45	34	988	988	988	984
Tamil Nadu	02/08	434	363	1718	1370	47265	45086	47265	43104
Tripura	02/08	53	45	304	204	7351	6442	7351	6524
Uttar Pradesh	02/08	998	573	6638	3839	150727	140886	150727	139233
Uttarakhand	02/08	99	70	420	295	9664	8599	9664	8420
West Bengal	01/08	640	479	4058	2534	92152	85165	92152	79385
A & N Islands	02/08	5	5	31	21	672	672	672	672
Chandigarh	02/08	3	3	15	12	370	370	370	370
Delhi	12/07	54	19	230	145	6106	6016	6106	6016
D& N Haveli	12/07	2	2	11	9	219	217	219	219
Daman & Diu	02/08	2	2	5	5	107	97	107	97
Lakshadweep	10/07	0	0	4	4	87	87	87	87
Pondicherry	02/08	5	5	32	27	688	688	688	688
All India		**8214**	**5373**	**45951**	**27930**	**1052638**	**961975**	**1052638**	**953483**

Source: www.wcd.nic.in

Exhibit 3.7
Nutritional Status by Demographic Characteristics: NFHS-I

Table 10.8 Nutritional status by demographic characteristics

Among children under four years of age, the percentage classified as undernourished according to three anthropometric indices of nutritional status, by demographic characteristics, India, 1992-93

	Weight-for-age			Height-for-age		Weight-for-height		
Demographic characteristic	Percentage below -3 SD	Percentage below -2 SD[1]	Number of children[2]	Percentage below -3 SD	Percentage below -2 SD[1]	Percentage below -3 SD	Percentage below -2 SD[1]	Number of children[3]
Child's age								
<6 months	2.8	15.6	4406	5.7	15.7	2.0	9.5	3225
6-11 months	14.1	43.3	4792	14.3	34.3	2.9	15.7	3176
12-23 months	26.3	63.4	9560	30.7	56.6	5.6	28.0	6945
24-35 months	25.9	62.2	8406	34.6	60.2	2.5	16.6	6033
36-47 months	21.8	58.5	8643	40.7	66.7	1.8	11.6	6204
Sex								
Male	20.2	53.3	18208	28.4	52.3	3.7	18.8	13040
Female	21.0	53.4	17599	29.4	51.7	2.6	16.1	12543
Birth order								
1	17.4	49.4	9719	24.8	48.1	3.0	16.5	6630
2-3	19.5	52.2	15209	27.3	49.8	3.2	17.4	10634
4-5	23.7	57.7	6848	32.6	56.6	3.6	19.1	5125
6+	26.8	59.8	4031	36.6	60.0	2.9	17.4	3194
Previous birth interval[4]								
First birth	17.5	49.5	9762	24.8	48.1	3.0	16.5	6664
< 24 months	23.3	56.9	6106	33.1	56.9	3.7	16.3	4549
24-47 months	21.5	55.2	14713	30.4	53.9	2.9	18.0	10677
48+ months	20.7	51.5	5227	26.4	47.3	3.6	19.2	3694
Total	20.6	53.4	35807	28.9	52.0	3.2	17.5	25584

Note: Figures are for children born 1-47 months prior to the survey. Each of the indices is expressed in standard deviation units (SD) from the median of the International Reference Population. The percentages of children who are more than three and more than two standard deviation units below the median of the International Reference Population (-3SD and -2SD) are shown according to selected characteristics.

[1]Also includes the children who are more than 3 standard deviations below the International Reference Population median

[2]Number of children for calculation of weight-for-age

[3]Number of children for calculation of height-for-age and weight-for-height, excluding Andhra Pradesh, Himachal Pradesh, Madhya Pradesh, Tamil Nadu and West Bengal

[4]In the case of first-born twins, both twins are counted as first births because neither has a previous birth interval.

Exhibit 3.8
Nutritional Status by Background Characteristics: NFHS-I

Table 10.9 Nutritional status by background characteristics

Among children under four years of age, the percentage classified as undernourished according to three anthropometric indices of nutritional status, by selected background characteristics, India, 1992-93

Background characteristic	Weight-for-age			Height-for-age		Weight-for-height		
	Percentage below -3 SD	Percentage below -2 SD[1]	Number of children[2]	Percentage below -3 SD	Percentage below -2 SD[1]	Percentage below -3 SD	Percentage below -2 SD[1]	Number of children[3]
Residence								
Urban	14.8	45.2	8464	22.0	44.8	2.9	15.8	5884
Rural	22.4	55.9	27343	30.9	54.1	3.2	18.0	19700
Mother's education								
Illiterate	24.7	59.2	22946	34.5	58.5	3.4	18.8	16639
Lit., < middle complete	16.7	50.4	6251	22.6	46.4	3.0	16.8	4260
Middle school complete	12.4	43.5	2765	17.9	39.3	2.7	14.7	1905
High school and above	7.8	30.3	3844	12.2	30.0	2.3	12.3	2780
Religion								
Hindu	21.0	53.7	28450	29.2	52.5	3.3	17.7	19897
Muslim	21.2	55.4	5440	31.4	54.5	3.0	17.2	4065
Christian	7.9	38.3	737	15.9	34.2	1.8	11.1	523
Sikh	12.6	40.2	670	13.1	34.9	2.4	17.4	656
Jain	9.6	29.9	106	12.6	25.8	0.3	6.4	78
Buddhist	22.8	54.3	262	31.7	59.5	2.0	22.2	251
Other	23.0	59.7	143	25.6	51.2	3.9	15.6	113
Caste/tribe								
Scheduled caste	23.7	57.5	4664	33.2	58.0	3.4	18.5	3347
Scheduled tribe	25.3	56.8	3203	28.8	52.8	4.1	22.0	2085
Other	19.5	52.3	27940	28.1	50.9	3.0	16.8	20152
Total	20.6	53.4	35807	28.9	52.0	3.2	17.5	25584

Note: Figures are for children born 1-47 months prior to the survey. Each of the indices is expressed in standard deviation units (SD) from the median of the International Reference Population. The percentages of children who are more than three and more than two standard deviation units below the median of the International Reference Population (-3SD and -2SD) are shown according to selected characteristics.
() Based on 25-49 unweighted cases
* Percentage not shown; based on fewer than 25 unweighted cases
[1]Also includes the children who are more than 3 standard deviations below the International Reference Population median
[2]Number of children for calculation of weight-for-age
[3]Number of children for calculation of height-for-age and weight-for-height, excluding Andhra Pradesh, Himachal Pradesh, Madhya Pradesh, Tamil Nadu and West Bengal

Exhibit 3.9
Nutritional Status by Demographic Characteristics: NFHS-II

Table 7.15 Nutritional status of children by demographic characteristics

Percentage of children under age 3 years classified as undernourished on three anthropometric indices of nutritional status, according to selected demographic characteristics, India, 1998–99

	Weight-for-age		Height-for-age		Weight-for-height		
Demographic characteristic	Percentage below –3 SD	Percentage below –2 SD[1]	Percentage below –3 SD	Percentage below –2 SD[1]	Percentage below –3 SD	Percentage below –2 SD[1]	Number of children
Age of child							
< 6 months	2.0	11.9	4.2	15.4	1.9	9.3	4,203
6–11 months	11.8	37.5	11.3	30.9	2.8	13.2	4,116
12–23 months	23.1	58.5	29.8	57.5	4.1	21.9	8,295
24–35 months	24.1	58.4	32.0	56.5	1.9	13.2	7,986
Sex of child							
Male	16.9	45.3	21.8	44.1	2.9	15.7	12,822
Female	19.1	48.9	24.4	47.0	2.7	15.2	11,778
Birth order							
1	13.6	40.9	17.8	39.6	2.8	14.5	7,111
2–3	16.3	46.2	21.8	44.4	2.5	15.0	10,893
4–5	23.8	52.9	28.5	52.3	3.2	16.8	4,287
6+	28.5	58.6	35.2	56.2	3.3	18.2	2,309
Previous birth interval[2]							
First birth	13.6	41.0	17.9	39.7	2.8	14.5	7,144
< 24 months	21.3	52.2	27.9	50.8	3.1	15.8	3,908
24–47 months	19.8	50.0	25.6	48.9	2.5	15.6	9,753
48+ months	18.0	45.1	21.2	42.4	3.2	16.5	3,794
Total	18.0	47.0	23.0	45.5	2.8	15.5	24,600

Note: Each index is expressed in standard deviation units (SD) from the median of the International Reference Population.
[1]Includes children who are below –3 SD from the International Reference Population median
[2]First-born twins (triplets, etc.) are counted as first births because they do not have a previous birth interval.

Exhibit 3.10
Nutritional Status by Background Characteristics: NFHS-II

Table 7.16 Nutritional status of children by background characteristics

Percentage of children under age 3 years classified as undernourished on three anthropometric indices of nutritional status, according to selected background characteristics, India, 1998–99

Background characteristic	Weight-for-age		Height-for-age		Weight-for-height		Number of children
	Percent-age below –3 SD	Percent-age below –2 SD[1]	Percent-age below –3 SD	Percent-age below –2 SD[1]	Percent-age below –3 SD	Percent-age below –2 SD[1]	
Residence							
Urban	11.6	38.4	15.4	35.6	2.2	13.1	5,757
Rural	19.9	49.6	25.4	48.5	3.0	16.2	18,842
Mother's education							
Illiterate	24.1	55.0	30.2	54.4	3.4	17.1	13,878
Literate, < middle school complete	13.1	44.6	18.3	40.7	2.0	15.3	4,634
Middle school complete	10.8	36.6	13.4	34.0	2.5	13.3	2,400
High school complete and above	5.8	26.6	8.2	25.4	1.6	11.0	3,685
Religion							
Hindu	18.4	47.7	23.3	46.0	2.9	16.0	19,572
Muslim	18.6	48.3	24.8	47.1	2.5	14.1	3,745
Christian	9.6	30.8	14.0	30.6	2.5	13.4	582
Sikh	8.4	26.8	16.0	35.4	1.1	7.0	365
Jain	1.3	20.9	0.8	13.2	0.0	11.9	60
Buddhist/Neo-Buddhist	7.5	43.7	8.7	32.5	0.9	11.9	168
Other	19.1	49.6	11.2	44.0	0.4	17.7	68
No religion	20.1	44.1	26.9	54.4	0.0	5.0	17
Caste/tribe							
Scheduled caste	21.2	53.5	27.5	51.7	3.0	16.0	4,919
Scheduled tribe	26.0	55.9	27.6	52.8	4.4	21.8	2,236
Other backward class	18.3	47.3	23.1	44.8	3.4	16.6	7,941
Other	13.8	41.1	19.4	40.7	1.8	12.8	9,265
Mother's work status							
Working in family farm/business	22.9	56.0	29.3	52.8	3.3	17.7	3,134
Employed by someone else	24.6	55.5	26.9	51.8	3.8	19.6	3,602
Self-employed	21.4	51.7	24.7	47.7	2.8	19.3	838
Not worked in past 12 months	15.5	43.3	21.0	42.7	2.5	14.0	17,018
Mother's height							
< 145 cm	28.3	59.8	36.8	60.7	2.9	17.1	3,100
≥ 145 cm	16.5	45.1	21.1	43.3	2.8	15.2	21,458
Mother's body mass index							
< 18.5 kg/m^2	23.4	57.2	25.9	50.3	3.0	19.6	9,824
≥ 18.5 kg/m^2	14.4	40.2	21.2	42.3	2.7	12.7	14,698
Standard of living index							
Low	25.3	56.9	29.8	53.7	3.9	19.7	8,548
Medium	16.5	46.8	22.4	45.3	2.4	14.3	11,636
High	6.7	26.8	10.7	28.5	1.5	10.2	4,137
Total	18.0	47.0	23.0	45.5	2.8	15.5	24,600

Note: Each index is expressed in standard deviation units (SD) from the median of the International Reference Population. Total includes 3, 23, 239, 7, 42, 78, and 278 children with missing information on mother's education, religion, caste/tribe, mother's work status, mother's height, mother's body mass index, and the standard of living index, respectively, who are not shown separately.
[1]Includes children who are below –3 SD from the International Reference Population median

Exhibit 3.11
Nutritional Status by Demographic and Background Characteristics: NFHS-III

Table 10.1 Nutritional status of children

Percentage of children under age five years classified as malnourished according to three anthropometric indices of nutritional status: height-for-age, weight-for-height, and weight-for-age, by background characteristics, India, 2005-06

Background characteristic	Height-for-age			Weight-for-height				Weight-for-age				
	Percent-age below -3 SD	Percent-age below -2 SD[1]	Mean Z-score (SD)	Percent-age below -3 SD	Percent-age below -2 SD[1]	Percent-age above +2 SD	Mean Z-score (SD)	Percent-age below -3 SD	Percent-age below -2 SD[1]	Percent-age above +2 SD	Mean Z-score (SD)	Number of children
Age in months												
<6	8.4	20.4	-0.6	13.1	30.3	4.1	-1.2	10.9	29.5	1.0	-1.4	3,845
6-8	10.8	25.9	-1.0	10.1	29.3	3.1	-1.1	13.7	34.7	0.6	-1.5	2,570
9-11	12.8	32.0	-1.2	10.9	28.9	1.6	-1.2	14.1	36.7	0.2	-1.6	2,086
12-17	21.7	46.9	-1.8	7.3	23.3	1.7	-1.1	14.2	40.2	0.3	-1.7	4,642
18-23	30.4	57.8	-2.2	7.6	22.2	1.1	-1.1	19.5	45.9	0.2	-1.9	4,636
24-35	28.9	55.9	-2.2	5.0	16.7	0.9	-1.0	17.7	44.9	0.4	-1.9	9,335
36-47	27.8	54.3	-2.1	4.7	15.5	1.0	-0.9	16.6	45.6	0.2	-1.9	9,780
48-59	23.9	50.3	-2.0	4.1	15.7	1.3	-1.0	15.3	44.8	0.3	-1.9	9,762
Sex												
Male	23.9	48.1	-1.9	6.8	20.5	1.7	-1.0	15.3	41.9	0.4	-1.8	24,346
Female	23.4	48.0	-1.9	6.1	19.1	1.4	-1.0	16.4	43.1	0.3	-1.8	22,309
Birth interval in months[2]												
First birth[3]	18.0	41.1	-1.6	5.4	17.8	2.0	-0.9	12.1	36.1	0.5	-1.6	13,546
<24	30.4	55.6	-2.2	6.1	18.9	1.4	-1.0	19.0	47.6	0.1	-2.0	8,448
24-47	26.0	51.2	-2.0	7.3	21.8	1.2	-1.1	17.9	46.2	0.3	-1.9	16,976
48+	20.9	44.7	-1.7	6.9	20.4	1.7	-1.1	14.5	40.3	0.5	-1.7	6,367
Birth order[2]												
1	17.9	41.0	-1.6	5.4	17.8	1.9	-0.9	12.0	36.1	0.5	-1.6	13,473
2-3	22.2	47.8	-1.8	6.3	19.6	1.6	-1.0	14.4	41.4	0.3	-1.8	20,032
4-5	30.4	54.3	-2.1	7.6	21.8	1.0	-1.1	21.2	49.9	0.2	-2.0	7,640
6+	37.2	61.0	-2.3	8.7	24.5	0.9	-1.2	26.3	56.6	0.3	-2.2	4,192
Size at birth[2]												
Very small	28.2	53.4	-2.1	9.6	28.7	1.0	-1.3	23.6	54.0	0.3	-2.1	2,533
Small	27.3	53.9	-2.0	8.2	25.8	1.5	-1.2	20.5	51.5	0.2	-2.0	6,664
Average or larger	22.7	46.5	-1.8	5.9	18.2	1.6	-1.0	14.5	40.1	0.4	-1.7	35,575
Residence												
Urban	17.6	39.6	-1.6	5.7	16.9	2.5	-0.8	10.8	32.7	0.6	-1.5	11,337
Rural	25.6	50.7	-2.0	6.7	20.7	1.2	-1.1	17.5	45.6	0.3	-1.9	35,318
Mother's education[4]												
No education	31.6	57.2	-2.2	8.0	22.7	1.1	-1.2	22.1	52.0	0.2	-2.1	22,730
<5 years complete	24.1	50.4	-1.9	6.2	20.8	1.1	-1.1	15.6	45.8	0.2	-1.9	3,361
5-7 years complete	20.3	45.6	-1.8	5.5	18.8	1.8	-1.0	12.3	38.5	0.4	-1.7	6,748
8-9 years complete	15.6	40.7	-1.6	5.2	17.5	1.9	-0.9	9.4	34.9	0.3	-1.6	5,514
10-11 years complete	10.9	33.0	-1.4	3.9	14.3	2.2	-0.8	6.5	26.8	0.9	-1.3	3,530
12 or more years complete	7.0	21.9	-1.0	4.0	12.8	2.6	-0.6	4.5	17.9	0.8	-1.0	3,995
Religion												
Hindu	23.4	48.0	-1.9	6.6	20.3	1.5	-1.0	16.1	43.2	0.3	-1.8	36,675
Muslim	26.2	50.3	-2.0	6.1	18.4	1.6	-0.9	15.6	41.8	0.4	-1.8	7,758
Christian	17.9	39.0	-1.5	5.1	15.5	3.1	-0.7	8.7	29.7	0.9	-1.4	929
Sikh	13.4	29.8	-1.3	2.8	11.0	1.9	-0.6	7.8	22.0	0.7	-1.1	619
Buddhist/Neo-Buddhist	23.2	56.1	-1.9	7.0	21.0	3.1	-0.9	14.7	39.2	0.8	-1.7	316
Jain	5.9	31.2	-1.2	5.2	15.8	0.8	-0.9	6.6	24.0	0.0	-1.3	78
Other	34.0	58.5	-2.2	10.5	33.6	1.3	-1.5	35.4	62.7	0.1	-2.4	233
Caste/tribe												
Scheduled caste	27.6	53.9	-2.1	6.6	21.0	1.3	-1.1	18.5	47.9	0.3	-1.9	9,531
Scheduled tribe	29.1	53.9	-2.1	9.3	27.6	1.5	-1.3	24.9	54.5	0.4	-2.1	4,448
Other backward class	24.5	48.8	-1.9	6.6	20.0	1.3	-1.0	15.7	43.2	0.3	-1.8	18,969
Other	17.8	40.7	-1.6	5.2	16.3	2.1	-0.8	11.1	33.7	0.5	-1.5	13,351
Don't know	22.3	45.8	-1.8	3.1	14.1	1.4	-0.9	16.3	35.1	0.0	-1.7	193
Mother's interview status												
Interviewed	23.7	48.1	-1.9	6.5	19.9	1.5	-1.0	15.9	42.6	0.4	-1.8	45,337
Not interviewed but in household	22.8	47.5	-1.7	7.9	18.0	0.3	-1.0	14.9	38.5	0.3	-1.7	541
Not interviewed and not in household[5]	20.7	45.3	-1.7	4.8	16.4	2.3	-0.9	13.1	36.9	1.0	-1.6	778
Mother's nutritional status												
Underweight (BMI<18.5)	27.3	53.5	-2.1	7.9	25.2	1.1	-1.3	20.9	52.0	0.2	-2.1	17,656
Normal (BMI 18.5-24.9)	22.5	46.3	-1.8	5.9	17.4	1.7	-0.9	13.6	38.7	0.4	-1.7	24,510
Overweight (BMI ≥ 25)	12.0	31.2	-1.3	2.7	9.3	3.0	-0.5	4.6	20.1	1.0	-1.1	3,159
Mother not measured	28.9	51.7	-1.9	7.7	19.6	1.4	-0.9	19.6	41.3	0.3	-1.7	524

Continued...

Exhibit 3.11 (contd)

Table 10.1 Nutritional status of children—*Continued*

Background characteristic	Height-for-age: Percentage below -3 SD	Height-for-age: Percentage below -2 SD[1]	Height-for-age: Mean Z-score (SD)	Weight-for-height: Percentage below -3 SD	Weight-for-height: Percentage below -2 SD[1]	Weight-for-height: Percentage above +2 SD	Weight-for-height: Mean Z-score (SD)	Weight-for-age: Percentage below -3 SD	Weight-for-age: Percentage below -2 SD[1]	Weight-for-age: Percentage above +2 SD	Weight-for-age: Mean Z-score (SD)	Number of children
Child's living arrangements												
Living with both parents	23.9	48.4	-1.9	6.4	19.6	1.5	-1.0	15.9	42.8	0.3	-1.8	38,020
Living with mother (not father)	23.0	46.6	-1.8	7.0	21.2	1.8	-1.0	15.7	41.6	0.4	-1.8	7,858
Living with father (not mother)	25.5	52.4	-1.9	6.8	18.8	3.8	-1.1	19.4	42.4	0.9	-1.8	154
Living with neither parent	19.5	43.5	-1.7	4.3	15.8	1.9	-0.9	11.5	35.6	1.0	-1.6	624
Wealth index												
Lowest	34.2	59.9	-2.3	8.7	25.0	1.0	-1.2	24.9	56.6	0.2	-2.2	11,689
Second	27.9	54.3	-2.1	6.7	22.0	1.1	-1.1	19.4	49.2	0.2	-2.0	10,398
Middle	23.1	48.9	-1.9	6.2	18.8	1.3	-1.0	14.1	41.4	0.3	-1.8	9,449
Fourth	16.5	40.8	-1.6	5.0	16.6	2.1	-0.9	9.5	33.6	0.5	-1.5	8,543
Highest	8.2	25.3	-1.1	4.2	12.7	2.7	-0.7	4.9	19.7	0.8	-1.1	6,577
Total	23.7	48.0	-1.9	6.4	19.8	1.5	-1.0	15.8	42.5	0.4	-1.8	46,655

Note: Table is based on children who stayed in the household the night before the interview. Each of the indices is expressed in standard deviation units (SD) from the median of the 2006 WHO International Reference Population. Table is based on children with valid dates of birth (month and year) and valid measurement of both height and weight. Total includes births with missing information on size at birth, religion, and caste/tribe, who are not shown separately.

[1] Includes children who are below -3 standard deviations (SD) from the International Reference Population median.

[2] Excludes children whose mothers were not interviewed.

[3] First born twins (triplets, etc.) are counted as first births because they do not have a previous birth interval.

[4] For women who are not interviewed, information is taken from the Household Questionnaire. Excludes children whose mothers are not listed in the household schedule.

[5] Includes children whose mothers are deceased.

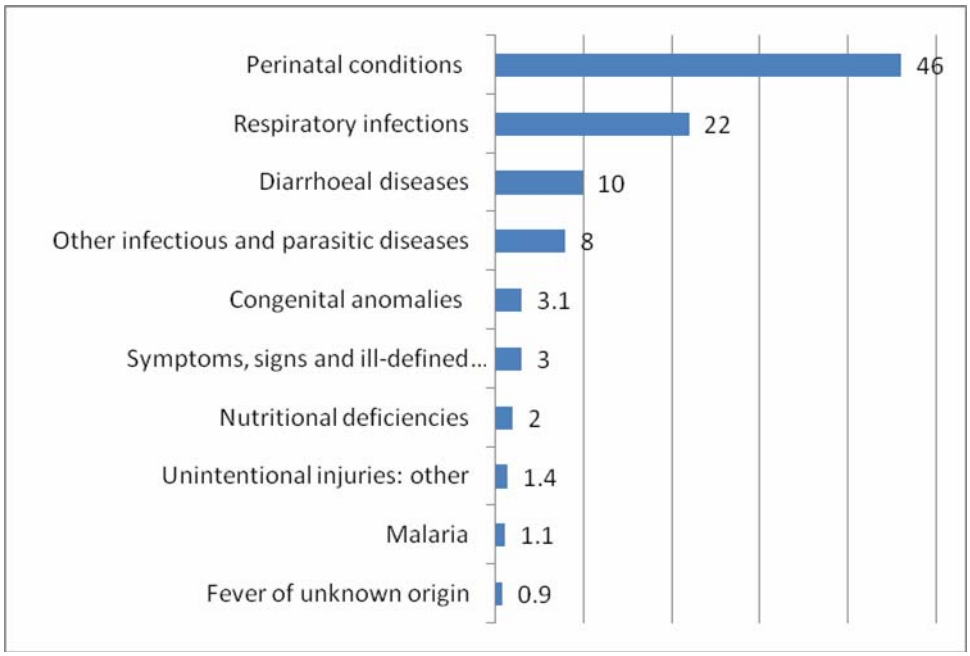
Chapter 4
Managing Childhood Illnesses: Can't we do better?

4.1. Introduction: More than 7 million children die every year in developing countries before they reach their fifth birthday, due to Acute Respiratory tract Infections (ARI), Diarrhoea, Measles, Malaria, or malnutrition-and often due to a combination of these illnesses (WHO, 2003). Projection based on the global burden of diseases, 1996 estimates that these conditions will continue to be major concerns even in 2020 unless greater efforts are made globally (Murray and Lopez, 1996). It is also worth noting that majority of these deaths are preventable and easily treatable. Managing childhood illnesses is therefore a very strategic issue in the overall management of child health.

4.2. Childhood Illnesses: Nearly 2 million children under the age of 5 years die in India every year, most of which are preventable. Figure 4.1 shows the top ten causes of death for infants, while Figure 4.2 shows the top ten causes of death for children 1-4 years old.

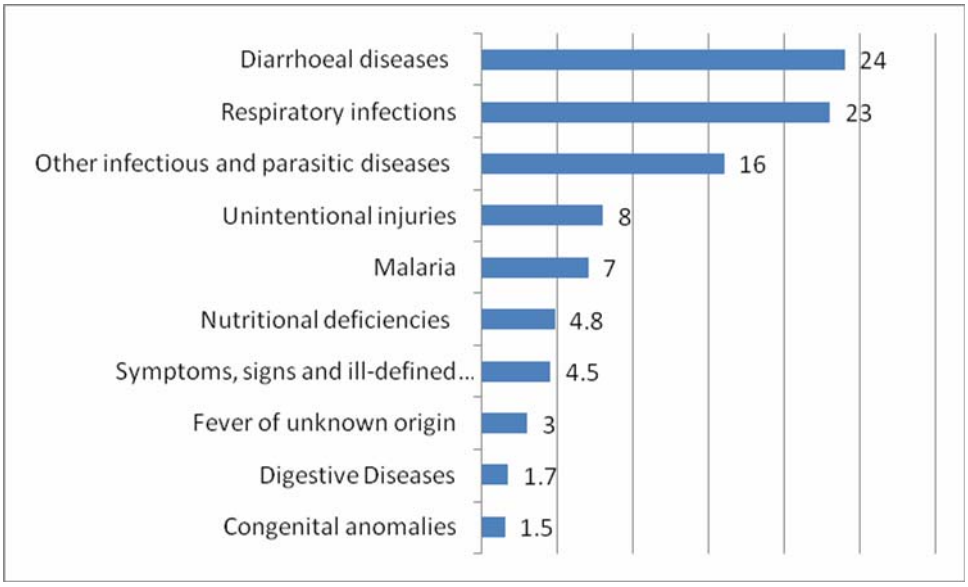
Figure 4.1

Top ten causes of death for infants in India 2001-03



Source: Registrar General of India, Government of India. Report on Cause of Death: 2001-03. Summary of the report.

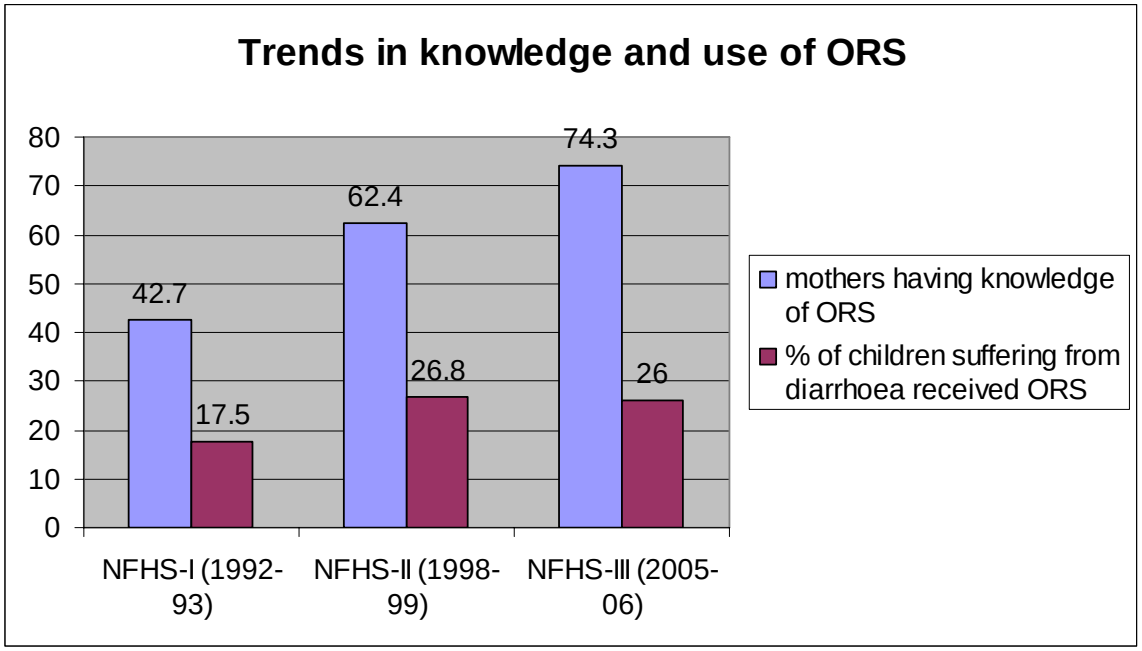
Figure 4.2
Top ten causes of death for children of 1 to 4 years of age in India 2001-03



Source: Registrar General of India, Government of India. Report on Cause of Death: 2001-03.

4.3. Management of Diarrhoea and ARI: It can be seen that Diarrhoea and ARI are the most serious illness leading to U5 child deaths. Several interventions are available to save the children from dying, for example, use of ORS for diarrhoea. However, the management of diarrhoea through ORS is not satisfactory as can be seen from Figure 4.3 below:

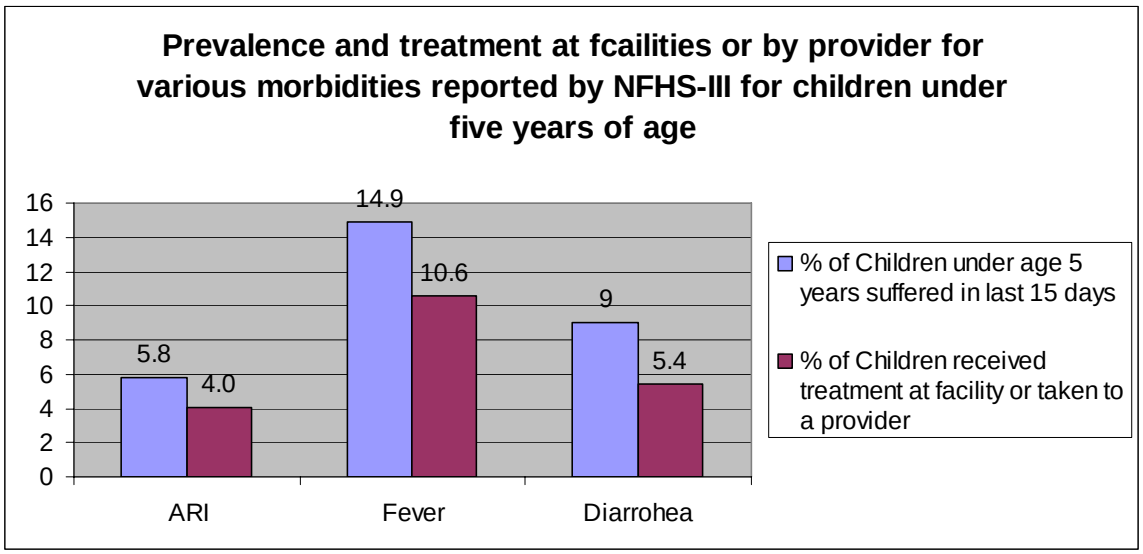
Figure 4.3
Knowledge and Use of ORS in mothers of children less than 3 years of age



From Figure 4.3, it is clear that the knowledge of ORS in mothers has increased from 43 % in NFHS –I (1992-93) to 75 % by NFHS-III (2005-06). However, percentage of children suffering from Diarrhoea receiving ORS has not shown much improvement. In fact, use of ORS has declined from 26.8 % in NFHS-II (1998-99) to 26 % by NFHS-III (2005-06), even though knowledge of ORS in mothers has increased from 62 % to 75% during the same period.

Figure 4.4 below shows the trends in the prevalence and treatment at facilities or by provider for various morbidities, reported under NFHS-III survey:

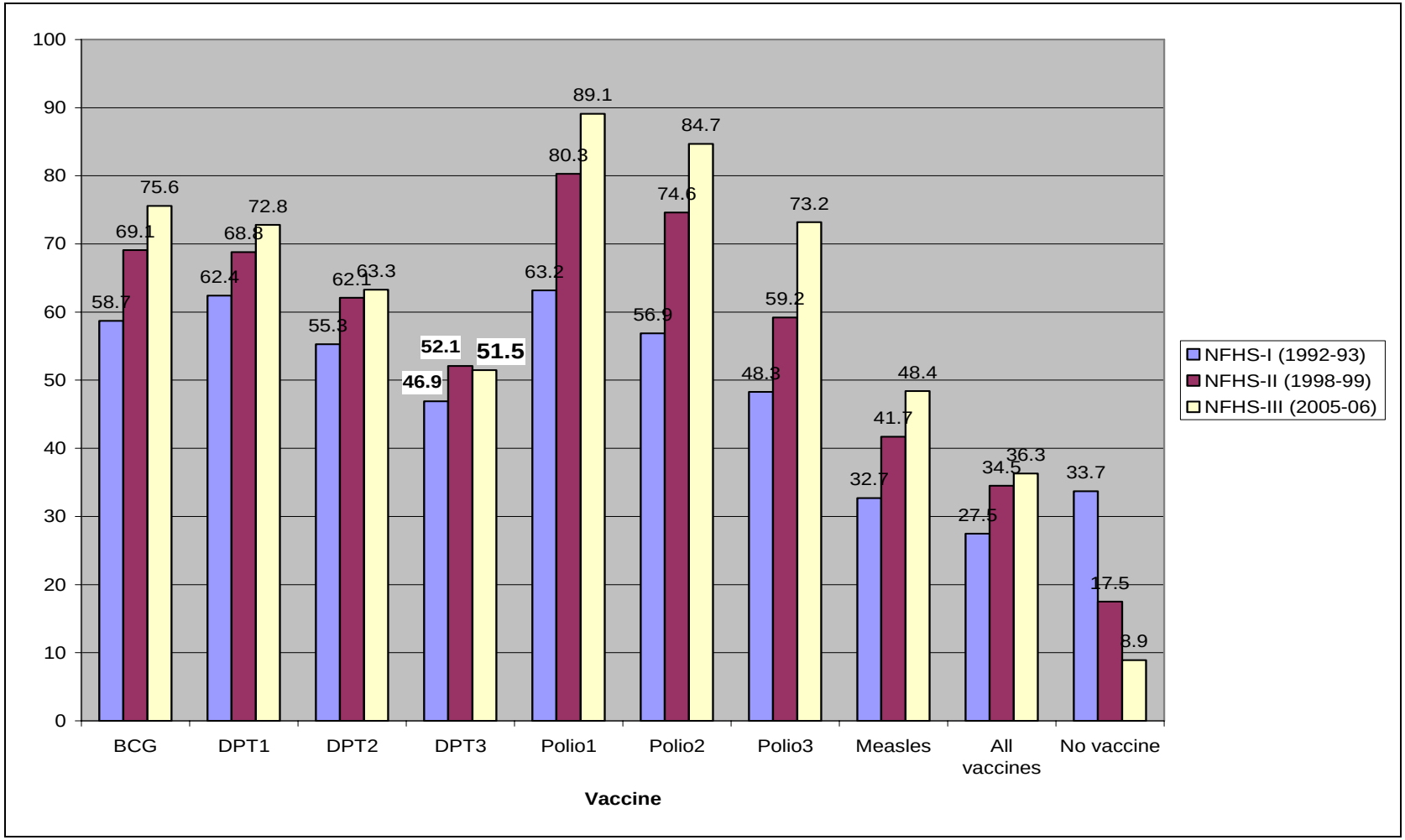
Figure 4.4
Morbidities in children reported by NFHS-III (2005-06)



It can be seen from Figure 4.4 that only about 2/3 rd of the children suffering from ARI, fever and Diarrhoea have received treatment at a facility or taken to a provider.

4.4. Immunization: Immunization against vaccine preventable diseases is another area of concern in managing childhood illnesses. Government of India announced Universal Immunization Program (UIP) in 1985, yet the coverage of children under vaccination for each of the Vaccine Preventable Diseases continues to be very poor (see Figure 4.5).

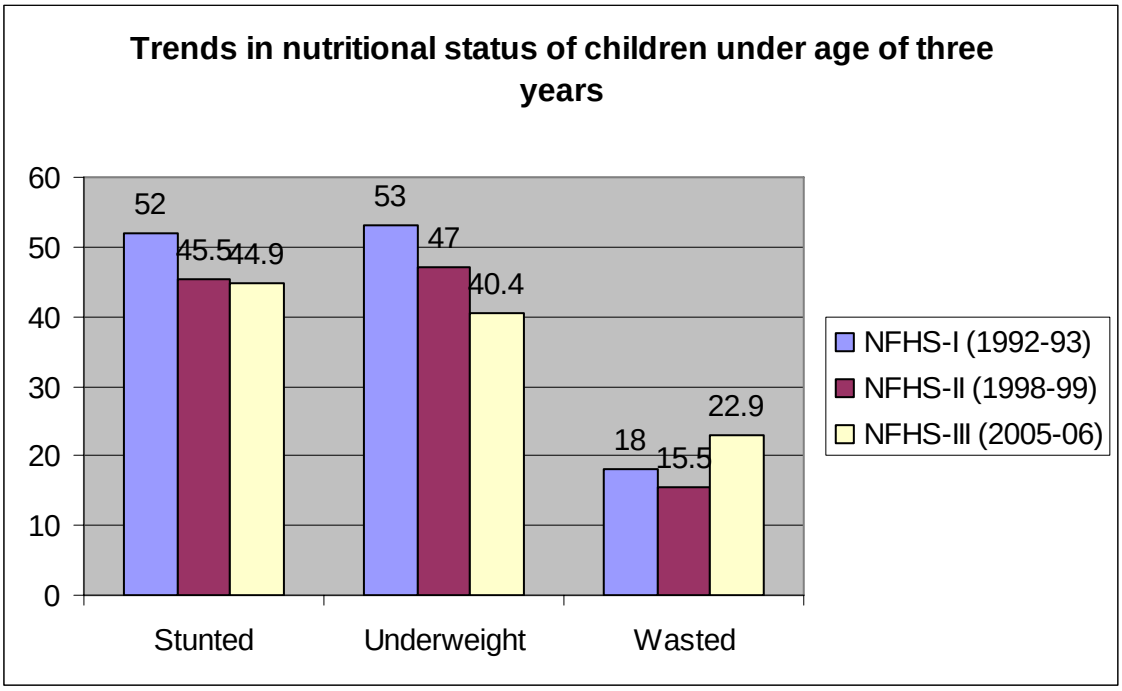
Figure 4.5
Trends in immunizations completed by 12 months of age in India (NFHS-I to NFHS-III)



It can be seen from Figure 4.5 that there is a significant drop in DPT 3 over DPT 1 and DPT 2. The same trend can be seen for Polio 1, 2, and 3, even though polio coverage is higher. Is the campaign mode for Pulse Polio Program the reason for a larger coverage for Polio and a relatively low coverage for routine immunization program? For example, measles vaccination has reached only 48 % by 2005-06. Complete vaccination for children (completed 12 months of age) has been achieved for only 36.3% by 2005-06 (NFHS-III).

4.5. Malnutrition: As explained earlier, malnutrition is a major cause of childhood illnesses. Figure 4.6 below captures the trend in the nutritional status of children under 3 years age, over the 15 year period from NFHS-I (1992-93) to NFHS-III (2005-06)

Figure 4.6
Trends in nutritional status of children under three years of age in India



Other areas of concern are the following:

- Feeding Practices
- Vitamin A Supplementation

Figure 4.7
Indicators of feeding practices among infants in India (NFHS I to NFHS III)

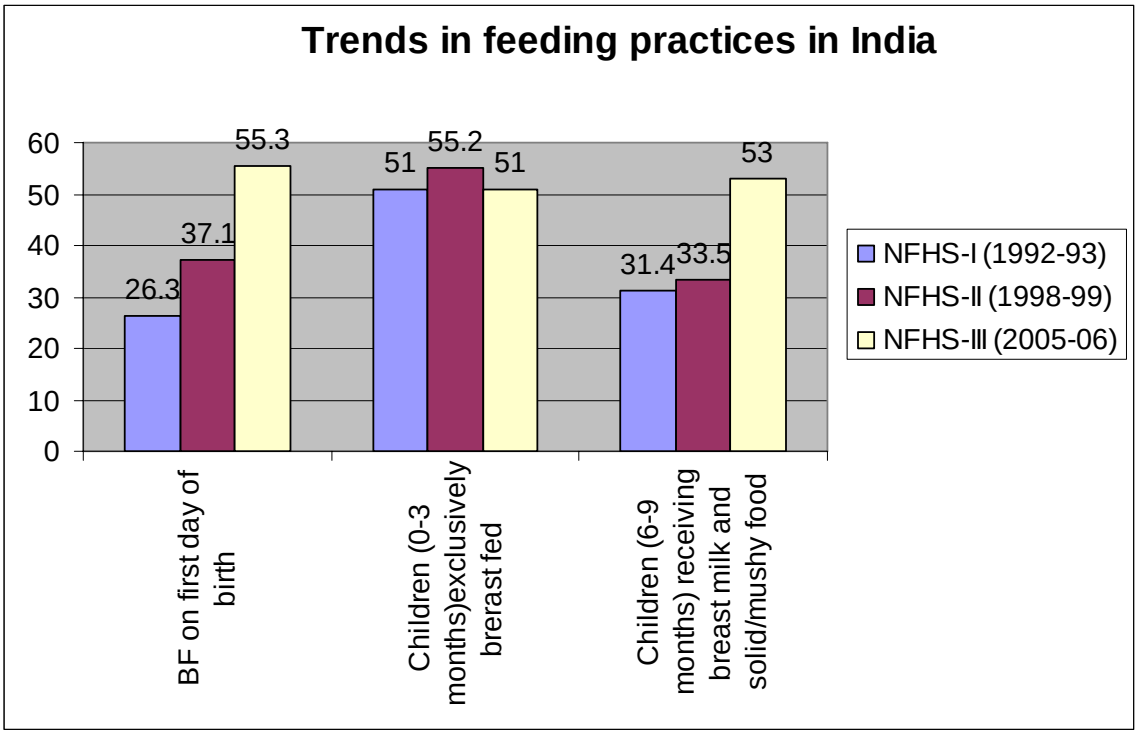
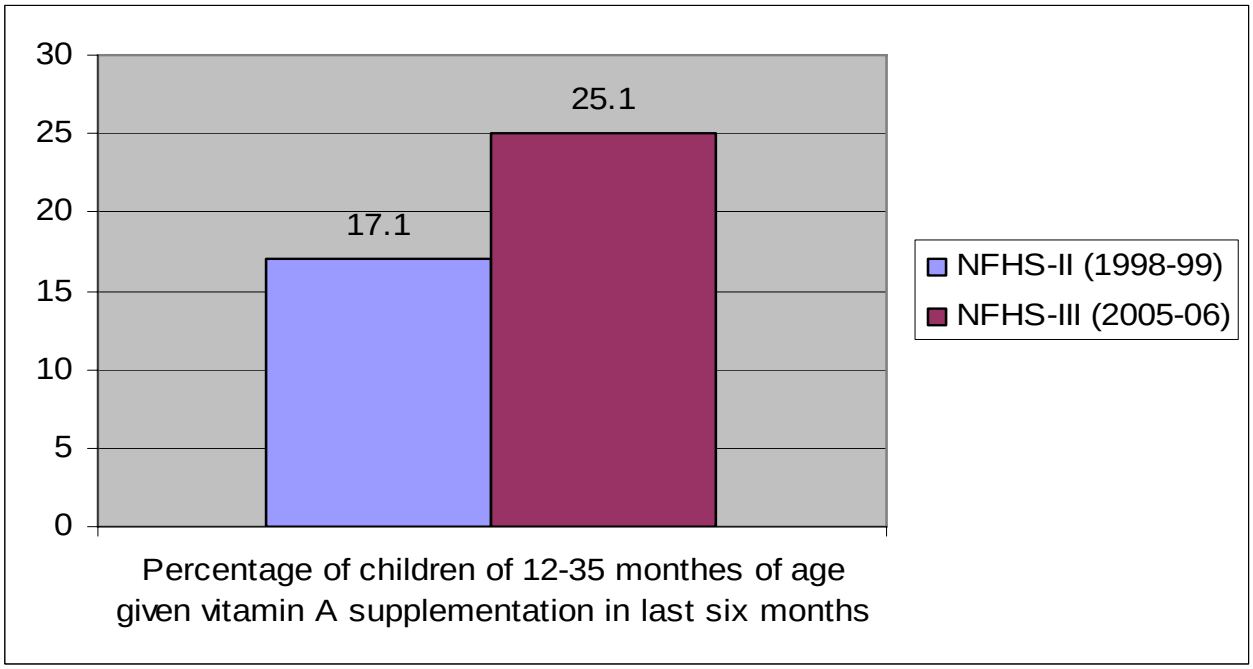


Figure 4.8
Trends in coverage of vitamin A supplementation to children (12-35 months of age)



4.6. Integrated Management of Childhood Illnesses (IMCI):

In many cases, children brought for medical treatment often suffer from more than one ailment, making a single diagnosis difficult and impossible. Most of the health centres in developing countries lack the necessary infrastructure and resources to provide quality care.

WHO and UNICEF have addressed this challenge by developing a strategy called the Integrated Management of Childhood Illness (IMCI). Launched in 1996, IMCI is an integrated strategy for delivering a package of child heath services, which takes into account a variety of factors that must be addressed to ensure the well-being of the whole child. It is based on the rationale that decline in child mortality rates is not necessarily dependent on the use of sophisticated and expensive technologies but rather on a holistic approach that combines the use of strategies that are cheap and can be made universally available and accessible to all (WHO, 2009). The strategy also includes early identification of serious condition and urgent referrals to the nearest health facilities.

Though the major stimulus for IMCI came from the needs of curative care, the strategy combines improved management of childhood illness with aspects of nutrition, immunization, and other important disease prevention and health promotion elements, to be implemented by families, communities and health facilities. IMCI aims to reduce death, illness and disability, and to promote improved growth and development among children under 5 years of age.

The strategy includes three main components:

- Improving case management skills of health-care staff
- Improving overall health systems
- Improving family and community health practices

In the health facilities, the IMCI strategy promotes the identification of childhood illnesses in outpatient settings, ensures appropriate combined treatment of all major illnesses, strengthens the counseling of caretakers, and speeds up the referral of severely ill children.

In the home setting, IMCI promotes appropriate care seeking behaviors, improved nutrition and preventative care, and the correct implementation of prescribed care.

The WHO handbook on IMCI is given in Exhibit 4.1. This model IMCI handbook is only a generic document; it needs to be suitably modified by the countries wishing to implement IMCI guidelines.

Evaluation of IMCI has also provided useful insight into the constraints in successful implementation of IMCI. The main constraints identified were (UN, 2009):

- Lack of health system support for IMCI:
  - Poor supervision
  - Low utilization of government facilities
  - Lack of management support at national or district level
  - Lack of drugs or supplies at implementing facilities
  - High staff turnover

- Insufficient implementation of community-based IMCI interventions

The community based component of IMCI was found to be less successful than the other components. Added emphasis will need to be placed on this aspect of the strategy over the next few years, and new approaches to mobilizing communities and households will need to be developed, tested, and evaluated.

4.7. From IMCI to IMNCI (Integrated Management of **Neonatal** and Childhood Illnesses**):** In India, neonatal deaths account for almost 50 % all U5 child deaths, as can be seen from Table 4.1. Accordingly, GoI has extended IMCI to include neonatal health also.

Table 4.1
IMR, NMR and Under 5 Mortality Rate of India

Indicator	1990	Current situation	National Population Policy 2010 Target	Millennium Development Goals 2015 Target
Neonatal Mortality Rate (NMR) Per 1000 live births	53	37 (SRS 2006)	<20	<20
Infant Mortality Rate (IMR) Per 1000 live births	80	57 (SRS 2007)	<30	<27
Under 5 Mortality Rate (U5 MR)	107	74 (NFHS-III , 2005)	-	<36

Source: SRS Bulletin 2007, and SRS 2006, NFHS-III

Table 4.2 below lists the states and Union Territories in India, which have very high neonatal, infant and U5 mortality rates.

Table 4.2
States with High IMR, NMR and Under 5 Mortality Rates

Name of the state	NMR (SRS 2006)	IMR (SRS 2007)	U5 MR (NFHS-III, 2005)
Madhya Pradesh	51	74	94.2
Orissa	52	73	90.6
Uttar Pradesh	46	71	96.4
Assam	35	67	85.0
Rajasthan	45	67	85.4
Chhattisgarh	43	61	90.3
Bihar	32	60	84.8
Haryana	34	57	52.3
Andhra Pradesh	33	56	63.2
Gujarat	38	53	60.4
Meghalaya	NA	53	70.5
Jammu and Kashmir	39	52	51.2
Himachal Pradesh	30	50	41.5
Jharkhand	29	49	93.0
Karnataka	28	48	54.7
Punjab	30	44	52.0
Uttarakhand	NA	43	56.8
Arunachal Pradesh	NA	40	87.7

NA: Not Available

The Government of India constituted a core group to address the training needs for management of childhood illnesses in India, with a special focus on neonatal care. The core group consisted of representatives from the Indian Academy of Paediatric (IAP), National Neonatology Forum of India (NNF), National Anti-Malaria Program (NAMP), Department of Women and Child Development (DWCD), Child-in Need Institute (CINI), WHO, UNICEF, eminent Pediatricians and Neonatologists as well as representatives from the Ministry of Health and Family Welfare (MOHFW). The generic IMCI guidelines were adapted and the Indian version (MOHFW, 2009) was named Integrated Management of Neonatal and Childhood Illness (IMNCI) .

The major adaptations were as follows (Ingle and Malhotra, 2007):

- The entire age group of 0 to 59 months (as against 2 weeks to 59 months in IMCI) was included to address the neonatal mortality challenge.

- The order of training was reversed, starting from the young infant (0-2 months) to the older child (2 months-5 years).

- The total duration of training was reduced from 11 days to 8 days out of which, half of the training time was earmarked for the management of the young infants, 0 to 2 months, which contributes to a lot to the mortality rate.

- Home-based care of newborns and young infants was included.

IMNCI is a skill based training (MOHFW, 2008)**.** The training is based on a participatory approach combining classroom sessions with hands-on clinical sessions in both facility and community settings. Table 3 displays the components of IMNCI trainings: a training component for medical officers focusing on clinical care, a component for front-line functionaries including Auxiliary Nurse Midwives (ANM) and Anganwadi Workers (AWW's) focusing on prevention, treatment and management of minor childhood diseases and referral of serious cases, and an additional module for supervisors. For ASHA and link volunteers, a separate package consistent with IMNCI focusing on the home care of newborn and children is in preparation keeping in mind their educational status.

IMNCI training is administered in two batches of 12 participants each for 8 days. Experience has shown that about 40-50 trainers are required for undertaking training of all health staff on a continuous basis, since every district has around 200 doctors and 200 supervisors along with 1200- 1600 workers.

Table 4.3
Types of training under IMNCI

Type of Training	Personnel to be trained	Duration	Package to be used	Place of Training
Clinical skills training	Medical Officer Pediatricians and staff nurses	8 days	Physicians Package	Medical college /District Hospital
	Health Workers, ANMs, LHVs, Mukhya Sevikas, CDPO's and AWWs	8 days	Health Workers Package	District Hospital
Supervisory Skills Training	Medical Officers, Pediatricians, CDPO's LHVs and Mukhya Sevikas)	2days	Supervisory Skills package	Medical college /District Hospital

Source: (MOHFW, 2008)

The essential elements include:

- Ensuring availability of the essential drugs with workers and at facilities covered under IMNCI
- Improve referral to identified referral facility.
- Referral mechanism to ensure that an identified sick infant or child can be swiftly transferred to a higher level of care when needed. Every health worker must be aware of where to refer a sick child and the staff at appropriate health facilities must be in position to identify and acknowledge the referral slips and give priority care to the sick children.
- Functioning referral centres, especially where healthcare systems are weak, referral institutions need to be reinforced or private/public partnerships established
- Ensuring availability of health workers / providers at all levels
- Ensuring supervision and monitoring through follow up visits by trained supervisors as well as on-the-job supportive supervision

Counseling of families and creating awareness among communities on their role is an important component of IMNCI. This includes:

- Promoting healthy behaviors such as breastfeeding, illness recognition, early case seeking etc
- IEC campaigns for awareness generation.

- Counseling of care givers and families as part of management of the sick child when they are brought to the health worker/health facility

- Counseling Home Visits provide an opportunity for identification of sickness and focused BCC for improving newborn and child care practices. As per the IMNCI protocol, a health worker has to make at least three home visits for all newborns, the first visit should be within 24 hrs of birth, second on day 3-4 and third at day 7-10. Three additional visits are scheduled for newborns with low birth weight at day 14, 21, and 28.

In India, IMNCI is a component of the World Bank supported Reproductive and Child Health (RCH) II program. It is being implemented through a joint effort of UNICEF, National Rural Health Mission (NRHM), Government and other child survival partners. IMNCI was first piloted in six districts, starting in 2002 (Ingle and Malhotra, 2007). In the next stage, implementation of the IMNCI strategy started in four districts each in nine selected states of Orissa, Rajasthan, Madhya Pradesh, Haryana, Delhi, Gujarat, Uttaranchal, Tamil Nadu and Rajasthan (MOHFW, 2009). At present it is implemented by 28 states and 145 districts. 1, 35,000 persons are already trained in the country. IMNCI training for undergraduate medical students has been introduced as pre service training in 60 medical colleges of six states (Kishore, 2009).

The National Institute of Public Cooperation and Child Development (NIPCCD), India, has also introduced IMNCI in the pre-service curriculum of Integrated Child Development Services (ICDS) workers. The faculty of the Council for Technical Education and Vocational Training-the apex national institution responsible for training paramedical staff-were trained in IMNCI. The Indira Gandhi National Open University has also included IMNCI in distance learning courses for doctors and paramedics. Collaboration with Emergency and Humanitarian Action Unit has resulted in the production of an orientation package on IMCI for health workers who provide health care to children in disaster situations (Chaturvedi and Chaturvedi, 2009).

IMNCI guidelines recommend standardized case management procedures based on two age categories: (i) upto 2 months and (ii) 2 months to 5 years. In IMNCI, only a limited number of carefully-selected clinical signs are considered, based on their sensitivity and specificity, to detect the disease. A combination of these signs helps in arriving at the child's classification, rather than a diagnosis. Classification(s) also indicates the severity of the condition. The classifications are color coded: .pink suggests hospital referral or admission, .yellow indicates initiation of treatment, and .green calls for home treatment. A sick young infant up to 2 months of age is assessed for possible bacterial infection, jaundice, and diarrhea. A sick child aged 2 months to 5 years is assessed for general danger signs and major symptoms like cough or difficult breathing, diarrhea, fever, and ear problems. All the children are also routinely assessed for nutritional and immunization status, feeding problems, and other potential problems.(1) The management procedures in IMNCI involve the use of only a limited number of essential drugs in order to promote their rational use. The mother is given clear instructions on how to give oral drugs and to treat the child at home when hospital admission is either not required or is not possible. She is also directed to return for follow-up visits as per the IMNCI protocol (WHO, 2003).

In India, various studies are going on to evaluate IMNCI. These studies will provide useful insight into the IMNCI. Several identified limitation for IMNCI implementation in India includes central importance to training, pace of the training, huge task of training large number of health professionals, lack of IEC about role of AWW in treating sick children, lack of supportive supervision, lack of supplies, availability of paediatricians, and weak community based components (Saxena, 2008, and Srijana, 2009).

Exhibit 4.1
IMCI Guidelines for Implementation:

Main steps in implementing IMCI in any country include (WHO, 2009):

- Adopting an integrated approach to child health and development in the national health policy.
- Adapting the standard IMCI clinical guidelines to the country's needs, available drugs, policies, and to the local foods and language used by the population.
- Upgrading care in local clinics by training health workers in new methods to examine and treat children, and to effectively counsel parents.
- Making upgraded care possible by ensuring that enough of the right low-cost medicines and simple equipment are available.
- Strengthening care in hospitals for those children too sick to be treated in an outpatient clinic.
- Developing support mechanisms within communities for preventing disease, for helping families to care for sick children, and for getting children to clinics or hospitals when needed.

IMCI has already been introduced in more than 100 countries around the world.
Evaluation of IMCI[3] in twelve countries of world and the major findings are:

- IMCI improves health worker performance and their quality of care;
- IMCI can reduce under-five mortality and improve nutritional status, if implemented well;
- IMCI is worth the investment, as it costs up to six times less per child correctly managed than current care;
- child survival programmes require more attention to activities that improve family and community behaviour;
- the implementation of child survival interventions needs to be complemented by activities that strengthen system support;
- a significant reduction in under-five mortality will not be attained unless large-scale intervention coverage is achieved.

Chapter 5
Managerial Challenges for Improving Child Health

India's neonatal mortality, which accounts for almost 2500 out of 5000 U5 deaths every day, is one of the highest in the world. India launched the Universal Immunization Program in 1985, but the status of full immunization in India has reached only 43.5 % by 2005-06. India started the Integrated Child Development Scheme (ICDS) in 1975 to provide supplementary nutrition to children, but 50 % of our children are still malnourished; nearly double that of Sub-Saharan Africa. The WHO/UNICEF training program on Integrated Management of Neonatal and Childhood Illnesses, known as IMNCI, started in India a few years ago, but the progress is very slow.

What is unfortunate is the fact that most of the child deaths are preventable through interventions: preventive interventions and/or treatment interventions. A list of interventions, with sufficient or limited evidence of effect on reducing mortality from the major causes of under-5 (U5) deaths is given in (Jones et al 2003); below, we list the interventions with sufficient or limited evidence to reduce U5mortality (Table 5.1).

Table 5.1
Child Survival Interventions with sufficient or limited evidence of effect on reducing U5 mortality

Interventions for survival	Causes of death and % of death by each cause of death									
	Diarrhea	Pneumonia	Malaria	Measles	Neonatal Disorders					Others
					Birth Asph-yxia	Sepsis	Pre-term	Tetanus	Others	
	22%	21%	9%	1%	10%	8%	8%	2%	5%	14%
Preventive Vaccine		√		√				√		
Vitamin A	√		**x**	**x**						
Zinc	√	√	**x**							
Exclusive Breast Feeding	√	√				√				
Complementary Feeding	√	√	√	√						
Clean Delivery						√		√		
Water, Sanitation, Hygiene	√		√							
Insecticide treated material							√			
Newborn temp management							**x**			
Antenatal Steroids							√			
Treatment ORS	√									
Antibiotics	√	√				√				
Vitamin A				√						
Zinc	√									
Anti Malarial			√							

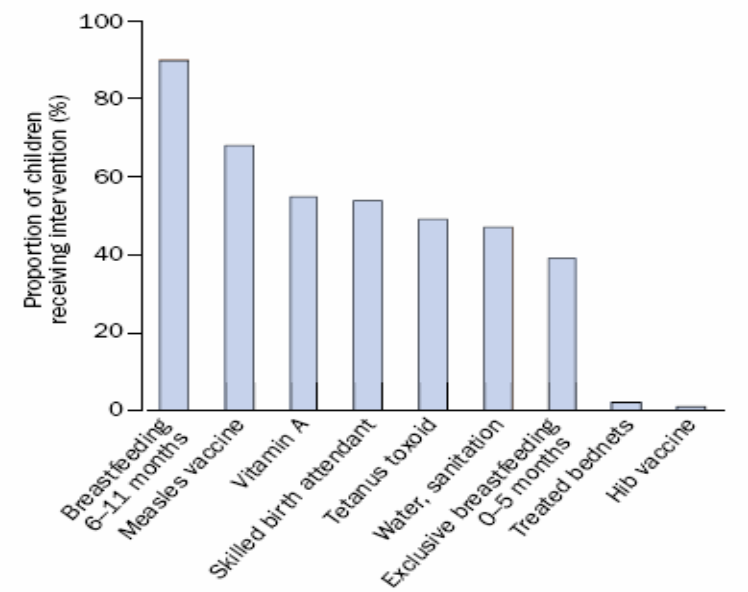
√ Sufficient evidence, x limited evidence

It can be seen from Table 5.1 that at least one proven intervention is available for preventing or treating each main cause of death among the under-5 children, except birth asphyxia.

We have, therefore, enough knowledge and instruments to reduce child mortality, but children continue to die because the interventions are not reaching them.

Figure 5.2 (Bryce et al, 2003) shows the estimated proportion of children younger than 5 years who received survival interventions in the 42 countries accounting for 90 % of all child deaths. It can be seen that only the breast feeding of infants 6-11 months reached almost all children, measles vaccine was received by almost 2/3rd of the children, and all other interventions had less than 60 % coverage.

Figure 5.1:
Estimated Proportion of Under-5 Children who received survival interventions



Community based initiatives can extend the delivery of interventions in remote areas where health services are either non-existent or non-functioning**.** But such activities are not sustainable in the long run. The long term aim should be to strengthen the national health system in developing countries, which requires substantial augmentation of management capacity.

While the management of maternal health programs requires medical interventions to bring down Maternal Mortality Ratio (MMR), the management of child health programs requires medical attention mainly to reduce Neonatal Mortality (NMR). Reduction in

IMR and U5MR can be achieved mostly through non-medical interventions, mentioned in Table 5.1 above. If these proven interventions can be implemented successfully, it would be possible to save several child deaths. But, successful implementation calls for improved management capacity.

What is management? Management focuses on the following tasks:

- Planning the allocation of resources (Staff, finance, medicines, and equipments)
- Monitoring the utilization of resources (costs and time Vs achievement of targets)
- Making interventions as and when necessary so as to achieve the desired goals

Management capacity is very poor in the Indian health sector, both at the national and state levels (Ramani and Mavalankar, 2009).

> Planning is the weakest segment; planning is limited to preparing financial budgets, with very little emphasis on planning the requirement of other resources (Staff, Medicines and Equipments) in order to transform money into service delivery. Planning of resources should take into account the magnitude of task for achieving the stated goals. For example, district level resource planning (required under NRHM) for achieving the district targets on IMR should be based on an estimate of the number of infant deaths to be prevented in the district, and the available resources in the district.
>
> Monitoring of project activities is very critical for project management to ensure effective and efficient utilization of resources for achieving the desired goals. Performance indicators for monitoring project progress should be designed and measured regularly. The current HMIS reports generated at the district level (approximately 60-65 reports are generated every month) do not contain performance indicators, and hence performance monitoring is almost non-existent in the Indian health sector. Monitoring reports should provide estimates of a few performance indicators for each level of supervisors to identify appropriate interventions.
>
> Interventions have to follow Monitoring. Monitoring without necessary interventions is a waste of resources. To facilitate timely interventions, monitoring reports should highlight only those activities which are not performing well, and such activities should be brought to the attention of only those supervisors/managers who can intervene. Without timely interventions, it is not possible to bring the project activities under control.

Poor planning, weak monitoring and very few interventions result in under achievement of the stated goals. Many state Health departments, therefore, do not report performance indicators in their annual reports, they report only service statistics. For example, service statistics on increased institutional deliveries are reported, but its implications on maternal and child health indicators are not reported. If institutional deliveries have increased, one would expect

(i) a larger percentage of complete immunization, as proper birth records are maintained for institutional deliveries. Unfortunately, only 43.5 % of our children are completely immunized.

(ii) a larger reduction in malnourished children, as the birth records on the weight of newborns are readily available on the birth registers maintained at all institutions. Unfortunately, malnutrition among children in India is almost double that of Sub-Saharan countries.

(iii) fewer cases of childhood illnesses, as the mothers would have been properly oriented on child care. Unfortunately, attention to childhood illnesses is poor.

In order to achieve MDG4 goals on child health, India has to achieve 7.6 % reduction in U5 Mortality per year from 2009-2015, as against an annual achievement of only 2.6 % during the period 1990-2009. Management of child health programs needs much more attention if we have to achieve MDG4 goals, as can be seen from Table 5.2.

Table-5.2
IMR, NMR and Under 5 Mortality Rate of India

Indicator (mortality per 1000 live births)	1990	Current situation	National Population Policy 2010 Target	Millennium Development Goals 2015 Target
Neonatal Mortality Rate (NMR)	53	37 (SRS 2006)	<20	<20
Infant Mortality Rate (IMR)	80	57 (SRS 2007)	<30	<27
Under 5 Mortality Rate (U5 MR)	107	74 (NFHS-III , 2005)	-	<36

Source: SRS Bulletin 2007, and SRS 2006, NFHS-III

To summarize, the managerial challenges in the health sector for improving child health indicators need to address the following concerns:

- Why should 5000 U5-children die in India every day?
- Why is our NMR so high, accounting for almost 50 % of all U5 child deaths?
- Why have we achieved only 43.5 % full immunization?
- Why do we have almost 50 % of our children malnourished?
- Can we not manage childhood illnesses better?

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