

IMMUNIZATION COVERAGE IN INDIA

SURESH SHARMA



सत्यमेव परमो धर्मः

**Institute of Economic Growth
University of Delhi Enclave
North Campus
Delhi – 110 007, India
Fax: 91-11-27667410
Gram: GROWTH – Delhi – 110 007
Phones: +91-11-27667101, 27667288, 27667365,
WEBSITE: iegindia.org**

Immunization Coverage in India

Suresh Sharma

Institute of Economic Growth
University Enclave, Delhi
India

Immunization Coverage in India

Suresh Sharma
Population Research Center
Institute of Economic Growth
University Enclave, Delhi
Suresh@iegindia.org

Abstract

Immunization against common childhood diseases has been an integral component of mother and child health services in India since adoption of the primary health care approach in 1978 being reinforced by the Declaration of Health Policy in 1983. The focus of this paper is to examine the status and performance during 1980-2004 of the child immunization programme in India, U.P. and Uttarakhand and to suggest policy and programmes for realization of the goals of universal immunization services. Data sources on immunization coverage used for this study include secondary data from the National Family Health Surveys and RCH Surveys in U.P. Uttarakhand and all over India. The analyses reveal that a large number of children who have contact with services providers are missed out of subsequent services. There is a wide gap between routine data and survey data. Almost every other child in Uttarakhand and U.P is incompletely protected and one out every of three children is a dropout from the immunization programme. Uttarakhand has not reached the goal of universal immunization coverage despite a focused and intense immunization programme since 1985.

Key Words: Immunization, Polio, U.P. Uttarakhand, etc.

1. Introduction

Immunization forms the major focus of child survival programmes throughout the world. Roughly 3 million children die each year of vaccine preventable diseases (VPDs) with a disproportionate number of these children residing in developing countries¹. Recent estimates suggest that approximately 34 million children are not completely immunized with almost 98 % of them residing in developing countries². Vaccination coverage in India is also far from complete despite the long-standing commitment to universal coverage. While gains in coverage proved to be rapid throughout the 1980s, taking off from a below 20 % coverage to about 60 % coverage for some VPDs, subsequent gains have been limited³. Immunization against common childhood diseases has been an integral component of mother and child health services in India since adoption of the primary health care approach in 1978 being reinforced by the Declaration of Health Policy in 1983. Government of India (GoI) launched the Expanded Programme on Immunization in 1978 to protect children against diphtheria, pertusis, tetanus, and typhoid. Vaccination against polio through oral polio vaccine (OPV) was added to the programme in 1979-80 and BCG vaccination against tuberculosis was added in 1981-82. Vaccination against measles was included in 1985-86.

In 1985, the Universal Immunization Programme (UIP) was launched to protect all infants (0-12 months) against six serious but preventable diseases, namely, tuberculosis, diphtheria, pertusis, tetanus, poliomyelitis, and measles. The objective of the programme was to fully vaccinate at least 85% of all infants of the age of one year. In subsequent years, the goal of UIP was raised to ensure 100% coverage of all eligible children with one dose of BCG, three doses of DPT and OPV, and one dose of the measles vaccine. This programme was integrated with the Child Health (RCH) Programme in 1997. In addition to the ongoing routine immunization programme, the Pulse Polio Immunization (PPI) campaign was initiated in 1995 to eradicate poliomyelitis from the country.

¹ Kane, M. Lasher, H. (2002) "The case for childhood immunization". Occasional paper, No.5. Children's Vaccine Program at Path. Seattle, WA.

² Frenkel, L.D. Nielsen, K. (2003) "Immunization issues for the 21st century. *Ann Allergy Asthma Immunol*' 90(6): Suppl 3:45-52.

³ WHO (2004). Review of National Immunization Coverage 1980-2003: India, WHO/UNICEF Report

In an effort to further boost vaccination coverage the Government of India initiated the Pulse Polio Initiative (PPI) Campaign in 1995. This campaign broke from the past by proactively engaging the public, through both media awareness campaigns as well as setting up additional infrastructure for dispensing polio vaccines. However, the success of PPI has been limited. Although, the PPI significantly increased first-dose polio immunization coverage, there were limited gains in complete coverage for polio vaccines⁴. Moreover, coverage of non-polio vaccines seemed to be unaffected by the PPI campaign. This limited success of the PPI campaign in expanding full-coverage for VPDs has renewed the search for other effective strategies to achieve universal immunization in India.

Characteristics	Uttarakhand	U.P	India
Population (in millions)	8.48	166.05	1028.00
Urban	2.17	34.51	285.3
Rural	6.31	131.51	741.6
Proportion of urban population`	25.59	20.78	27.78
Sex ratio	964	898	933
Female Literacy	60.30	29.8	41.8
Anemia among women	45.60	48.7	51.8
Malnutrition <25D	41.80	51.7	47.0
Anemia among children	77.40	73.9	74.3
Institutional delivery	20.30	16.2	34.0
Number of districts	13	70	593

The total population of India is 1028 million; while that of Uttarakhand is 8.5 million, which is less than one percent of the population of the country (Census 2001). The rural and urban break-up of the population shows that 72 % of the population was enumerated in rural areas and 28 % in urban areas. During 1991-2001, the state recorded a decadal growth rate of 19% which is lower than the national average (21%) and that of UP (26%).

⁴ Bonu, S. Rani, M. Baker, T.D. (2003)“The impact of the national polio immunization campaign on levels and equity in immunization coverage: Evidence from rural North India”. Social Science Medicine, 57:1807-19.

The sex ratio of the total population in the country has improved since the 1991 census from 927 to 933 females per 1000 males. Uttarakhand is one of the most sparsely populated states with a population density of 159 persons per square kilometer. The literacy rate in the state has improved from 52.2 % from 1991 to 64.8 % in 2001. The literacy rate and sex ratio are better than those of UP and the national averages. The literacy rate for the population of seven years and above is 84% for males and 60% for females and 72% for the total population, although it is quite a bit higher in these states than in UP. The sex ratio in Uttarakhand is 964 females per 1000 males.

2. Objectives

The focus of this paper is to examine the status and performance during 1980-2004 of the child immunization programme in India, U.P and Uttarakhand and to suggest policy and programme for the realization of the goals of universal immunization services. Specifically the analysis aims to do the following:

- To examine inter-state variations of immunization coverage.
- To study the pattern, trends, duration and reasons of immunization in India.
- To examine inter-district differentials in the coverage for different vaccinations.

3. Data and Methods

Data sources on immunization coverage used for this paper include secondary data from the National Family Health Survey 1998-99 (NFHS-2), Uttarakhand and all – India, the Coverage Evaluation Survey (CES 2001); RCH Programmes Rapid Household Survey 1998-99, and the RCH Programmes Rapid Household Survey (2002-04), as well as data from the 1993 and 1998 coverage of the National Family Health Survey (NFHS). The sample consists of ever-married women in the 13-49 age groups. Structured interviews were conducted with the women and the household in which they resided. Three types of questionnaires were used in NFHS one for households, and one for villages (the village questionnaire was administered only in the rural areas). For this analysis, selected variables from the household questionnaire and the village questionnaire were merged into the data file for ever-married women.

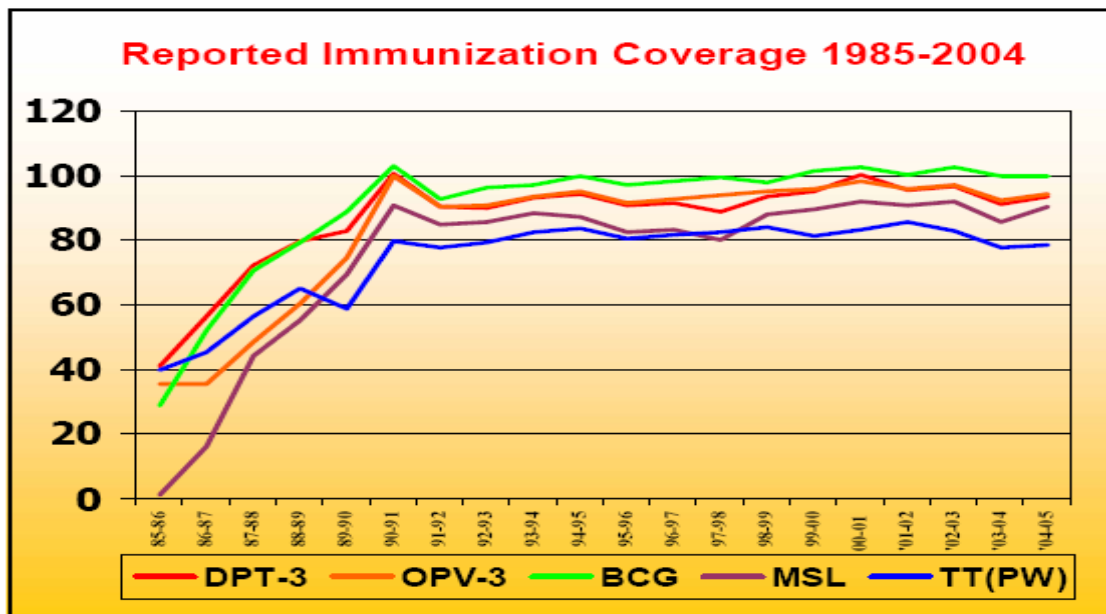
Data on immunization for children in the age group of 2-35 months were collected in each wave through the questionnaire administered to the mother. By matching the mother sub set data files with the village-level data files we have information on each child’s immunization status, their personal attributes, their maternal and household attributes, and the village infrastructure that they have access to.

3.1 Immunization

Mothers were asked about the immunization received by each of their eligible children, and where possible, this information was verified by crosschecking against the child’s vaccination card. Specifically, the survey asked whether the child had received BCG, DPT (all doses), Polio (all doses) and Measles vaccinations. Our definition of immunization distinguishes across vaccine types to identify immunization coverage rates for two categories of VPDs, Polio and Non-Polio and Government of India’s Recommended Immunization Schedule (Appendix Table-1A). Final results have been analyzed through a Popmap for showing the spatial variation.

The reported data is inflated; it is likely that about 70% of children were fully immunized by 1990 in contrast to about 10% in 1985.

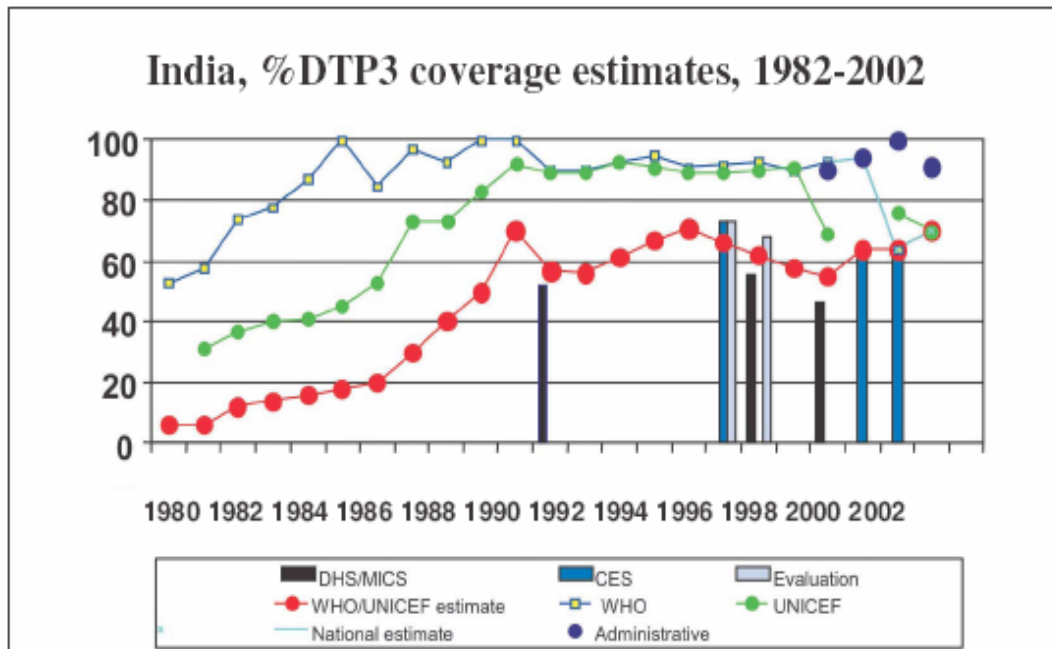
Figure1: Reported National Vaccine Coverage by Antigen from 1985 to 2004



The Reported coverage has remained high since 1990, but national coverage reports of 100% coverage, suggest problems with the accuracy of those reports. Therefore, coverage surveys are routinely used to evaluate coverage. Figure 1 is the best estimate of the reported and evaluated coverage data. Surveys through the 1990s have found that only about half of the birth cohorts are fully immunized, with individual year estimates ranging from a fully immunized rate of 3.5% to 68%. Variation from year to year may represent sampling factors and confidence intervals as much as any real change, when comparing data for the year 2002/3 with 1998/9. The Rapid Household District Surveys performed in 1998/9 and again in 2002/3 show that of the 236 districts that can be currently compared, 174 (74%) showed a decrease in infant full immunization rates. Comparing the 2003/3 results with 1998/9:

- A significantly greater percent of districts showed <40% full immunization coverage (43% compared with 30%).
- A significantly lower percent of districts had >60% full immunization coverage (35% compared with 45%).

Figure 2: Estimated percent national DTP3 coverage, 1980-2002

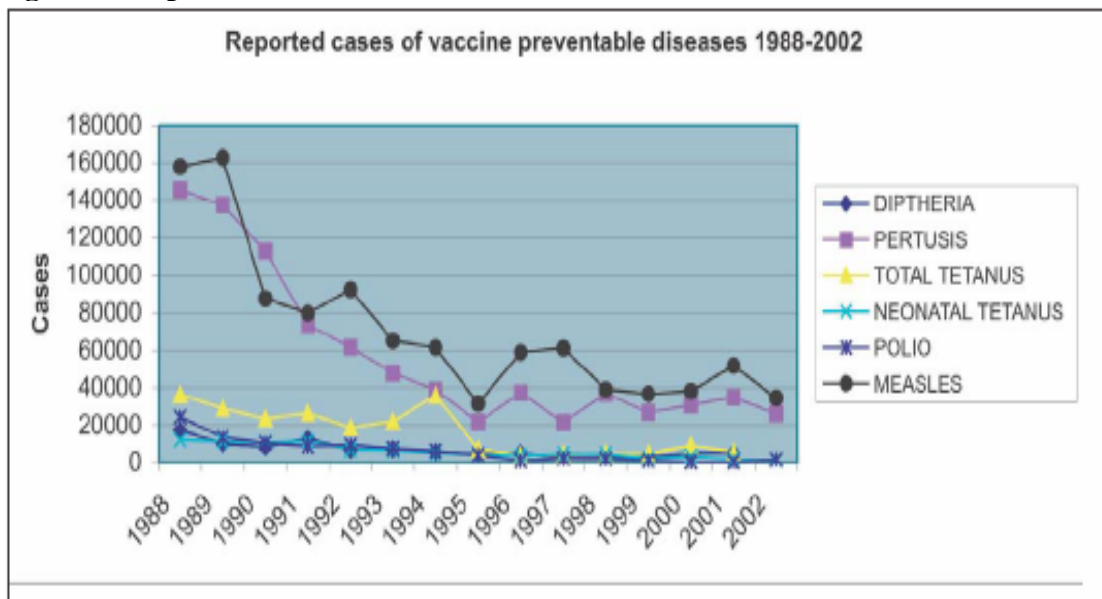


(Source: WHO & UNICEF).

A specific Immunization Strengthening Project (ISP) was designed to run from 2002-2003, which included three objectives namely: polio eradication, strengthening routine immunization, and strategic framework development. These three objectives of the three-year-plan have mostly been achieved, specifically the polio objective. However, there is no evidence of actual improvement in system output (coverage levels) or impact (disease incidence).

The UIP protects infants against six vaccine preventable diseases, (the Hepatitis B vaccine is being phased into the UIP with national coverage planned by 2009). Each year, the UIP protects more infants against these diseases than does any other program in the world, with the possible exception of China. The decline in the VPDs is shown in Figure.3.

Figure 3: Reported Cases of Vaccine Preventable Diseases 1988-2002



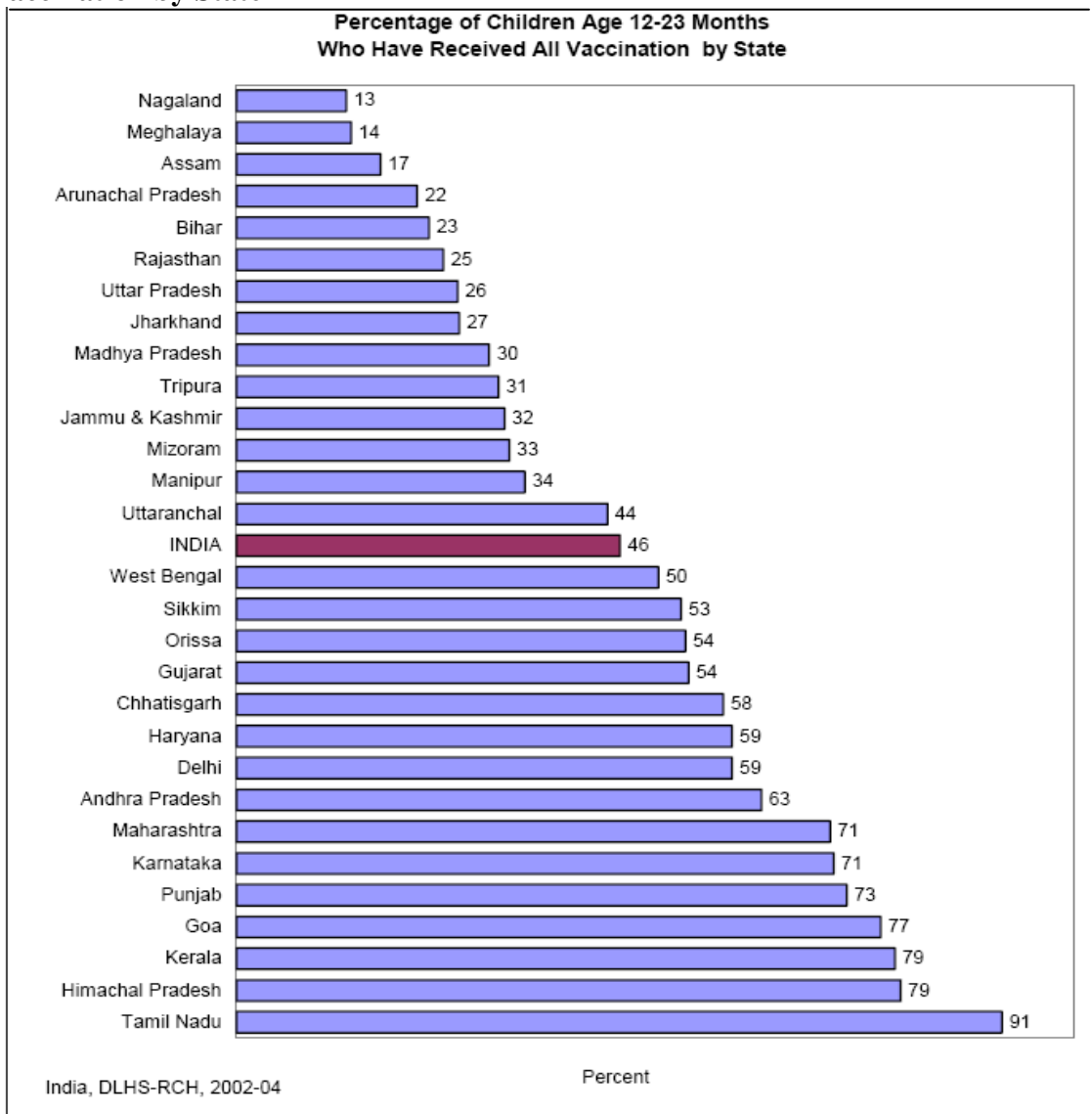
India also has the largest number of infants who reach their first birthday not fully immunized. Surveillance quality tends to be worst in areas with lowest coverage. So, the reported disease represents only a small fraction of the actual disease incidence. However, polio is an exception. Intensified efforts by the government and multiple partners have ensured that polio is on the verge of eradication in India and an extensive polio surveillance network is in place. Although the reported incidence of VPDs has

decreased since 1985, much work remains to protect all of India's children from these VPDs. India size and diversity make this especially challenging, as do the resource constraints and competing priorities.

3.1.1 Immunization Coverage by State

Figure 4 presents the percentage of children who received complete vaccination in the major states of India. The percentage of children who are fully vaccinated ranges from 13% percent in Nagaland to 91% in Tamil Nadu.

Figure 4: Percentage of Children (Age 12-23 Months) Who Have Received All Vaccination by State



In 15 states, Nagaland, Meghalaya, Assam, Arunachal Pradesh, Bihar, Rajasthan, Uttar Pradesh, Jharkhand, Madhya Pradesh, Tripura, Jammu and Kashmir, Mizoram, Manipur and Uttarakhand, full immunization is below the national average 46 % and in only 10 states/ union territories i.e. in Maharashtra, Karnataka, Punjab, Goa, Kerala, Himachal Pradesh, Dadra and Nagar Haveli, Pondicherry and Tamil Nadu is full immunization above 70 %. Almost half of the children in the age group 12-23 months in Bihar have not received a single vaccine, and it ranges from 20 % to 45 % in Jharkhand, Uttar Pradesh, Rajasthan, Arunachal Pradesh, Uttarakhand, Assam and between 10 % and 20 % in Meghalaya, Madhya Pradesh, Mizoram, Nagaland, Haryana.

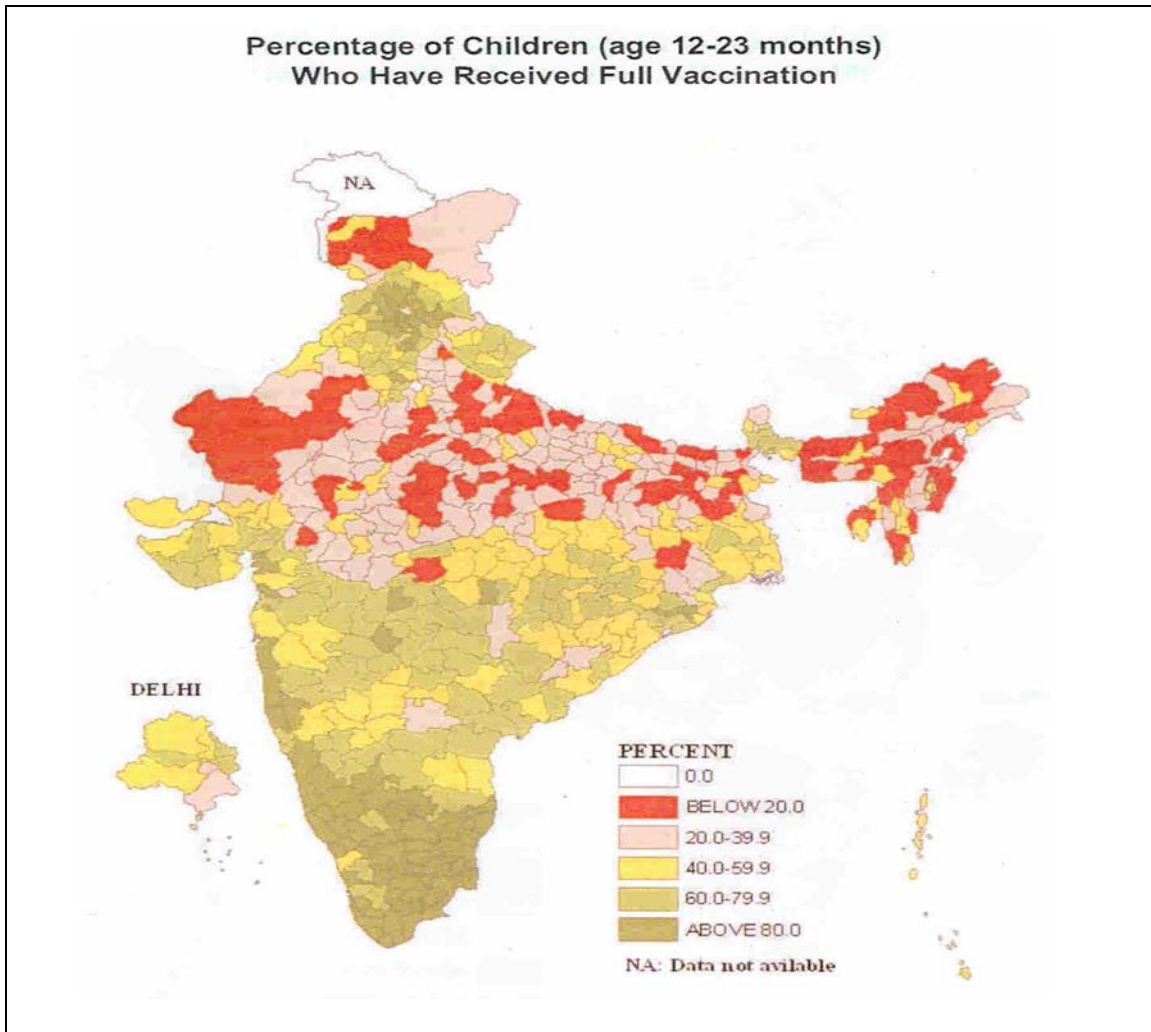
3.1.2 Immunization Coverage by Districts

The distribution of districts in Map 1 by coverage of full immunization among children in the age group 12-23 months shows that the coverage is below 20 percent % in 115 districts, 20 to 39.9 % in 153 districts, 40 to 59.9 % in 128 districts, 60 to 79.9 % in 109 districts and above 80 % in 88 districts. The highest vaccination coverage was recorded in Ratnagiri and Kolhapur districts of Maharashtra and Toothukudi district of Tamil Nadu, where 99 % children received the complete schedule of vaccination. In 12 more districts –Sindhudurg (Maharashtra), Uttar Kannada (Karnataka), Yanam (Pondicherry), Ariyalur, Chennai, Dharmapuri, Dindigul, Erode, Namakkal, Pudukkottai, Theni, and Virudhunagar (all in Tamil Nadu), the vaccination coverage is 95 % or more. The districts with high coverage are in Tamil Nadu (all 30 districts), 14 districts in Karnataka, 10 districts in Kerala, 8 districts in Maharashtra, 6 districts each in Himachal Pradesh and Punjab, 4 districts in Haryana, all four districts in Pondicherry, 2 districts in Gujarat and one district each in Orissa, Daman and Diu and Dadra and Nagar Haveli.

The 64 districts that have a poor performance, i.e. where coverage is below 20 % are in the Empowered Action Group (EAG) states with the following distribution that is, 19 districts each in Uttar Pradesh and Bihar, 12 districts in Rajasthan, 8 districts in Madhya Pradesh, 5 districts of Jharkhand and one district in Uttarakhand. Other than these districts, 41 districts are from northeastern states (15 districts in Assam, 6 districts each in Arunachal Pradesh and Nagaland, 5 districts in Meghalaya, 3 districts in Mizoram, and 2

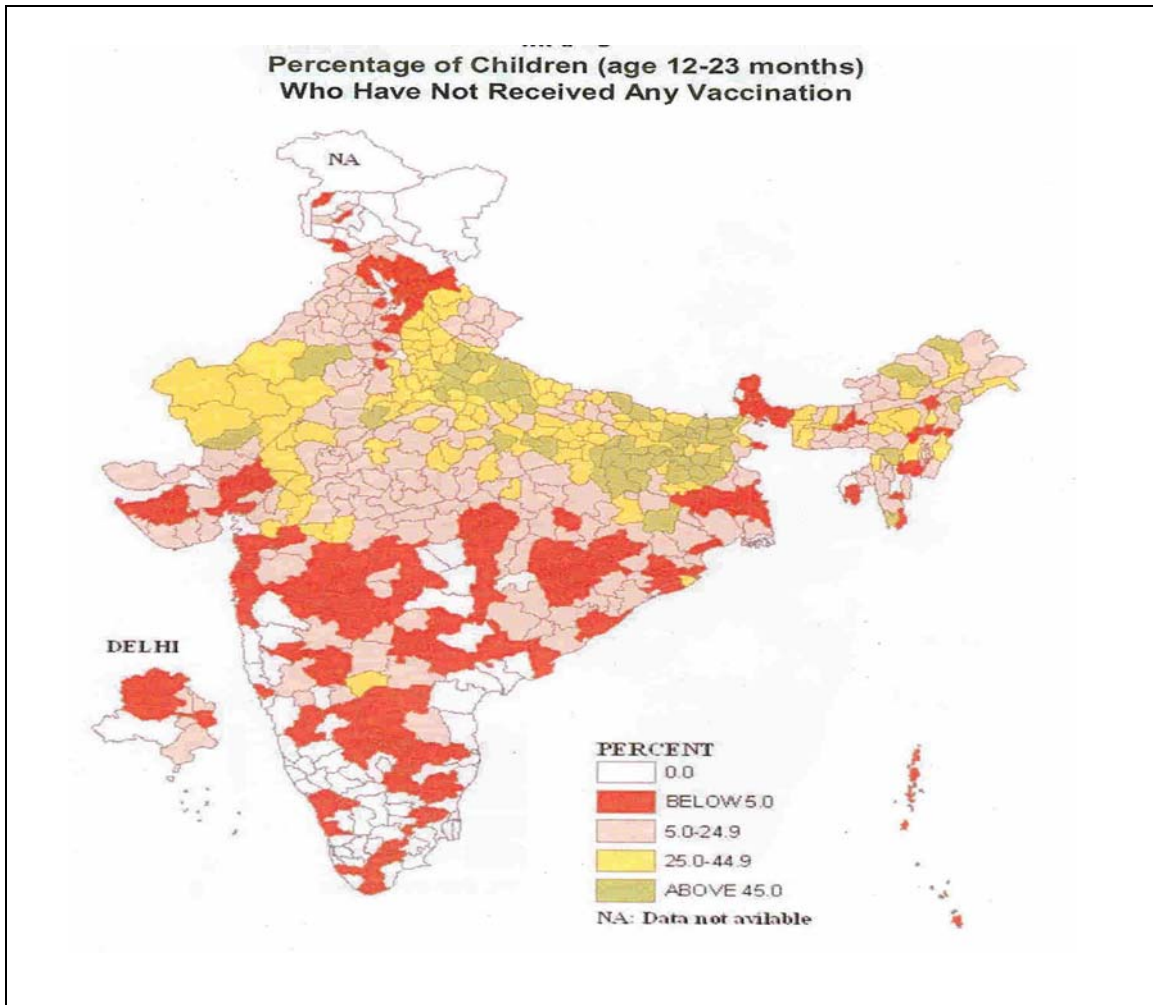
districts of Tripura), 9 districts in Jammu & Kashmir and one district in Gujarat also fall under this category.

Map 1: Percentage of Children (Age 12-23 months) Received Full Vaccination



The distribution of districts featuring no immunization at all under the routine programme among children in the age group 12-23 months is shown in Map 2. Of the 593 districts, in 292 districts less than 10 % of the children did not receive any vaccination. In 196 districts more than 20 % of the children did not have access to vaccination. In 182 districts the situation is extremely poor as more than 40 percent of the children did not have any vaccination.

Map 2: Percentage of Children (Age 12-23 Months) Not Received Any Vaccination



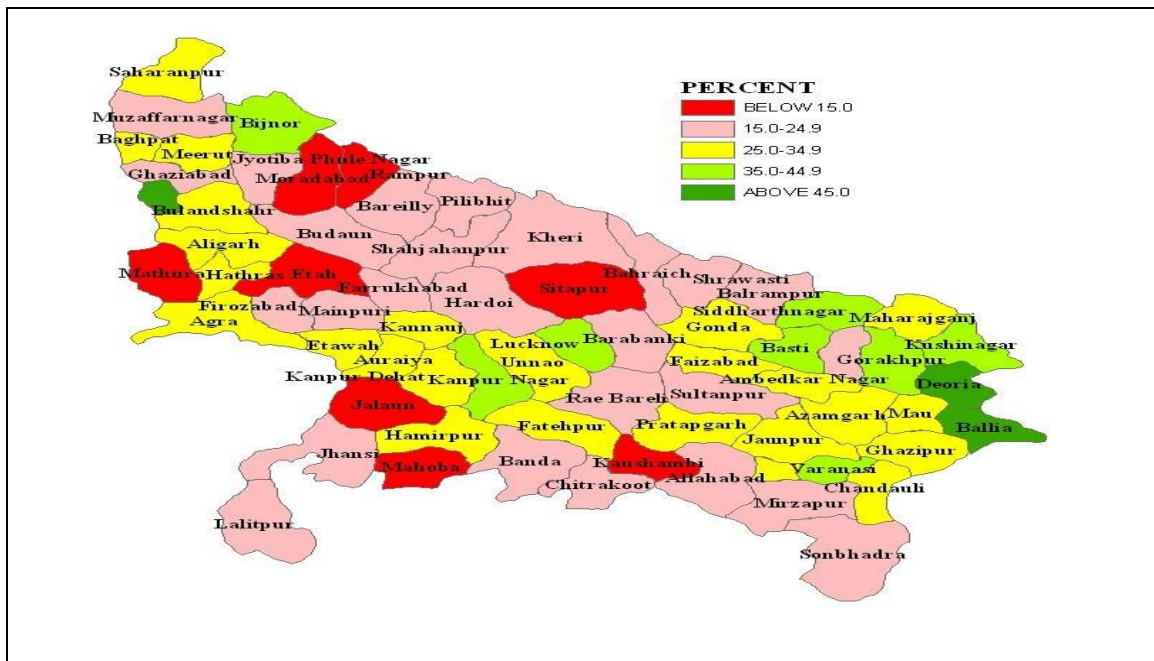
On the other hand, there are 226 districts in India where less than five percent of the children did not get any vaccine. This group of districts where 95 % or more children got some type of vaccination includes all the districts of the Andaman and Nicobar Islands, Chandigarh, Goa, Dadra and Nagar Haveli, Daman and Diu, Kerala, Lakshadweep, Pondicherry, Sikkim and Tamil Nadu. Most of the districts in the six states, namely, Andhra Pradesh (19 out of 23 districts), Delhi (5 out of 9 districts), Himachal Pradesh (11 out of 12 districts), Jammu and Kashmir (11 out of 14 districts), Karnataka (21 out of 27 districts), Maharashtra (30 out of 35 districts) also fall in to this group. Besides, there are 17 districts where 60 % or more children did not get a single dose of any vaccine. Namely 9 districts in Bihar, 5 districts in Jharkhand, and one district each from Arunachal Pradesh, Uttar Pradesh and Nagaland. In Kasumbhi (67 %) of Uttar Pradesh, Sahibganj

(69 %), Deoghar (72 %) of Jharkhand, Jamui (73 %), Pashcim Champaran (74 %) and Kishanganj (79 %) of Bihar, where two- thirds or more children did not receive even a single dose of vaccine.

3.1.3 Immunization Coverage by District in U.P. and UttaraKhand

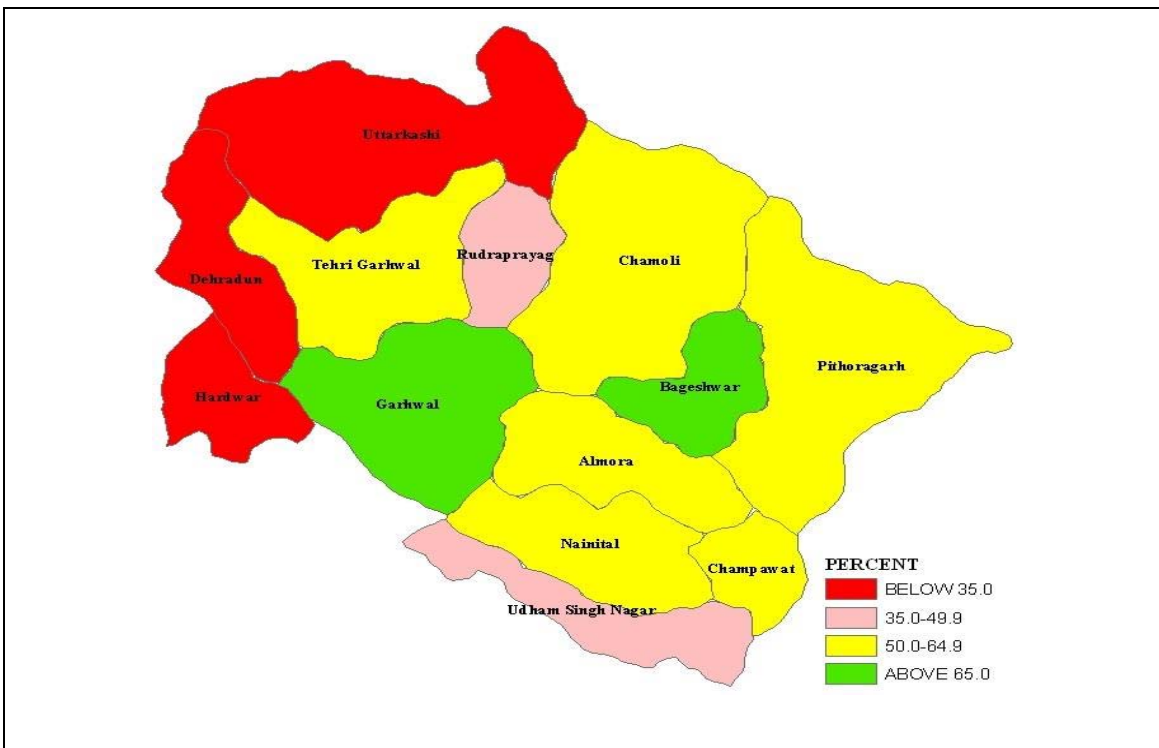
Coverage of vaccination rates for all vaccines for children in the age group 12-23 months in each district is presented in Map 3. There are inter-district differentials in the coverage for different vaccinations, and for children receiving all vaccinations and those that did not receive any vaccination at all. The percentage of children who are fully vaccinated ranges from 8 % in Kaushambi to 55 % in Deoria. In fifty % of the total districts, the coverage of full immunization is below one fourth (see Map) and is below the state average of 26 %. More than two third of children in Kaushambi district were not vaccinated at all, and in thirty two districts, the percentage of children not vaccinated is higher than the state average. In nearly all the districts, fewer children have received the measles vaccine than any of the other vaccinations. The coverage of polio drops at the time of birth varies from the lowest in Balrampur (6 %) to the highest in Rae Bareli (37 %).

Map 3: Percentage of Children (Age 12-23 months) Received Full Vaccination in U.P.



Coverage of vaccination rates for all vaccines for children in the age group 12-23 months in each district is presented in Table 5.9. There are inter-district differentials in the coverage for different vaccinations, and for children receiving all vaccinations and those that did not receive any vaccination at all. The percentage of children who are fully vaccinated ranges from 15.1 % in Hardwar to 71.7 % in Pauri Garhwal. In three districts, namely Hardwar (15.1 %), Dehradun (31.3 %) and Uttarkashi (33.8 %) the coverage of full immunization is below 40 % (see Map 4) and including these three districts in Rudraprayag (42.5 %) the coverage rate of full immunization is below the state average of 44.3 %. About 32.3 % of children in Hardwar district were not vaccinated at all, and in five districts, the percentage of children not vaccinated is higher than the state average. In nearly all the districts, fewer children have received the measles vaccine than any of the other vaccinations. The coverage of polio drops at the time of birth varies from the lowest in Uttarkashi (7.7 %) to the highest in Hardwar (29.3 %).

Map-4: Percentage of Children (Age 12-23 months) Received Full Vaccination in Uttarakhand



The extent of complete immunization consisting of BCG, three injections of DPT, three doses of Polio and measles is the lowest in Hardwar (15.1 %) and the highest in Pauri Garhwal (71.7 %). In 6 districts (Pauri Garhwal, Bageshwar, Nainital, Champawat, Chamoli and Pithorgarh) more than 60 % of the children received complete immunization.

4. Socio-Economic differentials

An examination of the social and economic differentials between India, U.P. and Uttarakhand based on the RCH survey data reveals that the coverage of each type of vaccine is greater in urban area than in rural areas. Forty percent of the children in rural areas had received all the recommended vaccinations by the time of the survey, compared with 61 % in urban areas. A large differential between rural and urban areas against polio zero may be observed from the table. Sixty nine percent of the children have received polio vaccine at the time of birth in urban areas whereas this proportion is only 33 % in rural areas.

Table2: Complete Immunization Status by Selected Background Characteristics

Characteristic	Category	India	U.P	Uttarakhand
Residence	Rural	40.0	22.8	41.3
	Urban	61.1	37.0	53.7
Sex Of the Child	Male	46.6	28.4	47.6
	Female	44.9	24.2	41.0
Birth Order	First	55.5	35.5	62.0
	Second	53.3	31.3	47.3
	Third	43.6	27.1	39.8
	Forth or More	26.1	18.6	22.7
Mother's Education	Non-literate	28.3	16.3	25.6
	0-9@years	57.6	36.9	58.7
	10 Years and above	73.6	63.4	62.8
Religion	Hindu	46.5	28.4	49.1
	Muslim	36.1	18.4	16.1
Caste	Scheduled caste	41.9	20.0	31.0
	Scheduled tribe	36.5	16.4	42.3
	O.B.C	44.9	24.2	30.5
	Other	53.9	38.1	55.1
Total		45.8	26.4	44.3

Male children (47 %) are more likely than female children (45 %) to be fully vaccinated as is apparent from the data present in table-2. Male children are also much more likely than female children to have received most of the individual vaccinations. The relationship between vaccination coverage and birth order is consistently negative for almost all vaccinations. A large majority of first-order births occur to younger women who are more likely than order women to utilize child health care services. As with the use of child health care services, there is a positive relationship between mother's education and children's vaccination coverage. Only 28 % of children of non- literate mothers are fully vaccinated compared to 56 % of children whose mothers were educated to a level below high school and 74 % of mothers who had at least completed high school. Hindu children are much more likely than (47 %) Muslim children (36 %) to have received each of the recommended vaccinations. There are no substantial differences in immunization coverage among the children of scheduled caste, scheduled tribes and other backward classes, though coverage is marginally low among scheduled tribes. However, coverage among the children of other caste groups is much higher. In U.P. and Uttarakhand, immunization coverage was much higher in the urban areas compared with the rural areas. Schedule Caste/Schedule Tribe (SC/ST) were disadvantaged groups and immunization coverage among them was found to be lower than for children from other groups. Similarly, educational differentials in immunization coverage could also be noted. Children of illiterate mothers were less likely to be immunized compared with children of educated mothers.

Table 3 shows the percentage of children in the age group 12-23 months and 24-35 months with a vaccination card, and the percentage who received various vaccinations during the first year of life by current age of children and place of residence. The interviewer was shown this vaccination card.

The percentage of children fully vaccinated by the age of 12 months declined slightly to 47 % for children in the age group 12-23 months from 49 % for children in the age group 24- 35 months. A rural– urban differential for the coverage of full vaccination was also observed. Fifty percent of the children in the age group 12-23 months are fully vaccinated

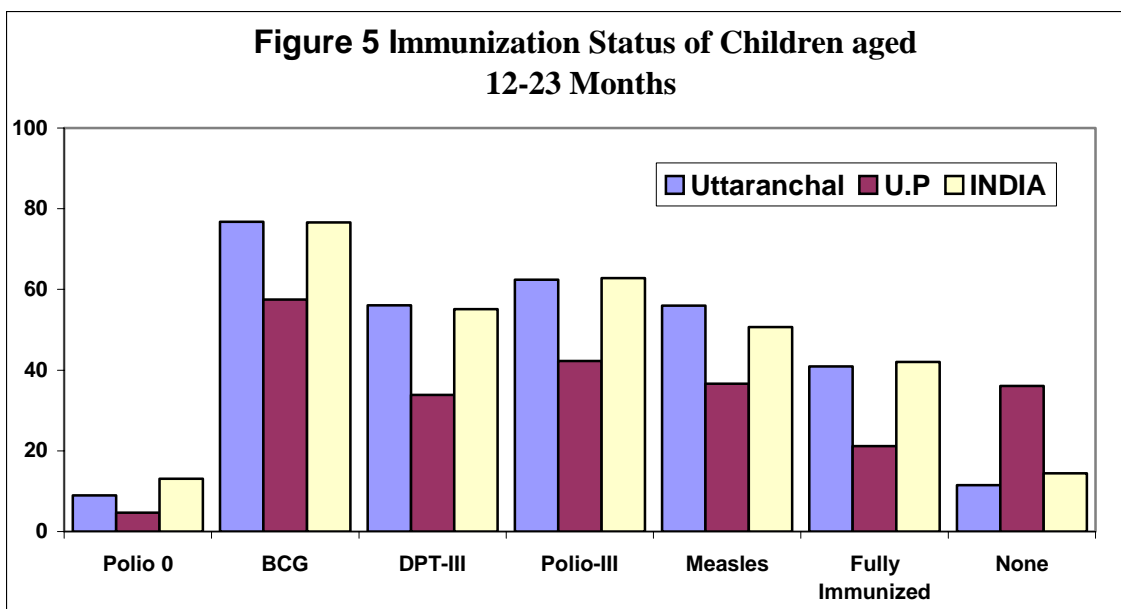
against 43 % of children in the age group 24-35 months in the rural areas, and this gap is a little wider in the urban areas. Only 61 % of the children in the age group 12-23 have received all the vaccines in the urban areas compared to 65 % of the children in the age group 24-35 months.

Table 3: Childhood Vaccination Received by 12 Months of Age

	TOTAL		RURAL		URBAN	
	12-23 Months	24-35 Months	12-23 Months	24-35 Months	12-23 Months	24-35 Months
India	45.8	49.4	40.0	43.4	61.1	65.0
U.P	26.4	29.6	22.8	25.7	37.0	40.7
Uttarakhand	44.3	49.9	41.3	46.8	53.7	58.4

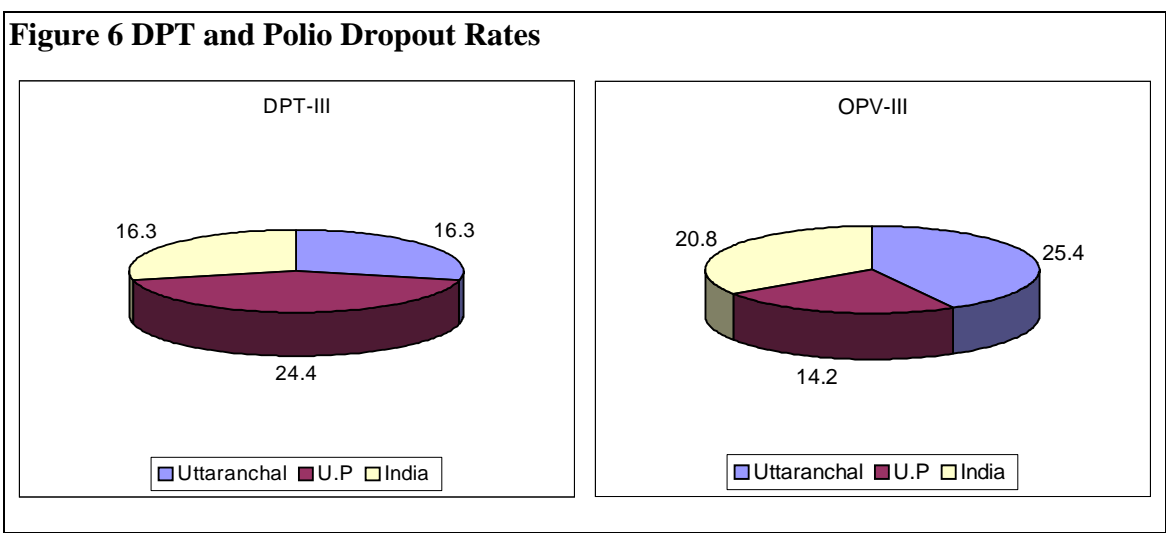
Sources: DLHS-RCH, 2002-04.

NFHS –2 Uttarakhand provides data on immunization coverage for the state as a whole. According to this survey, only 41% of children aged 12-23 months were fully immunized, which is equivalent to the all-India average of 42% full immunization. Coverage was almost twice that of UP, a state with similar topography bordering Uttarakhand. The proportion of infants not receiving any immunization was 12% in Uttarakhand, 36% in UP, and 14% at the national level.



Over three- fourths of children in the state received BCG immunization, 56% received DPT III and 62% received Polio III, which is almost comparable to the national estimates. About 9% of the children were administered polio drops at birth as well. Low coverage of DPT III and measles was responsible for the poor performance in full immunization in the state (Figure 5).

High dropout rates were another important concern in the programme. The dropout rate between the first and third doses of DPT was about 16% while that for polio was about 25% (Figure 6).



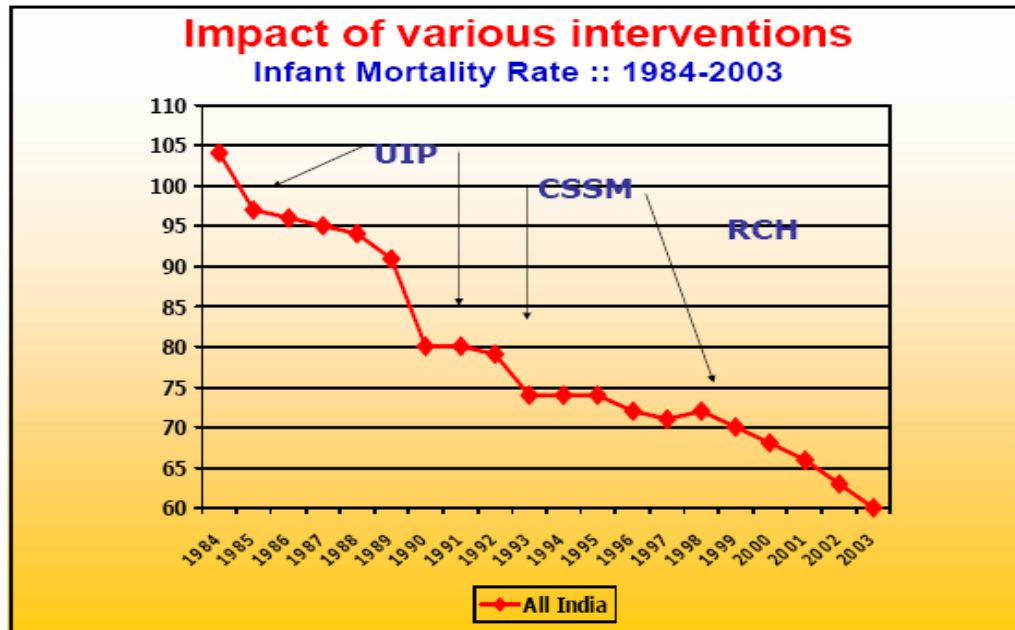
For routine immunization, a health worker provides a pregnant woman with a “mother and child immunization card”. On the card, a record is maintained of the immunization status of the mother during her antenatal period and that of her child during infancy.

5. INFANT AND CHILD MORTALITY

Despite fully protecting only about half of all infants, the infant mortality rate (IMR) declined during the phasing in of the UIP, especially in 1990 when there was a relatively high national coverage of most antigens (Figure 7). IMR continued to decline after 1990. The Child Survival Safe Motherhood (CSSM) and Reproductive Child Health (RCH) programmes started in 1992 and 1997, respectively. Both of these programmes included

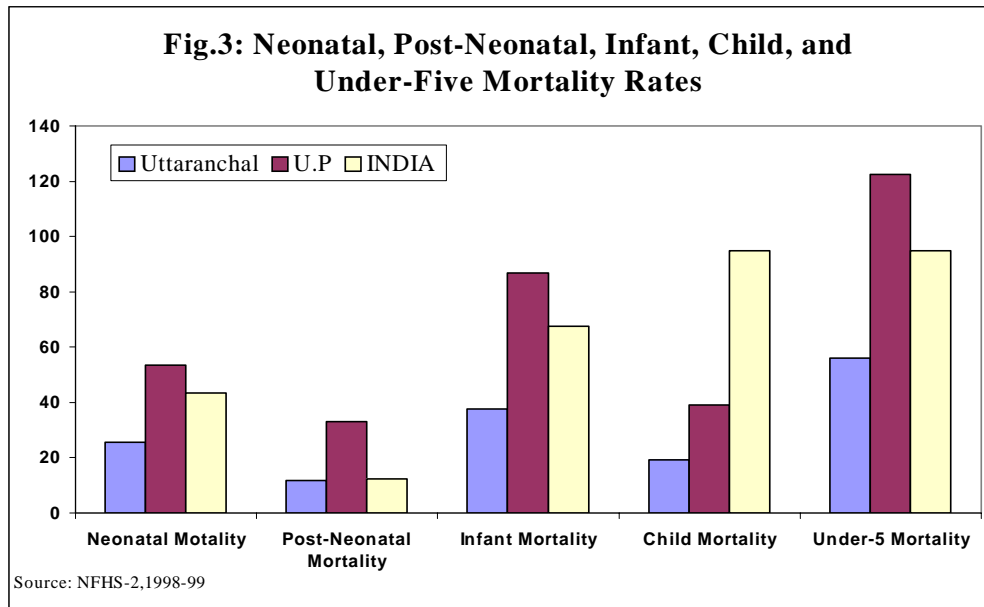
the UIP as a key component and built upon the infrastructure developed for the UIP. Currently, IMR in India remains relatively high (compared to other countries in the region) at 63 deaths per 1000 live births. Strengthening routine immunization may not contribute significantly to reducing IMR, but it does have a major impact on under five mortality and morbidity not only in India, but also globally.

Figure 7: Infant Mortality Rate: 1984-2003



Infant and child mortality rates are good indicators of socio- economic development and the status of health and population programmes. Figure 8 shows that the infant mortality rate in Uttarakhand was 38 per 1000 live births, which is much lower than the all India average (68 per1000 live births) and that of UP (89 per 1000 live births). Similarly, the child mortality rate and under five mortality rate are lower than those for UP and all – India.

Figure 8: Neonatal, Post-Neonatal, Infant, Child and Under- Five Mortality Rates



6. Reasons for Not Immunizing Children

Table 4 presents the percent distribution of children under the age of three years who did not receive any vaccination by reason as reported by the mother according to the place of residence and availability of health facilities in the village. About one-third of the children did not receive any vaccination because the mothers of the children were unaware of the need for immunization, and 14 % of children were not vaccinated, as the mothers felt that they were too young. Other reasons for not immunizing the children as reported by the mothers were that the place or time of vaccination was not known (13 %), place or time of vaccination was inconvenient (7 %), fear of side effects (5 %), no faith in vaccination (3 %) and ANM absent/ vaccine not available (8 %), family problems (9 %) and other reasons (6 %).

Table 4: Reasons for Not Immunizing Children

Reason				No Availability of health facility in the Village		
	India	UP	Uttrakhand	India	UP	Uttrakhnad
Unaware of need for immunization	32.5	30.5	30.3	33.1	29.7	29.9
Place/time unknown	13.1	13.5	10.1	14.4	13.9	8.7
Place/time inconvenient	7.1	7.7	13.2	8.4	9.2	15.6
Fear of side effect	5.3	6.9	5.2	4.5	5.9	3.5
No faith in Immunization	3.2	3.9	4.4	2.7	3.1	4.1
ANM absent/vaccine not available	8.3	10.5	10.6	9.4	12.8	12.8
Long waiting time	0.4	0.3	0.1	0.4	0.4	0.0
Child too young	14.4	11.1	14.0	12.8	10.8	14.2
Family problems	8.9	9.3	5.9	8.0	8.1	6.1
Other	6.3	5.9	2.6	5.7	5.4	2.3

Children from those villages where health facilities are available are slightly less likely to report that they were unaware of the need for immunization as compared to those villages where health facilities are not available. Where health facilities are available, fear of side effects and no faith in immunization were given as reasons for not immunizing the children.

7. Discussion

India's dream of becoming polio-free by 2007 has just received a major setback. More polio cases have been reported in 2005. The vast majority of cases are from western Uttar Pradesh. WHO's Jay Wenger, who heads the National Polio Surveillance Project, says India still has a chance to wipe out the virus by the end of 2007 but it must ensure good vaccination coverage. For every paralysed child there are about 100 infected children who get infected but survive and build a natural immunity against polio. Since the virus can survive for just a day or two in the environment, we have to ensure every child gets polio

drops so that the virus does not find anyone to infect and dies out, hopefully, by the end of next year.

In CES 2001, conducted for UNICEF, it was observed that about 60% of mothers had a mother-and-child immunization card. A significantly higher proportion of Hindus (75%) retained the card compared to Muslims (32%). According to the survey, 67% of infants received BCG, 65% DPT I, 62% DPT II, and 58% DPT III. A slightly higher proportion of infants (76%) received OPV I, 70% OPV II, and 63% OPV III, while a slightly lower proportion of children (55%) received the measles vaccine. Immunization coverage was marginally lower in urban areas. In the case of female children, coverage was significantly higher among Hindus and in literate families.

CES 2001 elicited reasons for the low percentage of fully-immunized infants in Uttarakhand. Major reasons for poor performance included the lack of knowledge of time and place for vaccinations (35%); lack of recognition of the need for all vaccinations (30%); and lack of awareness of the programme (24%). Fear of getting a disease (12%), having no faith in the vaccine (6%), and fear of side effects (5%) were also important obstacles.

The PPI Programme was launched in 1995 with the objective of eradicating polio from the country. Under this programme, all children below five years are given polio drops on a fixed day throughout the country. According to CES 2001, in Uttarakhand 92% of children received all three doses of OPV. There was no or only marginal difference in coverage with all three doses according to gender, religion, caste, or education of parents. However, coverage was lower in urban areas (89%) compared with rural areas (94%). The proportion of children not receiving any OPV dose during the PPI campaign was 0.6%. The proportion of children who had not received any OPV dose in their lifetime was 0.3%; of these almost half the numbers live in urban areas, belong to a Muslim community, have illiterate parents, and are likely to be female. During the 2000-2001 PPI campaign in Uttarakhand, almost three out of four children received OPV doses at PPI booths, while only one out of

every 10 children were immunized at home; the remainder received some doses at home and some at PPI booths.

Some of the main reasons reported for not getting one or more OPV doses during the PPI campaign were 'Lack of awareness of place/time', 'not aware of the need for additional doses', 'vaccinator did not come to my house', 'there was nobody to take the child to a booth', 'out of station', and 'child was young.' Myths such as 'oral polio will affect fertility of the child' (5.3%), 'no faith in additional doses' (3.2%), and 'a doctor advised against immunization' (1.0%) also contributed to non-acceptance of OPV during the PPI campaign.

There is a wide gap between routine data and survey data. Almost every other child in Uttarakhand is not fully protected and one out of every three children is a dropout from the immunization programme. Coverage is lower in rural areas, according to the RCH survey, while the CES 2001 reported lower coverage in urban areas. In addition, coverage was low for children whose mother belongs to an SC/ST community or is illiterate. The major source of immunization services is wholly through the public sector, The private sector plays an insignificant role, Though when compared with routine immunization, its PPI coverage is far better. About two-thirds of immunization sessions were done using a well-sterilized or pre-sterilized disposal syringe and one syringe with one needle was used for one immunization.

8. Conclusion

In India 75 %, 58 %, 57 % and 56 % of the children age 12-23 months received the BCG vaccine, three doses of DPT, Polio and Measles vaccine respectively. There is a 19 percentage point drop from BCG to Measles. It means that a large number of children who have contact with services providers are missed out of subsequent services. The complete schedule of immunization including BCG, three doses of DPT and Polio each together with Measles was received by 46 % of the children, whereas 20 % of the children did not receive a single vaccination under routine programme.

The extent of complete immunization consisting of BCG, three injections of DPT, three doses of Polio and Measles is the lowest in Nagaland 13 % and highest in Tamil Nadu 91 %. In 15 states namely Nagaland, Meghalaya, Assam, Arunachal Pradesh, Bihar, Rajasthan, Uttar Pradesh, Jharkhand, Madhya Pradesh, Tripura, Jammu and Kashmir, Mizoram, Manipur and Uttarakhand full immunization is below the national average of 46 %.

The coverage of full immunization among children age 12-23 months is below 20 % in 115 districts, 20 to 39.9 % in 153 districts, 40 to 59.9 % in 128 districts, 60 to 79.9 % in 109 districts and above 80 % in 88 districts. The highest vaccination coverage was recorded in Ratnagiri and Kolhapur districts of Maharashtra and Toothukdi district of Tamil Nadu, where 99 % children received the complete schedule of vaccination. The poor performing districts that have a coverage below 20 % are from the EAG states (64 districts) 41 districts are from north-eastern states 9 districts of Jammu and Kashmir and one district of Gujarat also fall under this category.

In Uttarakhand districts, the extent of complete immunization is the lowest in Hardwar (15.1%) and highest in Pauri Garhwal (71.7 %). In 6 districts (Pauri Garhwal, Bageshwar, Nainital, Champawat, Chamoli and Pithorgarh) more than 60 % of the children received complete immunization. In Uttar Pradesh, in 50 % of the total districts, the coverage of full immunization is below one fourth and is below the state average of 26 %. More than two third children in Kaushambi district were not vaccinated at all, and in thirty two districts, the percentage of children not vaccinated is higher than the state average. In nearly all the districts, fewer children have received the measles vaccine than any of the other vaccinations. The coverage of polio drops at the time of birth varies from the lowest in Balrampur (6 %) to the highest in Rae Bareilly (37 %).

Uttarakhand has not reached the goal of universal immunization coverage despite a focused and intense immunization programme since 1985. The main constraints are lack of attention to routine immunization, perhaps due to the intensified focus on PPI campaigns, and the integration of the UIP into CSSM and RCH in 1992 and 1997, respectively. As a

consequence there was a dilution of attention and focus on the routine immunization programme. There is 18 percentage points drop from BCG to measles. It means that a large number of children that have contact with services providers are missed out of subsequent services. The complete schedule of immunization including BCG, three doses of DPT and Polio each and measles was received by 44.3 % of the children, whereas 23.4 percent of the children did not receive a single vaccination under the routine programme.

Policy Recommendation

In this scenario, the goal of universal immunization can only be realized if the following programme and policy issues are considered in developing a prospective plan for the future: Strengthen the programme management skills of the lower- and mid level managers to address the high dropout rates and low proportion of fully immunized infants. Revitalize and strengthen routine immunization services with particular reference to urban areas, Muslims, illiterate parents, populations residing in the plains, and population groups or areas hitherto not reached. Ensure regular immunization services on a fixed day and fixed place basis. Address the issue of poor utilization of immunization services, obstacles and lack of awareness or motivation, through professionally–designed behavior change communication interventions. Eradication of polio in the next few years will provide opportunities to introduce newer vaccines in the programme.

References

- Bonu, S. Rani, M. Baker, T.D. (2003) “The impact of the national polio immunization campaign on levels and equity in immunization coverage: Evidence from rural North India”. *Social Science Medicine*, 57:1807-19.
- Das, N. Mishra, V. Saha, P. (2001) “Does Community Access Affect the Use of Health and family Welfare Services in Rural India?” National Family Health Survey Subject Reports. Number 18 May Indian Institute of Population Sciences, Mumbai India.
- Frenkel, L.D. Nielsen , K. (2003) “Immunization issues for the 21st century. *Ann Allergy Asthma Immunol*’ 90(6): Suppl 3:45-52.
- International Institute for Population Sciences (IIPS) and ORC Macro, 2001, National Family Health Survey (NFHS-2), India, 1998-99 UP and Uttarakhand.
- Kane, M. Lasher ,H. (2002) “The case for childhood immunization”. Occasional paper, No.5. Children’s Vaccine Program at Path. Seattle, WA.
- Munshi, Rekish. Sang-Hypo Lee. (2000) “ Child Immunization in Madhay Pradesh” , National Family Health survey Subject Reports. Number 15 Feb. Indian Institute of Population Sciences, Mumbai India.
- Sharma, Suresh (2005) “Child Health and Nutritional Status of Children: The Role of Sex Differentials”, working paper series no.e/262/2005. Institute of Economic Growth, Delhi, India.
- Shariff, A., Singh, G. (2002) “Determinants of maternal health care utilization in India: Evidence from a recent household survey”. Working Paper Series No. 85. National Council of Applied Economic Research. New Delhi, India.
- WHO (2004). Review of National Immunization Coverage 1980-2003: India, WHO/UNICEF Report. www.who.int/vaccines-surveillance.
- World Health Report, (1996) Fighting Disease Fostering Development, WHO: Geneva.

Appendix

Table-1: Recommended Immunization Schedule

Vaccine	AGE				
	Birth	6 Weeks	10 Weeks	14Weeks	9 Months
Primary Vaccination					
BCG	X				
Oral Polio	X ¹	X	X	X	
DPT		X	X	X	
Hepatitis B ²		X	X	X	
Measles					X
Booster Doses					
DPT + Oral Polio	18 to 24 months				
DT	5 years				
Tetanus Toxoid	At 10 years and again at 16 years				
Vitamin A	9, 18, 24, 30 and 36 month				
Tetanus Toxoid (PW): 1 st Dose	As early as possible during pregnancy after 1 st trimester				
2 nd Dose	1 month after 1 st dose				
Booster	If previously vaccinated within 3 years				
¹ In all institutional deliveries and in all endemic areas.					
² In pilot areas. A dose at birth is recommended for babies born in health care institutions.					
Vaccination schedule may get modified if newer vaccine is introduced in future in under National Immunization programme					
Source: UIP Div. Deptt. of Family Welfare, Min. of Health & Family Welfare.					

RECENT WORKING PAPERS

Title	Author (s) Name	Paper No.
Social Cost-Benefit Analysis of Delhi Metro	M.N. Murty Kishore Kumar Dhavala Meenakshi Ghosh Rashmi Singh	E/273/2006
Commercialization of Shrimp Trade, Environment and Rural Poverty: A Socio-Ecological Exploration in Coastal Orissa	Sarmistha Pattanaik	E/274/2006
Economics of Environmental Management System in Oil India Limited: An Environmental Economics Perspective Case Study of Oil, Duliajan	Devashis Bose	E/275/2006
Internalizing the Cost of Biodiversity Loss due to Aquaculture: A Case Study of the Indian Sundarbans	Kanchan Chopra Pushpam Kumar Preeti Kapuria	E/276/2006
Environmental Implications of Agriculture and Policy Initiatives in India and the EU: Review of Evidence and Issues	Amita Shah	E/277/2007
Fertility Transition in India: 1985-2003	Alok Ranjan Chaurasia	E/278/2007
Interaction between Trade and Environment Policies with Special Interest Politics	Meeta Keswani Mehra	E/279/2007
Imbalance in Child Sex Ratio: Trends, Causes and Emerging Issues	R.S. Bora	E/280/2007
Inclusive Growth in Hilly Regions: Priorities for the Uttarakhand Economy	Sabyasachi Kar	E/281/2007
On Environmental Accounting for Sustainable Development	M.N. Murty	E/282/2007