

CHAPTER 6

Social differentials and determinants of childhood immunization

Introduction

In the previous chapter, significant differences were observed between social groups across socio-economic and demographic characteristics and programme factors along with child immunization coverage in the three states. It was also observed that the rates of missed-out only one vaccine (Polio or DPT or Measles vaccine), and drop-out between multiple doses of vaccinations (Measles, DPT and Polio vaccines) are the major causes for the lower coverage of full immunization in them and among social groups also. Moreover, the rates of missed-out of one vaccination or drop-out of multiple doses of DPT and Measles vaccinations are quite high as compared with missing and drop-out rates of polio vaccination. That is, the magnitude of drop-out rates during polio vaccinations is lower than measles and DPT vaccinations.

The conceptual framework of this study using Health Belief Model (HBM) calls for examining the role of social group affiliation on the coverage of child immunization after controlling for other socio-economic and demographic characteristics and programme factors in Rajasthan, Odisha and Madhya Pradesh. In order to understand the above objective, in this chapter an attempt has been made to examine the gross social group differentials and to assess the net effect of caste/tribe after controlling for background characteristics and programme factors in the coverage of third dose of DPT, measles vaccination and immunization status in the states. This will help to understand whether the differences in the DPT3, measles and full immunization coverage between social groups are due to mainly differences in other socio-economic and demographic background characteristics and programme factors or social group affiliation *per se*.

In this chapter, first gross differentials are examined through bivariate analysis across the four caste/tribe groups and other socio-economic, demographic and programme factors on coverage of third dose of DPT, measles and immunization coverage status along with Vitamin A supplementation. Later, to examine the net effect of caste/tribe after controlling other socio-economic, demographic and programme factors, different multivariate analysis (multiple logistic regression and multinomial logistic regression

analysis) analysis have been carried out. This chapter has been broadly divided into two sections. The first section (Section 6.1), concentrates on the differentials in the coverage of third dose of DPT (DPT-3), measles vaccination and immunization coverage status (no, partial and full) along with coverage of Vitamin A supplementation across social groups and select background characteristics of children and mothers. The second section (Section 6.2), focuses on social determinants, especially on assessing the role of social group affiliation, sequentially controlling for other socio-economic, demographic and modifying factors on the coverage of specific vaccines (DPT-3 and Measles) and immunization coverage status (no, partial and full) in the three states. This section examines the likelihood of child to be vaccinated with the third dose of DPT (DPT3) and measles vaccinations, using multiple logistic regression analysis and immunization status using multinomial logistic regression analysis, with four models (Model 1-4) separately, formulated on the lines of Health belief model (HBM) in the three states of Rajasthan, Odisha and Madhya Pradesh. Finally, the effects of coverage of full immunization and social determinants, particularly the role of social group affiliation (caste/tribe) on Vitamin A supplementation coverage also examined in this chapter, sequentially controlling for other risk factors. The analysis focuses on 1,519, 1,366 and 2,520 children born during the 12-59 months before the survey in Rajasthan, Odisha and Madhya Pradesh respectively.

SECTION 6.1

Gross social group differentials in coverage of specific vaccination and immunization status

This section examines the gross differentials in the coverage of two specific vaccinations (DPT-3 and Measles), immunization status across social groups and makes an assessment of how the mothers and child's individual, household level characteristics and programme factors differ in the coverage of immunization services in the three states. The specifications and rationale for selecting the independent variables are given in the methodology chapter.

Coverage of third dose of DPT (DPT3) vaccination

Table 6.1.1 presents the percentage of children aged 12–59 months who received third dose of DPT (DPT3) vaccination among social groups along with the select socio-economic and demographic characteristics and programme factors in the three states. The

proportion of children who received the third dose of DPT vaccination was highest in Odisha (64%), followed by Madhya Pradesh (52%) and Rajasthan (34%). By caste/tribe, substantial differences are observed in the coverage of DPT3 vaccination and the coverage is lowest among ST in all the states. From the Table 6.1.1, it can be seen that OC's had the highest coverage of DPT3 vaccine in both Rajasthan and Madhya Pradesh, while in Odisha OBCs had the highest coverage rate. Coverage of third dose of DPT-3 vaccination was lowest among ST children in the three states. The proportion of ST children who received third dose of DPT varied from 12 per cent in Rajasthan to 32 per cent in Madhya Pradesh and 47 per cent in Odisha whereas among OC children, it ranges from 52 in the state of Rajasthan to about 70 per cent each in the states of Odisha and Madhya Pradesh. On the other hand, coverage of DPT3 vaccination among the SC children was also less as compared with OC children in all states. In Rajasthan and Madhya Pradesh, a large difference (37 and 39% respectively) is observed between OC-ST children compared with the differences between OC-SC children (12 and 16% respectively) in the coverage of DPT3 vaccination. However, differences in the coverage of the third dose of DPT vaccination between SC and OBC, and OBC-ST children were not much in all the three states, and SC children had marginally higher coverage of DPT3 in Rajasthan. The difference between SC, OBC and OC children was small in Odisha (Table 6.1.1).

Apart from the social group differentials, significant differentials are observed in the coverage of DPT3 vaccination by socio-economic-demographic characteristics and programme factors in all the three states. Significantly, for urban children it is ($p \leq 0.001$ in Rajasthan and Madhya Pradesh; in Odisha $p = 0.024$), children living in joint families ($p \leq 0.001$ in Rajasthan and Madhya Pradesh; in Odisha $p = 0.034$), children of non-working mothers (housewives) and children living in nuclear families ($p \leq 0.001$). They received DPT3 vaccination more than their counterparts, rural areas, joint families, nuclear families and working mothers. Parents' education and household standard of living showed a significant positive relationship with the coverage of DPT3 vaccination. With regards to household standard of living, 81-83 per cent of children from high household standard of living (index) received DPT3 vaccination compared with 54 and 41 per cent of children living in low household standard of living in Odisha and Madhya Pradesh. Similarly, more than 70 per cent children of mothers with secondary and higher level of education in the three states; and 74 and 64 per cent children of fathers with secondary

and higher level of education in Odisha and Madhya Pradesh respectively received DPT3 vaccine. On the other hand, more than half (50-52 per cent) of the children of illiterate parents (father and mother, respectively) in Odisha, about two-fifths (36 and 39%) children in Madhya Pradesh and about one-fourth (20-24 per cent) in Rajasthan, respectively received DPT3. Coverage of DPT3 vaccination among children of young mothers (below 25 years of age) was significantly ($p \leq 0.001$ for Rajasthan and Madhya Pradesh and for Odisha ≤ 0.042) higher than children of older mothers of age 26 years and above. Similarly, coverage of DPT3 vaccination was significantly higher among lower birth orders (1-2) than children of higher birth order (3+). The percentage of children who were vaccinated with DPT3 did not differ by sex i.e., male and female children almost equally received the third dose of vaccination in the three states (Table 6.1.1).

Besides the socio-economic and demographic characteristics, three programme factors (place of delivery, mother's exposure to electronic media and mother's access to health facility) also showed a strong positive relationship with the coverage of DPT3 vaccination in the three states. For instance, 75 and 57 per cent of children born at health facilities received third dose of DPT vaccination compared with 44 and 25 per cent of children born at home in Madhya Pradesh and Rajasthan respectively. Similarly, 65 and 51 per cent children of mothers exposed to electronic media received DPT3 vaccination compared with 37 and 20 per cent of children mothers who were not exposed to electronic media in Madhya Pradesh and Rajasthan respectively. Thus, large differences (28-33%) are observed between the children born at health facilities and children of mothers exposed to electronic media, compared with children born at home and children of mothers not exposed to electronic media in the states, particularly in Rajasthan and Madhya Pradesh. In Odisha, the corresponding difference in the proportion of children who received DPT3 vaccination between children born in institutions, children of mothers exposed to electronic media and their counterparts are observed to be small (16 and 22 per cent, respectively). In Odisha 78 and 68 per cent children delivered in health facilities and mothers exposed to electronic media received third dose of DPT vaccination compared with 56 and 53 per cent of children of mothers delivered at home and mothers who not exposure to electronic media. Moreover, a similar large difference is observed in the coverage of DPT3 vaccination between children of mothers who had higher accessibility to health facility compared with mothers who had lower access to health facility in Rajasthan (31%) compared with Madhya Pradesh and Odisha (18 and 11%

respectively). For instance, in Odisha and Madhya Pradesh, 62 and 69 per cent children with DPT3 vaccination were of mothers who had higher accessibility to health facility compared with 58 and 44 per cent mothers who had lower access to health facility respectively (Table 6.1.1).

Coverage of Measles vaccination

Table 6.1.2 presents the gross differentials in the coverage of measles vaccination among children aged 12-59 months across social groups along with background characteristics and programme factors in Rajasthan, Odisha and Madhya Pradesh. Like the coverage of third dose of DPT, the proportion of children receiving measles vaccination was highest in Odisha (67%), followed by Madhya Pradesh (60%) and Rajasthan (42%). However, coverage of measles vaccination was marginally higher than the coverage of DPT-3 vaccination in the three states. As observed in the coverage of third dose of DPT vaccination, considerable variations are seen in the coverage of measles vaccination among social groups. Lowest coverage of measles is observed among the ST children in the three states, highest coverage among OC children in Rajasthan and Madhya Pradesh, and OBC children in Odisha. More than three-fourths (78%) children in Madhya Pradesh and more than half (58%) of the OC children in Rajasthan, and 75-76 per cent of SC and OBC children in Odisha were vaccinated with measles. On the other hand, only 19 per cent ST children received measles vaccination in Rajasthan, while 42 and 49 per cent children received it in Madhya Pradesh and Odisha respectively. Thus, in the three states, large differences in coverage of measles vaccination are observed between OC-ST (21-39% difference), OBC-ST (22-27%), and SC-ST (20-27%) children and difference is negligible between OBC-SC. These differences are more pronounced in Rajasthan and Madhya Pradesh compared with Odisha. Similarly a small difference is observed between OC-SC (13 and 16%) and OC-OBC children (14 and 16%) in Rajasthan and Madhya Pradesh respectively.

Similarly, significant differences are observed in the coverage of measles vaccination with respect to socio-economic and demographic characteristics and programme factors among the states. In Rajasthan and Madhya Pradesh significantly ($p \leq 0.001$ for Rajasthan and Madhya Pradesh) higher proportion of children from urban areas received measles vaccination than children from rural areas. Coverage of measles vaccination was significantly higher among children from joint families ($p \leq 0.001$ for

Rajasthan and Madhya Pradesh; for Odisha ≤ 0.034) compared with children from nuclear families. Parents education and standard of living showed a positive relationship and coverage of measles vaccination increased steadily with the household standard of living and parents education. Coverage of measles vaccination was higher among children whose parents had high school education and more, and children from medium/high household standard of living. With regards to parents education, more than 80 per cent children of mothers with secondary and higher levels of education received measles vaccination in the states, while 72-75 per cent children of fathers with secondary and higher level of education in Odisha and Madhya Pradesh and 54 per cent in Rajasthan received measles vaccination. On the other hand, a significant proportion of children of illiterate parents (31-59 %children of illiterate mothers and 25-56% children of illiterate fathers) received measles vaccination. In Madhya Pradesh and Odisha, more than four-fifths (83-85%) of children from high household standard of living received measles vaccination compared with 52-58 per cent of children with low household standard of living. Significantly, children of mothers aged at least 25 years old ($p \leq 0.001$ for Rajasthan and Madhya Pradesh; for Odisha ≤ 0.028) and children with lower birth order ($p \leq 0.001$) were more likely to receive measles vaccination than children of older mothers (26+ years) and children with higher birth order (3+).

Significant association is observed between coverage of measles vaccination and the three programme characteristics - children's place of delivery, children of mothers exposed to electronic media ($p \leq 0.001$ in the three states) and constrains to access of health facility index ($p \leq 0.001$ for Rajasthan and Madhya Pradesh; for Odisha $p = 0.837$). Specifically, higher coverage of measles vaccination is observed among children delivered at health facilities, children of mothers who were exposed to electronic media and children of mothers who had more access to health facility than their counterparts – children delivered at home, children of mothers who were not exposed to electronic media and children of mothers who perceived low access to health facility. Differences in the coverage of measles vaccination between children of mothers exposed and non-exposed, and children delivered at institutions and home are large, particularly in Rajasthan and Madhya Pradesh compared with Odisha. For instance, difference in the coverage of measles vaccination between children delivered at health facilities and children delivered at home, and mothers who exposed to electronic media and not exposed to electronic media was about 32 per cent in Rajasthan, followed by 26-28 per

cent in Madhya Pradesh compared with 17-21 per cent in Odisha. On the other hand, 28 and 18 per cent difference observed in the coverage of measles vaccination between the children of mothers who have high access to health facility and low access to health facility in Rajasthan and Madhya Pradesh respectively. However, no such significant ($p=0.837$) differences are observed in Odisha. The differences in the coverage of measles vaccination between children of mothers with medium and low access to health facility was small (5-7% in Rajasthan and Madhya Pradesh) and negligible in Odisha (Table 6.1.2).

Immunization coverage status (no, partial and full)

Table 6.1.3 shows the immunization status (no, partial and full) among children aged 12-59 months according to social groups and select background characteristics and programme factors in Rajasthan, Odisha and Madhya Pradesh. As observed in the previous section, the overall coverage of full immunization (a child who has received eight doses of scheduled vaccines) was lowest (27%) in Rajasthan, while about half (46%) of the children in Odisha and Madhya Pradesh each are fully immunized. On the other hand, only seven and ten per cent of children in Rajasthan and Madhya Pradesh and 16 per cent of children in Odisha had not received any vaccine. This indicates that large proportions of children (63, 48 and 37% in Rajasthan, Madhya Pradesh and Odisha respectively) were partially immunized that is, had received at least one vaccination.

Coverage of full immunization

Social group differences are observed in the coverage of full immunization and SC/ST children are most disadvantaged compared with OBC/OC children. In Rajasthan and Madhya Pradesh, SC, ST and OBC children are less likely to be fully immunized than OC children. However, OBC children in Odisha are more likely to be vaccinated than OC and SC/ST children. For instance, in Rajasthan and Madhya Pradesh, 45 and 62 per cent of OC children received full immunization compared with 21 and 35 per cent of SC/ST children respectively. In Odisha, more than half (57 and 51%) of OBC and OC children respectively received full immunization compared with about two-fifths (38%) of SC/ST children. Thus, large differences are found in the coverage of full immunization between OC and SC/ST (24 and 27%) children in Rajasthan and Madhya Pradesh. However, the differences between OC-SC/ST were small (13%) in Odisha. On the other hand, difference in the proportion of children who received full immunization

between OBC and SC/ST was small (3.4 per cent) in Rajasthan compared with 15 and 19 per cent in Madhya Pradesh and Odisha respectively (Table 6.1.3).

Significant differentials in the coverage of full immunization are observed according to select socio-economic, demographic and programme characteristics. Parent's education and household standard of living had a substantial effect on child's full immunization particularly in Rajasthan and Madhya Pradesh. Full immunization among children increased with improvement of parents' education and household standard of living. The proportion of children fully immunized was almost twice in Odisha and more than twice in Rajasthan and Madhya Pradesh among children whose parents had secondary or higher level of education as well as children from wealthier households compared with children of illiterate parents and from poor households. Similarly, children of mothers aged below 25 years and children of mothers with lower parity (1-2) were more likely to be fully immunized than children of age 25 years and older mothers and children of mothers with higher parity (3+). The proportion of fully vaccinated children does not greatly differ by sex. However, boys are slightly more likely to be fully vaccinated than girls. Among other socio-economic factors, children in urban areas, joint families, and not-working mothers/housewives are more likely than other children to receive full vaccination with all the eight recommended vaccinations (Table 6.1.3).

Like differentials observed in the case of coverage of DPT3 and measles vaccinations, significant differentials are observed between three programme factors and full immunization coverage. Specifically, higher coverage of full immunization is observed among children delivered at health facilities, children of mothers who were exposed to electronic media and children of mothers who had high access to health facility than children delivered at home, children of mothers who were not exposed to electronic media and children of mothers who perceived low access to health facility. For instance, in Madhya Pradesh and Odisha, more than half of the children delivered at health facilities, children of mothers who were exposed to electronic media and children of mothers who had high access to health facility were received full immunization compared with about two-fifths of their counterparts, children delivered at home, mothers who were not exposed to electronic media and mothers of children who perceived low access to health facility. Difference in the coverage of full vaccination between children delivered at institutions and home or children of mothers exposed to media and not

exposed are highest (27 and 32% respectively) in Madhya Pradesh, followed by Rajasthan (27%) and Odisha (16%). Similarly, difference in the proportion of children fully immunized between mothers with higher access to health facility and low access was large in Rajasthan (27%), followed by Rajasthan and Odisha (20 and 10% respectively).

Coverage of partial immunization

Partial immunization coverage – the proportion of children who had partially received immunization also highest among SC/ST and OBC children compared with OC children. For instance, 66 per cent each of SC/ST and OBC children were partially immunized compared with 49 per cent of OC children in Rajasthan. Similarly, 57 and 43 per cent of SC/ST and OBC children were partially immunized compared with 34 per cent OC children in Madhya Pradesh, and 42 per cent SC/ST children compared with 33-34 per cent of OBC and OC children in Odisha. Thus, substantial difference is observed in the coverage of partial immunization between social groups, particularly in Madhya Pradesh and Rajasthan. In Madhya Pradesh and Rajasthan, social group differences in the coverage of partial immunization were large between SC/ST-OC (23 and 17% respectively) compared with OBC-OC (9 and 17% respectively). On the other hand, differences in the coverage of partial immunization between SC/ST-OC and SC/ST-OBC were small (8-9%) and negligible between OBC-OC in Odisha (Table 6.1.3).

Similarly, significant differential impact of predisposing, enabling and need factors on the coverage of partial immunization is observed in the states differences are particularly large in Rajasthan and Madhya Pradesh. With regard to socio-economic factors, partial immunization coverage was significantly high among rural children, nuclear families, and working mothers than urban children, children living in joint families and children of non-working mothers. The coverage of partial immunization is in-direct proportion to the level of parent's education and household standard of living. In the three states, children of illiterate parents or with primary level of schooling, and children from low/medium standard of living are most likely to be partially immunized their children than the children of literate parents and with high household standard. In addition, among demographic characteristics, children of older mothers (aged 25 years and above) and children of mothers with higher parity (3+) were more likely to be

partially immunized than children of younger (age <25 years) mothers and children of mothers with lower parities (Table 6.1.3).

Among the three programme characteristics, higher coverage of partial immunization observed among children delivered at home, children of mothers who were not exposed to electronic media and children of mother's who perceived low access to health facility than their counterparts, children delivered at institutions, mothers who were exposed to electronic media and children of mothers who perceived higher access to health facility. However, differences in the proportion of children who received partial vaccination between children delivered at home and institutions, or children of mothers who were not exposed to media and exposed to electronic media are large (26 and 18%) in Madhya Pradesh, followed by Rajasthan and Odisha (19 and 5% respectively). Similarly, differences in the partially immunized children between mothers who have lower access to health facility and higher access are small (in the range of 12-14 per cent) in states (Table 6.1.3).

Not immunized

Like partial immunization, a clear inter-social group disparity observed in the proportions of children who did not received any vaccinations. The proportion of children who had not received any vaccination was the highest among SC/ST children, followed by OBC children (except in Odisha) compared with OC children in the three states. In Odisha, about one-fifth (20%) of SC/ST children compared with nine per cent of OBC children, while 8 and 12 per cent of SC/ST children compared with four and six per cent of OC children had not received any vaccination in Madhya Pradesh and Rajasthan respectively. Thus, in Rajasthan and Madhya Pradesh, little difference is observed between the social groups in the proportion of children who were not vaccinated and the differences were small between SC/ST-OC (4 and 7% respectively) and between SC/ST-OBC children (1 and 3% respectively). However, in Odisha 7 and 11 per cent of difference is observed between OBC-SC/ST and OBC-OC in the proportion of children who were not vaccinated (Table 6.1.3).

Likewise significant differences are observed in the proportions of children who had not received any vaccination with respect to socio-economic, demographic and programme characteristics in the three states. However, the differentials are small compared with the differences observed with partial immunization. The proportion of

children who received no vaccinations is higher in rural areas (except in Odisha), children living in nuclear families, illiterate parents, low standard of living households, working mothers, higher order births or older mothers compared with their counterparts in the three states. Similarly, children delivered at home, children of mothers who were not exposed to electronic media or having lower access to health facility tend to have higher left-out immunization rates (no vaccination received) compared with the children delivered at institutions and children of mothers exposed to electronic media or having lower constraints and higher access to health facility (Table 6.1.3).

In short, large differences are observed between the social groups in the states and coverage of DPT3, measles vaccinations and coverage of full immunization significantly lower among SC, ST and OBC children compared with OC children. On the other hand, children with partial immunization coverage are also larger among SC, ST and OBC children compared with OC children. This is also the case for children with no immunization. Moreover, difference in the coverage of vaccinations and full immunization between SC/ST and OC children was much more pronounced than OBC-OC children, particularly in Rajasthan and Madhya Pradesh.

Among other background characteristics, coverage of third dose of DPT, measles vaccination and coverage of full immunization increase steadily with the parent's education, standard of living, accessibility to health facility and mother's exposure to media. Similarly, coverage of DPT-3, measles vaccination and full immunization were much higher among children living in urban areas, children living in joint families, children at lower birth orders, children who were given birth in medical institutions. On the other hand, there is not much difference, however, between social groups (SCs/STs, OBCs and OCs) in the coverage rates of DPT3, measles and immunization status by demographic and socio-economic characteristics. This suggests that the differences in the coverage of DPT3, measles and full immunization among social groups is due mainly to differences in demographic and socio-economic characteristics rather than to social group affiliation (SCs/STs, OBCs and OCs) *per se*.

Coverage of Vitamin A supplementation

Vitamin A deficiency is the leading cause of preventable childhood blindness and reduced immunity towards infections which results in increased mortality from childhood

diseases. VAS is one of the most cost-effective interventions for reducing childhood mortality. In populations where Vitamin A deficiency (VAD) is of public health importance, VAS is recommended as prophylaxis and as treatment for at-risk groups and sick individuals respectively. The Government of India recommends that children under three years receive VAS every six months, starting at age 9 months. VAS is considered a key intervention in reducing the under-five mortality rate (U5MR) and achieving MDG-4 of reducing the U5MR by two-thirds by 2015.

Table 6.1.4 presents the percentage of children age 12-59 months who received VAS in the last six months according to immunization status and social determinants. The proportion of children who received VAS is highest (71%) in Odisha, followed by Madhya Pradesh (49%) and Rajasthan (35%). The bivariate results show most children (87% in Odisha and 79% in Rajasthan and Madhya Pradesh each) who received full immunization also received VAS. However, it can also be seen that the children who were not fully immunised are significantly less likely to be receive VAS. Among the children who were not fully immunized, only about one-fifth (18%) of children in Rajasthan, and about one-fourth (23%) in Madhya Pradesh received VAS compared with about three-fifth (57%) in Odisha (Table 6.1.4).

By caste/tribe also, substantial differences are observed in the coverage of VAS and coverage is lowest among STs, while OC children had the largest coverage. The proportion of ST children who received VAS varies from 18 per cent in Rajasthan to 33 and 61 per cent in Madhya Pradesh and Odisha respectively. Whereas among OC children it ranged from 49 per cent in Rajasthan to 76 and 65 per cent in Odisha and Madhya Pradesh respectively. On the other hand, coverage of VAS among SCs and OBC children was less as compared with OC children. However, differences in the coverage of VAS between OC-SC and OC-OBC are small as compared with OC-ST children. In Rajasthan and Madhya Pradesh, a large difference (32% each) was observed between OC-ST children compared with the differences between OC-SC children (11 and 20%) and OC-OBC children (16 and 12%). On the other hand, differences in the coverage of the VAS between SC and OBC, and SC-OBC children was not much in the states, and SC children had marginally higher coverage in Rajasthan and Odisha. The difference between SC, OBC and OC children are small in Odisha (Table 6.1.4). Among other socio-economic factors, significant differentials in the coverage of VAS were observed. Mother's

education and household standard of living has a substantial positive effect on the coverage of VAS. Coverage of VAS among children increased with the increase in mother's education and household standard of living. The proportion of children who received VAS were more among urban children, lower birth orders (1-2), not-working mothers/ housewives than other children to have received VAS (Table 6.1.4).

Thus, the next section (Section 6.2) assesses the influence of caste/tribe on DPT3, measles vaccination and immunization status controlling other socio-economic demographic characteristics and programme factors using different multivariate analysis (multiple logistic and multinomial logistic regression analysis).

Table 6.1.1. Percentage of living children aged 12-59 months who received DPT3 vaccine by select background characteristics, Rajasthan, Odisha and Madhya Pradesh

Characteristics	Rajasthan (N=1519)	Odisha (N=1366)	Madhya Pradesh (N=2520)
Caste/tribe*			
Scheduled caste	39.0	67.9	53.4
Scheduled tribe	12.1	46.5	32.3
Other backward class	32.6	71.1	56.7
Other caste	51.5	69.7	69.8
Residence†			
Urban	59.5	70.7	73.2
Rural	27.4	62.3	46.1
Household structure*			
Joint family	38.7	70.9	57.6
Nuclear family	30.5	57.7	48.8
Standard of living (Index)*			
Low	22.6	54.4	40.8
Medium	28.6	69.4	48.7
High	54.2	82.5	80.8
Mother's education*			
Illiterate	24.0	51.8	39.4
Primary	37.5	68.4	56.3
Secondary or above	71.1	77.6	78.3
Father's education*			
Illiterate	19.9	50.0	36.0
Primary	23.6	64.4	52.8
Secondary or above	46.1	74.0	64.2
Mother's work status*			
Not working	41.5	66.5	57.5
Working	25.0	55.7	45.0
Mothers' age at the time of birth‡			
<20	32.0	65.9	49.0
21-25	40.4	65.8	58.0
26+	28.5	59.0	48.0
Child's birth order*			
1-2	43.8	69.0	60.3
3+	25.6	54.9	44.7
Sex of the child§			
Male	35.1	64.0	53.2
Female	33.1	63.0	51.6
Mother's expose to media*			
Not exposed	19.9	52.5	37.0
Exposed	51.2	68.4	65.1
Place of delivery*			
Home	24.6	55.5	44.2
Institutional	57.2	77.8	75.4
Accessibility health facility (Index)*			
Low	22.1	58.3	44.2
Moderate	26.9	63.6	51.0
High	53.5	69.3	62.1
Total	34.2	63.5	52.4

Note: This table based on the weighted sample for states. Except sex of the child all other variables show significant association with coverage of DPT 3 vaccine ($p \leq 0.001$)

* Chi-square test significance: $p \leq 0.001$

† For residence, Chi-square test significance: $p \leq 0.001$ for Rajasthan and Madhya Pradesh; for Odisha $p=0.024$.

‡ For mother's at the time birth, Chi-square test significance: $p \leq 0.001$ for Rajasthan and Madhya Pradesh; for Odisha $p=0.042$.

§ For sex of child, Chi-square test significance: $p = 0.406$ for Rajasthan; $p=0.658$ for Madhya Pradesh; and $p=0.405$ for Odisha.

Source of data: IIPS and ORC Macro, 2005-06, NFHS-3, Rajasthan, Odisha and Madhya Pradesh.

Table 6.1.2. Percentage of living children aged 12-59 months who received measles vaccination by background characteristics, Rajasthan, Odisha and Madhya Pradesh

Characteristics	Rajasthan (N=1519)	Odisha (N=1366)	Madhya Pradesh (N=2520)
Caste/tribe*			
Scheduled caste	45.5	75.1	61.7
Scheduled tribe	18.6	49.1	42.1
Other backward caste	42.4	76.0	63.7
Other caste	58.1	70.0	77.7
Residence†			
Urban	64.5	66.6	77.0
Rural	36.3	67.1	55.5
Household structure‡			
Joint family	47.7	70.0	64.6
Nuclear family	37.8	64.6	57.7
Household standard of living (Index)*			
Low	31.0	58.1	52.0
Medium	38.2	74.6	55.2
High	60.4	83.0	84.8
Mother's education*			
Illiterate	31.2	58.5	49.2
Primary	46.3	65.7	61.1
Secondary or above	82.0	80.1	84.9
Father's education*			
Illiterate	24.8	55.6	45.1
Primary	39.4	69.2	59.0
Secondary or above	54.0	75.1	72.3
Mother's work status*			
Not working	47.3	69.8	65.0
Working	35.9	59.5	54.0
Age of mother at the time of birth§			
<20	42.3	70.3	57.6
21-25	48.3	68.8	65.9
26+	35.1	62.3	55.9
Birth order*			
1-2	53.6	70.3	67.1
3+	32.0	61.9	54.1
Sex of child¶			
Male	43.4	66.1	61.1
Female	40.8	68.0	59.8
Mother's expose to media*			
Not exposed	27.7	52.8	45.2
Exposed	59.6	73.3	73.1
Place of delivery*			
Home	32.7	61.1	53.6
Institutional	65.2	77.6	79.8
Accessibility health facility (Index) **			
Not accessible	30.6	67.9	53.0
Partially Accessible	37.8	66.0	58.0
Highly accessible	58.3	67.4	70.6
Total	42.2	67.0	60.5

Note: This table based on the weighted sample for states. Except sex of the child all other variables show significant association with coverage of DPT 3 vaccine ($p \leq 0.001$). * Chi-square test significance: $p \leq 0.001$

† For residence, Chi-square test significance: $p \leq 0.001$ for Rajasthan and Madhya Pradesh; for Odisha $p=0.900$.

‡ For household structure variable, Chi-square test significance: $p \leq 0.001$ for Rajasthan and Madhya Pradesh; for Odisha $p=0.034$.

§ For mother's at the time birth, Chi-square test significance: $p \leq 0.001$ for Rajasthan and Madhya Pradesh; for Odisha $p=0.028$.

¶ For sex of child variable, Chi-square test significance: $p = 0.317$ for Rajasthan; $p=0.481$ for Madhya Pradesh; and $p=0.489$ for Odisha.

** For Mother's constrains to access health facility-access index, Chi-square test significance: $p \leq 0.001$ for Rajasthan and Madhya Pradesh; for Odisha $p=0.837$.

Source of Data: IIPS and ORC Macro, 2005-06, NFHS-3, Rajasthan, Odisha and Madhya Pradesh.

Table 6.1.3. Percentage of living children aged 12-59 months according to immunization status by select background characteristics, Rajasthan, Odisha and Madhya Pradesh

Characteristics/ Immunization status	Rajasthan (N=1519)			Odisha (N=1366)			Madhya Pradesh (N=2520)		
	No	Partial	Full	No	Partial	Full	No	Partial	Full
Caste/tribe*									
Scheduled caste/tribe	12.4	66.3	21.2	20.0	42.3	37.8	8.0	57.2	34.8
Other backward caste	9.5	66.0	24.6	9.4	34.0	56.6	6.7	43.3	50.0
Other caste	5.9	49.3	44.8	16.5	32.8	50.7	3.7	34.2	62.1
Residence*									
Urban	7.6	43.2	49.2	16.3	33.7	50.0	3.2	27.5	69.3
Rural	10.5	68.5	21.0	16.1	38.1	45.9	7.9	53.9	38.3
Household structure*									
Joint family	8.0	61.9	30.1	14.7	30.8	54.6	5.0	45.0	50.0
Nuclear family	11.4	64.2	24.4	17.3	42.8	39.9	8.0	49.6	42.5
Standard of living (index)*									
Low	13.0	69.6	17.4	20.6	43.5	35.9	8.5	57.5	34.1
Medium	10.7	67.8	21.5	11.2	34.5	54.3	7.5	51.2	41.4
High	5.1	50.5	44.3	9.4	23.6	66.9	2.4	23.4	74.2
Mother's education*									
Illiterate	12.8	69.3	17.9	19.7	44.4	35.9	9.6	57.5	32.9
Primary	6.4	64.2	29.4	15.1	38.1	46.8	5.5	46.6	47.9
Secondary or above	1.0	38.8	60.2	11.5	26.9	61.5	1.4	26.8	71.8
Father's education *									
Illiterate	15.2	69.9	14.8	19.4	44.9	35.8	11.3	59.3	29.4
Primary	12.5	70.2	17.4	18.2	37.5	44.3	5.3	50.0	44.7
Secondary or above	5.8	57.0	37.2	12.5	31.4	56.1	4.1	38.3	57.6
Mother's work status *									
Not working	8.0	58.8	33.2	15.9	35.2	48.9	5.5	43.1	51.5
Working	12.3	68.6	19.1	16.8	43.3	39.8	8.7	54.5	36.9
Age of mother at the time of birth *									
<20	9.4	65.4	25.1	12.5	38.2	49.3	7.3	50.2	42.5
21-25	6.8	61.0	32.2	14.6	38.2	47.2	5.9	43.4	50.6
26+	13.9	63.9	22.1	20.8	36.0	43.3	7.4	51.1	41.5
Birth order*									
1-2	7.4	56.1	36.5	15.0	34.1	50.9	4.6	41.7	53.7
3+	12.2	69.5	18.4	18.0	42.7	39.3	8.9	53.5	37.6
Sex of the child									
Male	9.3	63.6	27.1	16.4	35.9	47.7	7.3	46.4	46.3
Female	10.6	62.6	26.8	15.8	39.1	45.1	6.2	49.0	44.7
Exposed to electronic media*									
Not exposed	13.6	71.7	14.7	23.4	41.1	35.5	12.1	57.3	30.7
Exposed	5.5	52.9	41.6	12.9	35.8	51.3	2.4	39.8	57.8
Place of delivery*									
Home	12.4	68.7	18.9	19.7	39.5	40.8	8.2	54.6	37.2
Institutional	3.8	49.8	46.4	9.7	33.8	56.5	2.8	28.3	68.9
Accessibility health facility (index)*									
Low	18.7	64.0	17.2	14.2	44.6	41.2	10.8	52.1	37.2
Medium	6.7	74.4	18.9	15.1	37.4	47.5	6.6	51.0	42.4
High	4.3	51.1	44.6	18.6	30.4	51.0	2.9	40.0	57.1
Total	9.9	63.2	26.9	16.1	37.4	46.4	6.8	47.7	45.5

Note: This table based on the weighted sample for states. Except sex of the child all other variables show significant association with coverage of DPT 3 vaccine ($p \leq 0.001$). * Chi-square test significance: $p \leq 0.001$

Source of data: IIPS and ORC Macro, 2005-06, NFHS-3, Rajasthan, Odisha and Madhya Pradesh.

Table 6.1.4. Percentage of living children aged 12-59 months who received Vitamin A Supplementation according to select socio-demographic characteristics, Rajasthan, Odisha and Madhya Pradesh

Characteristics	Rajasthan (N=1519)	Odisha (N=1366)	Madhya Pradesh (N=2520)
Coverage of full immunization*			
No	18.4	56.5	22.5
Yes	79.2	86.9	79.5
Caste/tribe*			
Scheduled caste	37.9	74.8	44.5
Scheduled tribe	17.5	61.3	32.8
Other backward caste	33.6	71.4	53.0
Other caste	49.1	76.0	64.5
Residence†			
Urban	52.1	73.6	63.3
Rural	30.2	70.1	44.0
Household standard of living (Index)*			
Low	22.8	63.0	38.4
Medium	30.5	77.2	46.3
High	54.1	84.2	71.8
Mother's education*			
Illiterate	25.3	61.4	35.8
Primary	41.7	72.4	51.7
Secondary+	66.8	82.9	74.2
Mother's work status*			
Not working	38.0	73.1	52.6
Working	30.8	64.0	42.4
Age of mother at the time of birth*			
<20	34.9	72.7	45.0
21-25	40.8	74.1	53.7
26+	27.6	64.8	44.7
Birth order*			
1-2	44.6	75.0	54.2
3+	26.0	63.6	42.9
Sex of child*			
Male	35.1	69.7	50.1
Female	34.4	71.6	46.8
Total (%)	34.8	70.6	48.5

Note: This table based on the weighted sample for states.

Except sex of the child and residence all other variables show significant association with coverage of Vitamin A supplementation ($p \leq 0.001$). * Chi-square test significance: $p \leq 0.001$

† For residence, Chi-square test significance: $p = 0.770, 0.447$ and 0.089 , for Rajasthan and Odisha Madhya Pradesh, respectively.

Source of data: IIPS and ORC Macro, 2005-06, NFHS-3, Rajasthan, Odisha and Madhya Pradesh.

SECTION 6.2

Net effect of social group affiliation on coverage of specific vaccinations and immunization status

In the previous section, large differentials were observed across social groups in the coverage of specific vaccinations (DPT3 and measles) and immunization status. These differences may be attributable, in whole or in part, to differences in socio-economic factors (the characteristics hypothesis). Therefore, net differentials among social groups are assessed in this section, after controlling other key socio-economic and demographic characteristics and programme related variables. This will help to understand whether the differences in the immunization coverage among social groups are due to mainly differences in socio-economic and demographic background and programme characteristics or social group affiliation *per se*. Broadly, this section tries to estimate the probability of child to be fully immunized or receive specific vaccinations (DPT3 and measles) among the social groups and to elaborate the relationship between social group affiliation and childhood immunization by sequentially controlling other risk factors.

In order to assess the role of social groups on the likelihood of vaccinated with the specific vaccinations (third dose of DPT and measles) and immunization status (no, partial and full) four models are formulated. In the lines of Health belief model (HBM). *Model 1* contains social group affiliation as the only explanatory variable (Baseline) and *Model 2* includes three programme/ health care utilisation related characteristics (exposure to electronic media, place of delivery and mother's access to health facility) along with social group affiliation. *Model 3* includes only mother and child-level socio-economic and demographic characteristics (residence, household standard of living, parents' education, mothers' age at child birth, their education, mothers' occupation, sex of the child, and birth order) in addition to social group affiliation. Finally, *Model 4* contains all the socio-economic and demographic characteristics and programme factors from the previous three models (Model 1 + Model 2 + Model 3), which consists of Caste/tribe (Model 1); exposure to electronic media, place of delivery, accessibility health facility (Model 2); residence, household structure, household standard of living (Index), mother's education, fathers' education, mother's work status, her age at the time of child birth, child's birth order, and sex of the child (Model 3).

Since the measures of DPT3 and measles vaccinations of child are binary variables, multiple logistic regression analysis is used to estimate the effects of each predictor variables on specific vaccination of child. If the child has received the specific doses of vaccines, it indicates one, otherwise zero. The results are interpreted in terms of odds ratios. For categorical variables, an odds ratio greater than one indicates an increased chance of an outcome occurring, those less than one signify a decreased chance of an outcome occurring. An odds ratio of one means, that the variable has no effect. For continuous variables the odds ratio measures the change in the dependent variable per unit change in it.

For immunization status (Full, partial and no), multinomial logistic regression analysis carried out. The specifications of the independent variables are already given. The analysis focuses on 1519, 1366 and 2520 children born during the 12-59 months before the survey in Rajasthan, Odisha and Madhya Pradesh respectively.

Coverage of third dose of DPT (DPT 3) vaccination

Table 6.2.1 presents the results of multiple logistic regression analysis estimating the effect of social group affiliation on the coverage of third dose of DPT vaccination among children aged 12-59 months in the three states. As mentioned earlier, Social group affiliation is introduced as baseline model (*Model 1*), and the results (unadjusted odds ratios) shows significant effect of social group affiliation on the likelihood of receiving third dose of DPT vaccine in all the three states. As compared with the OC children, ST children were significantly less likely to receive third dose of DPT vaccination in all the three states; and SC and OBC in Rajasthan and Madhya Pradesh. For instance, as compared with OC children in the states, ST children had a lower likelihood (OR=0.130, 0.207 and 0.373 in Rajasthan, Madhya Pradesh and Odisha respectively) of receiving third dose of DPT3 vaccination in all the three states. Likewise, in Rajasthan and Madhya Pradesh, SC children (OR=0.600 and 0.497, respectively) and OBC children (OR=0.455 and 0.568, respectively) had a lower likelihood of receiving third dose of DPT vaccination as compared with OC children. While in Odisha, the likelihood of receiving third dose of DPT vaccination among SC and OBC children was not significant.

Along with social group affiliation (*Model 1*), three programme factors (exposure to electronic media, place of delivery and mother's access to health facility) are

introduced in *Model 2*. As in *Model 1*, results from *Model 2* show a significant effect of social group affiliation and ST children in all the three states, OBC in Madhya Pradesh and Rajasthan, and SC children in Madhya Pradesh were significantly less likely to receive third dose of DPT vaccination as compared with the OC children. Moreover in comparison with *Model 1*, the likelihood of receiving DPT3 vaccination among ST children in *Model 2* increased further in all the three states, and among OBC children in Rajasthan and Madhya Pradesh. For instance, the odds of receiving DPT3 vaccination among ST children increases steadily between *Models 1* and *2*, from 0.130 to 0.206 in Rajasthan; from 0.373 to 0.616 in Odisha and from 0.207 to 0.374 in Madhya Pradesh. Similarly, between *Models 1* and *2*, the odds of receiving DPT3 vaccination among OBC children increased from 0.455 to 0.611 and from 0.568 to 0.784 in Rajasthan and Madhya Pradesh respectively. On the other hand, however, between *Models 1* and *2*, SC children lost significance and became insignificant in Rajasthan, while in Madhya Pradesh, the odds of receiving DPT3 vaccination among SC children increased (from 0.497 to 0.696).

Among the programme variables included in *Model 2*, results reveal that mother's exposure to electronic media, place of delivery and access to health facility were found significant and positively associated with the coverage of third dose of DPT vaccination in the three states. For instance, children of mother's who exposed to electronic media (regularly watching TV and listening to radio programmes) were more likely to vaccinate (OR = 2.420, 2.189 and 1.467 in Madhya Pradesh, Rajasthan and Odisha respectively) their children with DPT3 than mothers who had no exposure. Likewise, mothers who delivered within public health facilities (both public and private health care facilities) were more likely to vaccinate their children (OR=2.775, 2.543 and 2.151 in Rajasthan, Madhya Pradesh and Odisha respectively) with third dose of DPT than those mothers who delivered at home. Besides, mother's exposure to electronic media sets and place of delivery and mothers' access to health facility show a significant effect on the coverage of third dose DPT vaccination only in Rajasthan. In this state, children of whose mothers perceived high access to health facility were more likely (OR=2.362) to receive third dose of DPT vaccination compared with children whose mothers had low access to health facility.

With the introduction of the socio-economic and demographic characteristics along with caste/tribe in the *Model 3*, social group affiliation remain significant in the

three states, and ST children are the least likely (OR=0.674, 0.644 and 0.322 in Odisha, Madhya Pradesh and Rajasthan respectively) to be immunized with the third dose of DPT vaccination as compared to OC children. Moreover between Models 2 and 3, the likelihood of ST children to be vaccinated with third dose of DPT vaccination increased markedly in all the states (0.206 to 0.322 in Rajasthan; 0.374 to 0.644 in Madhya Pradesh and 0.616 to 0.674 in Odisha). Nonetheless, though the odds of receiving DPT3 vaccination among OBC children in Rajasthan and Madhya Pradesh, SC in Madhya Pradesh increases between Model 2 and Model 3, it lost significance and become insignificant in Model 3.

In addition to these major social group effects in Model 3, mother's education and household standard of living were significantly and positively associated with the coverage of third dose of DPT vaccination among children in all the three states. Mothers who had completed secondary and higher level of education (OR=3.156, 2.569 and 1.618 in Rajasthan, Madhya Pradesh and Odisha respectively) and mothers from high household standard of living (OR=1.813, 2.860 and 2.072 in Rajasthan, Madhya Pradesh and Odisha, respectively) were more likely to immunize their children with third dose of DPT vaccination than illiterate mothers and those from low household standard respectively. Among other socio-economic and demographic characteristics, residence, fathers education, mothers work status, her age at the time of child birth, birth order in Rajasthan and Madhya Pradesh, and household structure only in Odisha were significant predictors of coverage of third dose of DPT vaccination.

Finally, in *Model 4* (full model) along with social group affiliation, variables from both Models 2 and 3 are included (socio-economic and demographic characteristics of mothers and children along with programme factors) on the coverage of third dose of DPT vaccination to assess the combined net effect of social groups simultaneously in the states. Results from the Model-4 were consistent with those seen in Models 1 to 3 and social group affiliation remains significant in Rajasthan and Madhya Pradesh. However, the effect of social group affiliation disappeared in Odisha. In Model 4 also ST children are the least likely (OR=0.310 and 0.654, respectively in Rajasthan and Madhya Pradesh) to be immunized with the third dose of DPT vaccination as compared with OC children. However, there was attenuation (between models 3 and 4, from 0.322 to 0.310) of the

likelihood of receiving DPT3 vaccination among ST children compared with OC children in Rajasthan and a slight increase (from 0.644 to 0.654) in Madhya Pradesh.

In addition to the social group affiliation, the effects of other background controls remained the same – mother’s education, mother’s exposure to electronic media and child’s place of delivery (institutional) in all the three states; residence, father’s education, mother’s work status, her age at the time of child birth and birth order in Rajasthan and Madhya Pradesh; household structure in Odisha were found to be other significant predictors of coverage of third dose of DPT vaccination. On the other hand, attenuation was observed in the odds ratios for the association between other socio-economic and demographic characteristics and programme variables and DPT3 coverage in the states. For instance, between models 3 and 4, the likelihood of children to be vaccinated with third dose of DPT vaccination among mothers with secondary or higher education decreased in all the three states (odds ratios from 3.156 to 2.344, 2.569 to 2.161 and 1.618 to 1.459 in Rajasthan, Madhya Pradesh and Odisha respectively) than the children born to mothers with no education. Likewise, the likelihood of receiving DPT3 vaccination also decreased (odds from 2.362 to 2.139) amongst children of mothers who perceived high access to health facility compared with children of mothers who had low access to health facility in Rajasthan.

Coverage of measles vaccination

Table 6.2.2 presents the results of multiple logistic regression analysis on predicting the effect of social group affiliation on the coverage of measles vaccination among living children aged 12-59 months in Rajasthan, Odisha and Madhya Pradesh. DPT3 vaccination is significant and marked effect of social group affiliation on the probability to be vaccinated with measles vaccination is observed. Results from Model 1 (baseline) provide the unadjusted independent effects of social group affiliation on the likelihood of coverage of measles vaccination in the three states. The unadjusted odds ratio shows that in all the states, ST children (OR=0.164, 0.208 and 0.408, in Rajasthan, Madhya Pradesh and Odisha respectively), and in Rajasthan and Madhya Pradesh, SC children (OR=0.602 and 0.462 in Rajasthan and Madhya Pradesh respectively) and OBC children (OR=0.531 and 0.503, in Rajasthan and Madhya Pradesh, respectively) were found to be less likely to receive measles vaccination as compared with OC children. Thus, ST children were least likely to receive measles vaccination than OC children in all the three states. While in

Odisha, OBC children were relatively more likely to be vaccinated with measles vaccination (OR=1.331) than the OC children. The bivariate analysis also showed a similar trend.

In *Model 2*, programme factors (exposure to electronic media, place of delivery and mothers access to health facility) are included along with social group affiliation to predict the relative change in odds ratio of principal predictor variable (social group affiliation) on coverage of measles vaccination. With the introduction of the programme factors in the Model, the effects of social group affiliation remained the same and a significant increase in the odds ratios is observed among all the social groups across the three states. As compared with OC children, ST children were significantly less likely to receive measles vaccination in all the three states. For instance, as compared with OC children in the states, ST children had a lower likelihood (OR=0.254, 0.362 and 0.600 in Rajasthan, Madhya Pradesh and Odisha respectively) of receiving measles vaccination. Moreover, the odds of receiving measles vaccination among ST children increased remarkably between Model 1 and 2 (from 0.164 to 0.254, 0.208 to 0.362 and 0.408 to 0.600 in Rajasthan, Madhya Pradesh and Odisha respectively). Conversely, OBC children in Odisha are found to be significantly more likely (OR=1.541) to receive measles vaccination compared with the OC children. Moreover, the likelihood of vaccination with measles increased between Model 1 and 2 (from 1.331 to 1.547). On the other hand, between Model 1 and 2, SC children lost significance and became insignificant in Rajasthan, while in Odisha, ST children show were significantly more likely (OR=1.468) to receive measles vaccination compared with OC children.

Among the three programme factors, results from Model 2 revealed that in all the three states, mothers who were exposed to electronic media and those who delivered within public health facilities are more likely to vaccinate their children with measles vaccination than mothers who were not exposed to electronic media and went in for home delivery. Likewise, the odds of measles vaccination were significantly higher among children of mothers who perceived higher access to health facility in Rajasthan.

Model 3 shows the estimated net effects of different social groups to receive measles vaccination controlling for other socio-economic and demographic characteristics. Results of Model-3 shows that in the three states, ST children remain

significantly less likely to receive measles vaccination compared with OC children (OR=0.357, 0.557 and 0.659 in Rajasthan, Madhya Pradesh and Odisha respectively). Moreover, the likelihood of ST children to be vaccinated with measles vaccination increased markedly between Models 2 and 3 (from 0.254 to 0.357, 0.362 to 0.557, and 0.600 to 0.659 in Rajasthan, Madhya Pradesh and Odisha respectively). As in Models 1 and 2, SC and OBC children in Odisha are significantly more likely (OR=1.853 and 1.484 respectively) to receive measles vaccination than the OC children. On the other hand, SC and OBC children in Rajasthan and Madhya Pradesh lost significance and become insignificant in Model 3.

Among other socio-economic and demographic characteristics in Model 3, mother's level of education shows a significant positive effect on the odds of the receiving measles vaccination in all the three study states. Mothers who had secondary and higher level of education were more likely (OR=5.176, 2.758 and 1.641 in Rajasthan, Madhya Pradesh and Odisha respectively) to vaccinate their children with measles vaccination than illiterate mothers in all the three states. In Rajasthan and Madhya Pradesh, fathers' education and birth order of the child; but residence and household standard of living in Odisha and Madhya Pradesh show significant positive effect on the likelihood of measles vaccination. On the other hand, household structure, mothers' work status and sex of the child do not show any significance on the likelihood of receiving measles vaccination in the states.

Model 4 (full model) shows the net effect of social group affiliation after controlling both socio-economic and demographic characteristics of mothers and children and programme variables on the coverage of measles vaccination in the states. As previous models (models 1-3), ST children are significantly least likely (OR=0.346 and 0.554 in Rajasthan and Madhya Pradesh respectively), and SC and OBC children are more likely (OR=1.829 and 1.570 respectively in Odisha) to receive measles vaccination compared with OC children. On the other hand, ST children lost significance in the Model 4 in Odisha. Meanwhile between Models 3 and 4, there was attenuation of the likelihood of receiving measles vaccination monotonically among ST children compared with OC children in Rajasthan (from 0.357 to 0.346) and Madhya Pradesh (from 0.557 to 0.554). Similarly between Models 3 and 4, slight increase (from 1.484 to 1.570) among

OBC children and slight decrease (from 1.853 to 1.829) among SC children is observed in the probability of receiving measles vaccination in Odisha.

In addition to the social group affiliation, mother's education in all the three states, household standard of living and birth order in Rajasthan and Madhya Pradesh, and father's education in Odisha and Madhya Pradesh showed a significant positive effect on the likelihood of receiving measles vaccination. Besides, the socio-economic and demographic characteristics, programme factors, viz., exposure to electronic media and place of delivery, showed significant positive net effect on the likelihood of receiving measles vaccination in the three states. Surprisingly, residence, age of mother at the time childbirth and access to health facility show significant negative effect on the likelihood of measles vaccination in Odisha. Moreover, there was attenuation observed in the odds ratio of receiving measles vaccination among all the predictors exhibiting significant influence of the socio-economic and demographic characteristics and programme factors.

Immunization status: Results from multinomial logistic regression analysis

In the previous analysis, significant effects of social group affiliation are observed on the coverage of childhood specific (DPT3 and measles) vaccinations even after controlling for individual characteristics and programme factors. Since the ultimate goal of NPP and finally fourth goal of MDGs are to immunize all children, an attempt has been made to assess the net effects of social group affiliation on the immunization status, particularly to estimate the probability of child not to be fully immunized and child to be partially immunized across social groups and to elaborate the relationship between social group affiliation and child immunization by sequentially controlling all other risk factors in predicting full immunization coverage. In order to examine the net effect of social group on immunization status of a child, multinomial logistic regression analysis has been carried out with four models. Effects are measured by relative risk ratios (RRRs) calculated from the fitted multinomial logistic regressions underlying each of the four models. In the unadjusted Model (Model 1), social group affiliation is the only predictor variable, i.e., the effects of social group affiliation are estimated without controlling other variables. Control variables are introduced in Models 2 – 4 by adding them to the set of predictor variables. Multinomial logistic regression is a simple extension of binary logistic regression that allows for more than two categories of the dependent or outcome variable. Like binary logistic regression, multinomial logistic regression uses maximum

likelihood estimation to evaluate the probability of categorical variables. Moreover, multinomial logistic regression is often considered an attractive analysis because it does not assume normality, linearity or homoscedasticity. In all analyses, weights are used for restoring the representativeness of the sample. Thus, multinomial logistic regression analysis is carried out to estimate the probability of a child being not partially immunized after controlling for child, maternal, household, and programme variables. Fully immunized one chosen as the reference category and results of the likelihood of a child not being immunized or partially immunized are presented. Results are presented as RRRs and not coefficients. The RRRs are ratios of absolute risk but for the specific comparison of the outcome in question against the chosen reference.

Net effects of child not being immunized

Table 6.2.3 and 6.2.4 present the results of multinomial logistic regression analyses with four models estimating the effect of social group affiliation on child being not, and being partially immunized (relative to fully immunized) among children aged 12-59 months, after controlling for child and mothers individual characteristics and programme factors in Rajasthan, Odisha and Madhya Pradesh.

Model 1 in Table 6.2.3 depicts the unadjusted RRRs from the multinomial models on the risk of child being not immunized in the states. From the unadjusted models, it is observed that in all the study states, SC and ST children (RRR= 4.416, 3.858 and 1.625 in Rajasthan, Madhya Pradesh and Odisha respectively) were significantly more likely at risk of being not immunized than their counterparts in OC children. Similarly, in Rajasthan and Madhya Pradesh, OBC children were also relatively more likely (RRR=2.899 and 2.223, respectively) at risk of being not immunized. In Odisha, OBC children were relatively (RRR=0.509) less likely to be not immunized.

In Model 2, adjusting for programme factors (exposure to electronic media, place of delivery and access to health facility) in addition to social group affiliation, the likelihood of child being not immunized remains significantly higher among SC/ST's children (RRR= 2.646 and 1.731 in Rajasthan and Madhya Pradesh respectively) and OBC's children (2.074 in Rajasthan) as compared with OC children. Moreover, the attenuation between Model 1 and 2, among SC/ST children (RRRs from 4.416 to 2.646 and 3.858 to 1.731 in Rajasthan and Madhya Pradesh respectively) and among OBC

children (RRRs from 2.899 to 2.074 in Rajasthan) are high. On the other hand, OBC children compared with OC children in Odisha have significantly lower risk of being not immunized and between Model 1 and 2, the slightly attenuated RRRs from 0.509 to 0.407.

Among the programme variables included in the Model 2, results prove that in the three states, children delivered at home, children of mothers who were not exposed to electronic media, and children of mothers who perceived low/medium access to health facility were significantly more likely to be not immunized than their counterparts, i.e., children delivered at institutions, mothers of children exposed to electronic media and children of mothers who perceive higher access to health facility.

Progressively adding socio-economic and demographic characteristics and program factors as covariates in Models 3 and 4, the relative risk of child being not immunized reduces among all social groups and becomes statistically insignificant in Rajasthan and Madhya Pradesh. In Odisha, on the contrary, the relative risk of child being not immunized is significantly lower among OBC children than among OC children, and it increases between Models 2-4 (RRRs from 0.407 in Model 2 to 0.448 and 0.412 in Models 3 and 4 respectively). Among other socio-economic and demographic characteristics and program related variables included in the Models 3 and 4, household standard of living, and three programme variables (mothers' place of delivery, children of mother's exposure to electronic media and mothers' access to health facility) show a significant negative association on child being not immunized in all the three states. Children from poorer households, children born at home, children of mothers who were not exposed to media and children of mothers who perceived low/medium access to health facility have higher RRR and significantly more likely at risk of child not being immunized than their counterparts. Similarly, in Rajasthan and Madhya Pradesh, parents' education showed a significant negative association, and birth order a positive association on the child being not immunized (Table 6.2.3).

Net effects of child being partially immunized

Table 6.2.4 presents the unadjusted (Model 1) and adjusted (Models 2-4) RRR from multinomial logistic regression analyses estimating the effect of social group affiliation on a child being partially immunized (relative to fully immunized) among children aged 12-59 months in Rajasthan, Odisha and Madhya Pradesh. The unadjusted results (model

1) shows that in the states, SC and ST children (RRR= 2.985, 2.839 and 1.728 in Madhya Pradesh, Rajasthan and Odisha respectively) were significantly more likely at risk of being partially immunized than OC children. Similarly, in Rajasthan and Madhya Pradesh, OBC children were also relatively more likely (RRR=2.439 and 1.573 respectively) at risk of being partially immunized.

After the introduction of three programme factors along with social groups in the Model 2, social group affiliation remain significant in the three states, and the relative risk of child being partially immunized remains significantly higher among SC/ST children as compared with OC children. Moreover, between Models 1 and 2, the RRR of child being partially immunized attenuated remarkably in all the three states (RRRs from 2.839 to 1.938 in Rajasthan; 2.985 to 1.835 in Madhya Pradesh and 1.728 to 1.366 in Odisha). On the hand, the adjusted relative risk of child being partially immunized is much greater among OBC and OC children and slightly attenuated the relative risks (RRRs from 2.439 to 1.843) between Model 1 and 2 in Rajasthan. However, OBC children in Madhya Pradesh lost significant and become insignificant in Model 2. Among others, the three programme factors included in the Model 2 (child's place of birth, mother's exposure to electronic media and mothers' perceived access to health facility) show a significant negative effect on the relative risk of child being partially immunized in all the three states.

With the introduction of socio-economic and demographic covariates in Model 3 and all control variables (Model 1+2+3) in Model 4, the relative risk of being partially immunized remains significantly higher among OBC children (RRR=1.420 and 1.393 in Model 3 and 4 respectively) in Rajasthan and significantly lower (RRR=0.767 and 0.743 in Model 3 and 4 respectively) in Madhya Pradesh than among OC children. Moreover, the relative risks attenuated between the Models (2 to 3, and 3 to 4). On the other hand, however, SC and ST children lost significance in Model 3, though the relative risk of being partially immunized remains higher than among other caste children. Among other socio-economic and demographic characteristics included in the models, the relative risk of child being partially immunized attenuated is observed to be higher among children of illiterate mothers or mothers with primary level of schooling, children from poorer households in all the three states, and among children of illiterate fathers and children of younger mothers in Rajasthan and Madhya Pradesh. Likewise, among the three

programme variables, children born at home, children of mothers who were not exposed to electronic media and children of mothers who perceived low or moderate access to health facility were more likely at risk of being partially immunized than their counterparts children delivered at institutions, children of mothers who exposed to electronic media and children of mothers who perceived higher access to health facility (Table 6.2.4).

In short, significant variations observed across social groups and individual-level and household-level contexts in the coverage DPT3, measles and full immunization. Significant association is observed between social groups and the likelihood of children receiving specific vaccinations and full immunization. This association remained only slightly attenuated even after sequentially adjusting for possible individual, household level characteristics and programme related confounders. Thus, it is very clear from the above analysis that the caste/tribe has an important role in the coverage of specific (DPT3 and measles) vaccinations and full immunization independently or interacting with other factors. Moreover, simultaneously adjusting for both socio-economic and demographic characteristic of mothers and children along with programme factors, the net effect of social groups decreased with the interaction of other socio-economic characteristics (with educational status of mother, household standard of living status and lower birth order of the child) and further changed with the intervention through good programme factors (exposure to mass media, institutional delivery and accessibility of health facility). Clearly, these programme factors work as catalyst towards full immunization. In all the three states after the inclusion of programme factors in the model, the effect of social group affiliation is either reduced or diluted markedly. In addition to social groups, results in the models showed that there were a number of other major social determinants which include parents' education, household standard of living, place of delivery and mother's exposure to electronic media which were significantly associated with specific vaccinations and full immunization in the states.

The next chapter (Chapter 7) examines whether the social group affiliation interacts with programme factors and influences the child immunization coverage. It is possible that at least a portion of differentials in the child fully immunized among social groups are attributable to differences in the programme related characteristics. Therefore, the effect of interaction variables (viz., 'Caste/tribe-exposure to media', 'Caste/tribe and

place of delivery' and 'caste/tribe-access to health facility') on child immunization are accessed using multiple logistic regression analyses carried out for three interaction variables controlling other socio-economic variables and relevant programme variables separately with four models (Models 1-4).

Table 6.2.1. Results of logistic regression analysis on net effect of caste/tribe on the coverage of third dose of DPT, for living children aged 12-59 months, Rajasthan, Odisha and Madhya Pradesh

Background characteristics	Reference category	Rajasthan (N=1519)				Odisha (N=1366)				Madhya Pradesh (N=2520)			
		Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Caste/tribe	Other caste												
	Scheduled caste	0.600***	0.874	1.384	1.416	0.906	1.178	1.405*	1.508**	0.497***	0.696**	1.020	1.038
	Scheduled tribe	0.130***	0.206***	0.322***	0.693***	0.373***	0.616***	0.674**	0.785	0.207***	0.374***	0.644***	0.654**
	Other backward class	0.455***	0.611***	0.771	0.777	1.063	1.289	1.270	1.345*	0.568***	0.784*	1.081	1.098
Residence	Rural												
	Urban			1.419***	0.805			0.976	0.892			1.793***	1.410***
Household structure	Joint family												
	Nuclear family			0.992	1.026			1.393***	1.435***			0.955	0.947
Standard of living (Index)	Low												
	Medium			1.209***	1.123			1.332*	1.284			1.082	1.066
	High			1.813***	1.292***			2.072***	1.780**			2.860***	2.482***
Mother's education	Illiterate												
	Primary			1.235***	1.109***			1.366*	1.254			1.462***	1.345**
	Secondary/high			3.156***	2.344***			1.618**	1.459*			2.569***	2.161***
Fathers' education	Illiterate												
	Primary			0.834***	0.793			1.275	1.259			1.395***	1.282**
	Secondary and above			1.616	1.430**			1.216	1.178			1.249*	1.134
Mother's work status	Not working												
	Working			0.711***	0.684**			1.037	1.038			1.004	1.048
Age of mother at child birth	Continuous			1.308*	1.301			0.963	0.947			1.194**	1.177**
Birth order	3+												
	1-2			1.705***	1.577***			1.226	1.102			1.477***	1.387***
Sex of the child	Female												
	Male			1.113	1.086			1.077	1.091			0.969	0.933
Exposure to electronic media	No												
	Yes		2.189***		1.467***		1.467***		1.164		2.420***		1.560***
Place of delivery	Home												
	Institutional		2.775***		2.219***		2.151***		1.717***		2.543***		1.748***
Accessibility health facility (Index)	Low												
	Moderate		1.012		0.992		1.185		1.143		1.049		1.050
	High		2.362***		2.139**		1.213		1.032		1.107		0.938

Note: This table based on the weighted sample for states. Model-1 contained only caste/tribe; Model-2 included program related characteristics; Model-3 Adjusted for Model 1+ other socio-demographic characteristics; Model-4: Model 1 + Socio-demographic characteristics + Program variables.
Level of significance: *** p<0.010; ** p<0.050; * p<0.100

Source of data: IIPS and ORC Macro, 2005-06, NFHS-3, Rajasthan, Odisha and Madhya Pradesh.

Table 6.2.2. Results of logistic regression analysis on net effect of caste/tribe on measles vaccination coverage, for living children aged 12-59 months, Rajasthan, Odisha and Madhya Pradesh

Background characteristics	Reference category	Rajasthan (N=1519)				Odisha (N=1366)				Madhya Pradesh (N=2520)			
		Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Caste/tribe	Other caste												
Scheduled Caste		0.602***	0.832	1.279	1.291	1.273	1.468**	1.853***	1.829***	0.462***	0.631***	0.861	0.856
Scheduled Tribe		0.164***	0.254***	0.357***	0.346***	0.408***	0.600***	0.659**	0.735	0.208***	0.362***	0.557***	0.554***
Other backward Class		0.531***	0.694**	0.871	0.871	1.331*	1.547**	1.484**	1.570**	0.503***	0.670***	0.876	0.870
Place of residence	Rural												
Urban				1.232	0.766			0.621**	0.629**			1.507***	1.125
Household structure	Joint family												
Nuclear family				1.079	1.090			0.983	1.006			0.972	0.978
Standard of living (Index)	Low												
Medium				1.072	0.995			1.747***	1.610***			0.882	0.834*
High				1.241	0.912			2.595***	2.229***			2.212***	1.762***
Mother's education	Illiterate												
Primary				1.395*	1.265			0.927	0.874			1.197	1.076
Secondary or above				5.176***	3.915***			1.641**	1.547**			2.758***	2.237***
Fathers' education	Illiterate												
Primary				1.460**	1.413*			1.308	1.242			1.332**	1.219
Secondary or above				1.751***	1.595***			1.164	1.093			1.464***	1.316**
Mothers work status	Not working												
Working				0.994	0.979			0.960	0.991			0.994	1.037
Age of mother at birth	Continuous												
3+				1.232**	1.242**			0.829**	0.827**			1.119	1.098
Birth order	3+												
1-2				1.792***	1.689***			0.890	0.829			1.260**	1.190
Sex of the child	Female												
Male				1.136	1.109			0.985	1.034			0.947	0.917
Exposure to electronic media	Not exposed												
Exposed				2.185***	1.451**			1.983***	1.631***			2.547***	1.823***
Place of delivery	Non-institutional												
Institutional				2.687***	2.145***			1.728***	1.480**			2.147***	1.600***
Accessibility health facility (Index)	Low												
Moderate				1.096	1.068			0.877	0.879			0.986	1.005
High				1.835***	1.719***			0.714**	0.672**			1.188	1.092

Note: This table based on the weighted sample for states. Model-1 contains social group affiliation (caste/tribe) only; Model-2: Model 1 + program factors included; Model-3: Adjusted for Model 1 + other socio-demographic characteristics; Model-4: Model 1 + Model 2 + Model 3. That is Social group affiliation + Socioeconomic-demographic characteristics + Program variables.

Level of significance: *** p<0.010; ** p<0.050; * p<0.100; Data source: IIPS and ORC Macro, 2005-06, NFHS-3, Rajasthan, Odisha and Madhya Pradesh.

Table 6.2.3 - Results of multinomial logistic regression analysis estimating effect of caste/tribe on being not to be immunized (relatively to fully immunized) among living children aged 12-59 months, Rajasthan, Odisha and Madhya Pradesh

Characteristics	Reference category	Rajasthan				Odisha				Madhya Pradesh			
		Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Caste/tribe	Other caste												
Scheduled caste/tribe		4.416***	2.646***	1.379	1.462	1.625***	1.076	0.957	0.885	3.858***	1.731***	1.087	1.085
Other backward class		2.899***	2.074**	1.453	1.496	0.509***	0.407***	0.448***	0.412***	2.223***	1.286	0.942	0.927
Residence	Rural												
Urban				1.341	3.763***			1.407	1.324			0.410***	0.790
Household structure	Joint family												
Nuclear family				1.102	1.056			0.914	0.846			0.827	0.808
Standard of living (Index)	High												
Low				2.213**	1.017			3.211***	2.506***			2.085**	1.101
Medium				1.607	0.962			1.341	1.172			2.286**	1.403
Mothers' education	Secondary+												
Illiterate				14.583***	7.747***			1.685*	1.480			5.694***	3.535***
Primary				7.992***	4.888**			1.259	1.243			3.421***	2.542**
Fathers' education	Secondary+												
Illiterate				2.197***	2.015**			1.092	0.967			1.834***	1.570*
Primary				2.197	2.248			1.215	1.197			0.851	0.799
Mother's work status	Not working												
Working				0.533***	0.532***			1.178	1.220			0.859	0.906
Age of mother at child birth	26+												
<20				1.401	1.573			0.508***	0.454***			2.224***	1.972**
21-25				0.614*	0.613*			0.710*	0.689*			1.118	1.154
Birth order	3+												
1-2				0.563**	0.591*			1.213	1.419			0.437***	0.492***
Sex	Female												
Male				0.905	0.969			0.903	0.837			1.275	1.315
Mothers' exposure to media	Exposed												
Not-exposed			3.111***		2.094***		2.294***		1.837***		6.531***		3.852***
Place of delivery	Institutional												
Non-institutional			3.851***		3.245***		2.453***		2.154***		2.736***		1.684*
Accessibility health facility (Index)	High												
Low			5.784***		6.236***		0.659**		0.558***		2.833***		2.566***
Moderate			2.535***		2.541***		0.640**		0.561***		1.939**		1.710**

Note: This table based on the weighted sample for states. Model-1 contains social group affiliation (caste/tribe) only; Model-2: Model 1 + program factors included; Model-3: Adjusted for Model 1+ other socio-demographic characteristics; Model-4: Model 1 + Model 2+ Model 3. That is Social group affiliation + Socioeconomic-demographic characteristics + Program variables. Dependent variable: Immunization status of child = '0' if the child is not immunized (N=150 (10 per cent)); '1' if the child is partially immunized (N=960 (63 per cent)); '2' if the child is fully immunized (N=409 (27 per cent)). Children fully immunized is considered as the reference/comparison group).

Level of significance: *** p<0.010; ** p<0.050; * p<0.100; *Data source:* IIPS and ORC Macro, NFHS-3, Rajasthan, Odisha and Madhya Pradesh.

Table 6.2.4. Results of multinomial logistic regression analysis estimating effect of caste/tribe on being partially immunized (relatively to fully immunized) among living children aged 12-59 months, Rajasthan, Odisha and Madhya Pradesh

	Reference	Rajasthan				Odisha				Madhya Pradesh			
		Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Caste/tribe	Other caste												
	Scheduled caste/tribe	2.839***	1.918***	1.222	1.218	1.728***	1.366*	1.020	1.004	2.985***	1.813***	1.094	1.050
	Other backward caste	2.439***	1.843***	1.420*	1.393*	0.928	0.829	0.773	0.763	1.573***	1.125	0.767*	0.743**
Residence	Rural												
	Urban			0.645**	1.064			1.203	1.272			0.457***	0.539***
Household structure	Joint family												
	Nuclear family			1.173	1.113			0.689***	0.687***			1.163	1.162
Standard of living (Index)	High												
	Low			1.745***	1.222			2.049***	1.994***			2.754***	2.507***
	Medium			1.381*	1.061			1.385	1.359			2.498***	2.301***
Mothers' education	Secondary+												
	Illiterate			2.319***	1.802***			1.763***	1.687**			2.096***	1.879***
	Primary			2.063***	1.769**			1.436*	1.429#*			1.597***	1.515***
Fathers' education	Secondary+												
	Illiterate			1.476**	1.305			1.020	1.002			1.311***	1.218
	Primary			1.705**	1.602**			0.931	0.913			1.006	0.992
Mothers' work status	Not working												
	Working			0.673***	0.649***			0.938	0.924			0.928	0.954
Mother's age at child birth	26+												
	<20			1.744**	1.687**			1.160	1.165			1.369**	1.347**
	21-25			1.032	0.979			1.251	1.237			0.933	0.933
Birth order	3+												
	1-2			0.512***	0.536***			0.826	0.835			0.680***	0.720***
Sex	Female												
	Male			1.015	1.030			0.830	0.837			0.997	1.028
Mothers' exposure to media	Exposed												
	Not-exposed		2.433***		1.647***		1.440**		1.112		2.075***		1.248**
Place of delivery	Institutional												
	Non-institutional		2.053***		1.676***		1.256*		0.974		2.563***		1.612***
Accessibility health facility (Index)	High												
	Low		1.927***		1.758***		1.530***		1.254		1.225#*		0.956
	Moderate		2.561***		2.343***		1.155		0.991		1.245**		1.023

Note: This table based on the weighted sample for states. Model-1 contains social group affiliation (caste/tribe) only; Model-2: Model 1 + program factors included; Model-3: Adjusted for Model 1+ other socio-demographic characteristics; Model-4: Model 1 + Model 2+ Model 3. That is Social group affiliation + Socioeconomic-demographic characteristics + Program variables. Dependent variable: Immunization status of child = '0' if the child is not immunized (N=150 (10 per cent)); '1' if the child is partially immunized (N=960 (63 per cent)); '2' if the child is fully immunized (N=409 (27 per cent)). Children fully immunized is the comparison group). Level of significance: *** p<0.010; ** p<0.050; # p<0.100; *Data source:* IIPS and ORC Macro, 2005-06, NFHS-3, Rajasthan, Odisha and Madhya Pradesh.

Table 6.2.5. Results of logistic regression analysis on net effect of coverage of full immunization along with caste/tribe and other social determinants on Vitamin A supplementation, for living children aged 12-59 months, Rajasthan, Odisha and Madhya Pradesh.

		Rajasthan				Odisha				Madhya Pradesh			
		Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Full immunization	Yes												
	No	0.059***	0.064***	0.071***	0.079***	0.196***	0.201***	0.222***	0.226***	0.075***	0.081***	0.087***	0.091***
Caste/tribe	Other caste												
	Scheduled caste		0.814	0.966	1.260		0.958	1.178	1.225		0.548***	0.634***	0.709*
	Scheduled tribe		0.525***	0.585**	0.694		0.643**	0.855	0.981		0.477***	0.571***	0.695**
	Other backward class		0.803	0.802	0.940		0.692**	0.738*	0.733*		0.745**	0.826	0.908
Residence	Rural												
	Urban			0.973	0.774			0.829	0.792			0.903	0.821
Standard of living (Index)	Low												
	Medium			0.375***	0.477***			0.466***	0.621**			0.572***	0.763*
	High			0.523***	0.633**			0.768	0.948			0.698**	0.882
Mother's work status	Not working												
	Working			0.842	0.766*			1.201	1.077			0.997	0.917
Age of mother at child birth	Continuous				1.007				0.967**				0.994
Birth order	3+												
	1-2				1.389*				1.029				0.878
Sex of the child	Female												
	Male				1.051				0.896				1.108
Mother's education	Illiterate												
	Primary				0.430***				0.550***				0.376***
	Secondary/high				0.746				0.719				0.550***

Note: This table based on the weighted sample for states.

Model-1 contains Coverage of full immunization only; Model-2: Model 1 + social group affiliation (caste/tribe); Model-3: Adjusted for Model 1+ other social determinants; Model-4: Adjusted for Model 1+ other social determinants and demographic characteristics with education

Level of significance: *** p<0.010; ** p<0.050; * p<0.100

Source of data: IIPS and ORC Macro, 2005-06, NFHS-3, Rajasthan, Odisha and Madhya Pradesh.