

CHAPTER 5

Levels and differentials of childhood immunization coverage

Introduction

In the previous chapter, significant differences were observed in social groups across socio-economic, demographic characteristics and access to various programme factors. This chapter attempts to understand the levels and gross differentials of child immunization coverage by source of immunization data and across social groups. In order to understand the gross differentials of child immunization, an attempt has been made to examine the variations in the coverage of specific vaccinations and vaccination status (fully, partially immunized or not vaccinated) along with the reasons for partial coverage of immunization (drop-out rates between the vaccinations, missed-out of only one dose of vaccination) among children aged 12-59 months who have received each vaccination at any time before the interview in the three states through bivariate analysis.

Coverage of specific child vaccinations and completeness status of immunization

Table 5.1 presents the percentage distribution of children aged 12-59 months according to (a) Coverage of specific vaccines; (b) Immunization status; (c) Drop-out for DPT and Polio vaccinations and drop-out during BCG and measles vaccinations; and (d) missed-out of only one dose of vaccine and the total coverage status of vaccination, if not missed-out of one dose of vaccination, in the three selected states. As mentioned earlier, following results are based on the information from both vaccination cards and the mother's memory. This could be from a vaccination card if the mother was able to show a card to the interviewer, or could be the mother's verbal report if she did not show a vaccination card but reported that the child had received one or more immunizations. Vaccination cards were available for only 13 and 15 per cent of children in Rajasthan and Madhya Pradesh, and 40 per cent of children in Odisha.

a) Coverage of specific vaccinations

Table 5.1 presents the extent of coverage of specific vaccinations for children aged 12–59 months in the states. Coverage rate varies by the type of specific vaccinations and among all the eight doses of scheduled vaccines, polio was the most frequently received vaccination and

third dose of DPT (DPT3) vaccination was the lowest in the states. Except in Rajasthan, a majority of children in Odisha and Madhya Pradesh received BCG (79 and 80 per cent) and first dose of DPT (73 and 78 per cent) vaccinations. In Rajasthan, 62 and 59 per cent of children received BCG and first dose of DPT vaccinations respectively. Similarly, the proportion of children who received at least three recommended doses of DPT and measles vaccinations (34 and 42 per cent) was also the lowest in Rajasthan compared with the proportion of children who had received three doses of DPT and measles in Odisha and Madhya Pradesh (63 and 67 per cent in Odisha and 52 and 61 per cent in Madhya Pradesh respectively). On the other hand, a majority of children (82 to 93%) had received the first dose of Polio, and 85 and 75 per cent children in Madhya Pradesh and Rajasthan and 62 per cent of children in Odisha had received at least three doses of polio vaccination. Thus, despite the extra attempts through Pulse Polio Campaign to eradicate polio in the last five years, still 15 to 38 per cent of children had not received three doses of polio vaccines in the states. The proportion of children who had not received at least three doses of polio vaccination was highest in Odisha (38%), followed by Rajasthan (25%) and lowest in Madhya Pradesh (15%). Another unusual feature had also found that measles coverage was notably higher than the DTP3 coverage rates by 8 per cent in the states of Rajasthan and Madhya Pradesh, and 3.5 per cent in Odisha. Similarly, in this state, coverage of measles vaccination is higher than Polio 3 by 5 per cent. Thus, the relatively low percentage of children vaccinated with the third dose of DPT and measles was mainly responsible for the low percentage of fully immunized children in these states.

In summary, the coverage rate varied by the type of vaccine and the coverage rates for DPT3 and measles were much lower than for other vaccinations. Coverage of BCG and first dose of polio vaccinations were satisfactory in the states. Most of the children (82 to 93%) in these states had received the first dose of Polio vaccinations, which had gradually decreased thereafter in the three states. Generally polio and DPT vaccinations were administered simultaneously. Therefore, the coverage rates for polio and DPT were about the same. However, the situation is that the coverage rates for polio and DPT are not same. A large gap between coverage of DPT and polio vaccinations is observed between the first and all the consecutive doses in the states and the coverage rates are higher for Polio than DPT. Another unusual feature is that measles coverage was notably higher than the DTP3 in all the three states and polio 3 coverage rate in Odisha.

b) Completeness of immunization/vaccination status

As discussed in the Methodology chapter, immunization status assessed on the basis of the coverage for each of the eight vaccines, i.e., children who had received BCG, three doses of each DPT and polio vaccines and measles vaccines were considered as fully immunized, and those children who had received at least one vaccine were considered as partially immunized. Thus, as per definition, if a child has received all the eight doses of scheduled vaccines then s/he will be called as fully immunized. Based on the definition, a total of 27 per cent of children aged 12-59 months in Rajasthan and 45 and 46 per cent of children in Odisha and Madhya Pradesh were fully immunized with all the four traditional by scheduled vaccines (DTP, polio and measles) with eight doses in all, against the six major childhood illnesses: tuberculosis, diphtheria, pertussis, tetanus, polio and measles while 7 to 16 per cent children had not received any vaccine. Among the studied states, children who had not received any vaccine constituted the highest in the state of Odisha (16%) and lowest in Madhya Pradesh (7%), followed by Rajasthan (10%). On the other hand, a large proportion of children (37-63%) were partially immunized, that is, they received at least one vaccine as per definition. The proportion of children who were partially immunized was highest in Rajasthan (63%) followed by Madhya Pradesh (48%) and lowest in Odisha (38%). This is because these children either dropped-out or left-out during vaccination or missed few doses of vaccines. Besides, the low level of coverage for measles was probably being a major factor in the failure to achieve full immunization.

In short, the coverage for specific vaccines (BCG, DPT, OPV) was much higher than the proportion of fully immunized children, suggesting a significant decline in coverage for each subsequent dose of DPT/OPV and between the third dose of DPT/OPV, and measles vaccination. Moreover, relatively low percentage of children vaccinated with the third dose of DPT and measles was mainly responsible for the low percentage of fully immunized children. These findings are of concern, as low immunization coverage may lead to the outbreaks of vaccine-preventable diseases. Moreover, to achieve universal immunization, it is important to understand at what stage children drop-out from receiving all the required vaccines. A drop out is defined as a child who failed to return for subsequent doses for which he or she is eligible. In order to see the magnitude of drop out between vaccinations, drop-out rates are calculated as the difference in percentage coverage in between the consecutive vaccines divided by coverage of first dose of vaccination.

c) Drop-out rates during multiple doses of vaccinations

The vaccine drop-out rates among children represent the proportion of children who start receiving vaccines, but do not get one or more of the remaining vaccines in the schedule offered by the Universal Immunization Programme (UIP). Thus, drop-out rates are useful indicators at certain point to find out the pockets where immunization service failed to act. The BCG to Measles rate would span the whole length of time of the primary immunisation service, thereby giving an indication of case holding from birth to the immunisation provision at nine months. In contrast, the DTP1 to Measles drop-out rate identifies a group of children that had already made contact with their immunisation provider once after birth. The DTP1 to DTP3 drop-out rate indicates the short-term case holding ability. Further, improvement in coverage is most likely to be achieved by reducing drop-out rates. Therefore, drop-out rates between DPT, polio vaccinations, and between BCG/Polio/DPT and measles vaccinations are discussed in the following paragraphs.

i) Drop-out rates between DPT vaccinations

Table 5.1 shows the percentage of children aged 12-59 months who started receiving vaccination but failed to complete the three doses of polio or DPT or measles vaccinations. As mentioned earlier, DPT and polio vaccines are given in a series and many children receive the first dose but do not complete the series. Thus, the drop-out of vaccinations, while receiving multiple doses of vaccines is a major reason for the lower coverage of immunization in Rajasthan, Odisha and Madhya Pradesh. Overall, a large proportion of children in Rajasthan (42%) and Madhya Pradesh (28%) followed by Odisha (19%) had dropped out between the first and third doses of DPT vaccination, and a majority of them dropped in second and third doses. For instance, in Rajasthan of the 59 per cent children who received the first dose of DPT vaccine, 17 per cent of them missed the second dose (DPT1 – DPT2) and an additional 30 per cent missed the third dose (DPT2 – DPT3). Similarly, among the children who received the first dose of DPT vaccination, 8 and 12 per cent in Odisha and 12 and 18 per cent in Madhya Pradesh were dropped during second (DPT1 – DPT2) and third phase (DPT2 – DPT3) of DPT vaccination respectively. Thus, the drop-out rates during DPT vaccination are observed to be the highest in Rajasthan but lowest in Odisha.

ii) Drop-out rates between Polio vaccinations

Similar drop-out rates are observed in the first and third doses of polio vaccination. The drop-out rates during polio vaccination were the highest in Odisha (25%), followed by Rajasthan (16%) and Madhya Pradesh (8%). For instance, among 93 per cent of children who received the first dose of polio in Madhya Pradesh, about three and six per cent children had not received the second and third doses of Polio vaccinations (Polio1-Polio2 and Polio2-Polio3, respectively). Similarly, among the 89 and 82 per cent children who received the first dose of Polio in Rajasthan and Odisha, about five to six per cent of them failed to receive the second dose (Polio1-Polio2) and an additional 11 and 20 per cent of children (Polio2-Polio3) had not received the third dose.

iii). Drop-out rates between BCG/Polio/DPT and measles vaccinations

Measles is another vaccine that children largely missed. Table 5.1 presents the overall drop-out rates between the BCG/Polio/DPT and measles vaccinations that is, the percentage of children who were eligible for measles vaccination but not received it, calculated as the difference between the children who received the respective (BCG/Polio/DPT) vaccination and who received measles vaccination divided by the proportion of children who received the respective (BCG/Polio/DPT) vaccination. There was a steady increase in drop-out between consecutive vaccines, with drop-out rates being the highest between Polio1 and measles vaccinations in all the three states. For instance, among the 89 per cent of children who had received Polio 1 vaccination in Rajasthan, about 53 per cent of them had not received the measles vaccination. Similar highest drop-out rates are observed between DPT1-measles and Polio1-measles in Rajasthan, while the lowest in Odisha. The overall drop-out rates between BCG and measles vaccination were the highest in Rajasthan (32%) followed by Madhya Pradesh (24%) and Odisha (15%). It means that a large number of children who had contact with service providers were missed out of subsequent services. In short, drop-out rates (complement to the rate of progression) are lower for Polio 1, 2, 3 followed by DPT 1, 2 and 3. However, the drop-out rates are large for Measles vaccine followed by DPT 3.

e) Missed-out of only one dose of vaccine and total coverage status of vaccination, if not missed-out one vaccine

Like drop-out of multiple doses of vaccines, missing-out of only one vaccine (Polio, DPT or measles) is another reason for a lower coverage of immunization in the three states. Table 5.1 also shows the percentage of children who received vaccinations but had missed only one

vaccine. This provides further insight into the causes of lower coverage rate for full immunization. About 11 and 12 per cent of children in Rajasthan and Madhya Pradesh, and 17 per cent of children in Odisha missed only one dose of vaccine, and therefore they were partially immunized. If these children had not missed the one dose of vaccination, the coverage rate of full immunization would have increased from 26.9 to 37.8 per cent in Rajasthan; 45.5 to 57.5 per cent in Madhya Pradesh, and 46.3 to 63.6 in Odisha. On the other hand, the proportion of partially immunized children decreased from 63.2 to 52.3 per cent in Rajasthan; 47.7 to 35.8 per cent in Madhya Pradesh and 37.5 to 20.3 in Odisha. In brief, a significant proportion of children missed only one dose of vaccine. If these children had not missed the one dose of vaccination, the coverage rate of full immunization would have reached a satisfactory level, instead of the current low rates. On the other hand, the proportion of partially immunized also decreased satisfactorily.

Coverage and completeness of child immunization by source of data

As mentioned in the methodology chapter, the NFHS data on immunization coverage are derived from vaccination cards, if available, and from the mother's memory, if she could not show a card. Each mother was asked whether she had a vaccination card for each child. When a card was available, the interviewer copied the date for each vaccination from the card. When the mother could not produce a vaccination card, she was asked whether the child had received any vaccination. If the child had been vaccinated, the mother was asked whether the child had received one or more vaccinations for each of the six diseases. For DPT and polio, information was obtained on the number of injections or oral doses given.

Immunization card provides a documented record of a child's immunization history. It is considered to be a more reliable source of information than the mother's report of vaccinations. Therefore, patterns in the coverage of specific vaccinations and coverage status, and drop-out rates between vaccinations by source of data are discussed in the following paragraphs. As stated earlier, the following results are based on the information obtained from both the vaccination cards and mother's memory, i.e., this could be from a vaccination card if the mother was able to show a card to the interviewer, or could be the mother's verbal report if she did not show a vaccination card but reported that the child had received one or more immunizations.

a) Source of immunization data among social groups

Table 5.2 shows the extent of availability of vaccination card among children aged 12-59 months in the studied states. The proportion of children with vaccination cards was highest in Odisha as compared with Rajasthan, and Madhya Pradesh. A clear difference in terms of social group is observed in the proportion of children with the immunization card in the .Availability of vaccination card was much less among the ST children as compared with OC children, particularly in Rajasthan and Madhya Pradesh. Only four per cent of ST children showed vaccination card at the time of the survey compared with 20 and 25 per cent of OC children in Rajasthan and Madhya Pradesh respectively. However, differences in the proportions of children reporting vaccination cards among OBC, SC and OC children were small in Rajasthan and Madhya Pradesh. On the other hand, in Odisha vaccination cards were available for about half of the SC and OC children (48 and 47%) followed by OBC children (43 %) and lowest among ST children (23 %).

b) Coverage of specific vaccinations

Table 5.2 reveals the immunization coverage rates for each type of vaccination and immunization status among children aged 12-59 months according to the source of data (vaccination card or mothers recall), in the three states. As discussed previously, vaccination cards were available for only 13 per cent in Rajasthan and 15 per cent in Madhya Pradesh, and 40 per cent children in Odisha. Not surprisingly, the levels of immunization coverage are much higher for children with vaccination cards than for those without them. Among the children who had vaccination cards and which were showed at the time of survey, the coverage of BCG and first two doses of Polio and DPT vaccinations was satisfactory, exceeding 90 per cent, and the coverage of Polio 3 and DPT3 vaccinations were as high as 85-93 per cent in all the states. The proportion of children who received measles vaccination ranged between 78 to 86 per cent among the children who had vaccination cards in all the three states.

On the other hand, the coverage of vaccines was much lower among children who had not presented vaccination card at the time of survey. Among those who had not presented card, among them the coverage of BCG vaccination based on mothers recall ranges from 57 to 76 per cent, the highest in Madhya Pradesh (76%) followed by Odisha (66%). The coverage of at least three doses of polio ranged from 41 to 84 per cent in the states. The

highest was in Madhya Pradesh (84%) followed by Rajasthan (74%) and Odisha (41%). Except in Rajasthan, more than two-fifths (44 – 46%) of the children in Odisha and Madhya Pradesh received the recommended minimum of three DPT vaccinations, and more than half (54 – 56%) of them received measles vaccination (based on the mothers recall reports). In Rajasthan, coverage of at least the recommended three DPT vaccinations and measles vaccinations according to the mothers' recall were 27 and 37 per cent respectively.

A large gap was seen between the coverage by card and that by recall in the states. The gap was large in Rajasthan and Odisha but small in Madhya Pradesh. It was high for the coverage of third dose of DPT and measles vaccinations, compared with the BCG and third dose of Polio vaccinations. For instance, the coverage gap between the two methods for the third dose of Polio vaccination was 52, 14 and 5 in Odisha, Rajasthan and Madhya Pradesh respectively. Similarly, the gap ranged from 21 to 40 for BCG, 43 to 59 for the third dose of DPT and 27 to 41 for measles vaccinations in the states. On the other hand, in the three states, the coverage of DPT and Polio vaccines was almost the same and the gap between the three doses of DPT and Polio vaccination were negligible (up to two per cent) among the children whose coverage of vaccination data were recorded from their vaccination cards. While among the children whose vaccination data were collected from their mothers recall, the gap was large in Rajasthan and Madhya Pradesh. In these states the coverage gap between the third dose of Polio and DPT were 38 and 47 per cent points respectively. In brief, among children who never had a health card, the vaccination rates are much lower than for children with cards.

c) Completeness of immunization status

The coverage of fully immunized children was also considerably higher when the source of data on immunization was the card as compared with the mother's recall. Children, who had vaccination cards, were either fully immunized with all the four scheduled vaccines with eight doses or partially immunized with at least one vaccine. Among children who had presented vaccination cards at the time of survey, 74 to 83 per cent of them aged 12-59 months were reported fully immunized as compared with 20 to 39 per cent children whose vaccination data were collected through maternal recall in the three states. Also among the children whose vaccination data were collected through maternal recall, a large majority (51 to 69%) of children were partially immunized, with at least one vaccine compared with 17 to 26 per cent of children who had presented vaccination cards during survey.

Among the children whose vaccination data were collected through the mothers recall, about two-fifths (39%) of them in Madhya Pradesh and one-fifth (20 and 22%) of them in Odisha and Rajasthan each were fully immunized with eight doses, while about one-fourth of them in Odisha (27%) and 8-11 per cent of children in Madhya Pradesh and Odisha did not received any vaccine. However, a large majority (51-69%) of them whose vaccination data had been collected through maternal recall were partially immunized with at least one vaccine. The proportion of children who were partially immunized was highest in Rajasthan, (69%) followed by Madhya Pradesh (53%) and Odisha (51%).

On the other hand, between the coverage by card and recall, a large gap in the full immunization and partially immunization observed. The coverage gap as shown by vaccination card and mother's recall for the full immunization vaccination was 61 per cent in Odisha, 54 per cent in Rajasthan and 42 per cent in Madhya Pradesh. Partial immunization ranges from 34 to 43 per cent between the states. Similarly, significant gaps were observed in the coverage of between specific vaccinations and the gap between card and mothers recall coverage which ranges from 21 to 40 per cent for BCG, 43 to 59 per cent for the third dose of DPT, 5 to 52 per cent for Polio3 and 27 to 41 per cent for measles vaccinations in the states.

d) Drop-out rates during multiple doses of vaccinations

Table 5.2 presents the drop-out rates among multiple vaccinations (between first and third dose of Polio/DPT and between BCG/Polio/DPT and measles vaccinations), which indicate the proportion of children aged 12-59 months who initiated, but did not complete the series of vaccinations according to the source of vaccination data (vaccination card or mothers recall), in the three states. Not surprisingly, drop-out rates were much lower for children with vaccination cards than for children without them. For instance, most of the children who had vaccination card and shown at the time of survey (98-100%) received the first dose of DPT and Polio and among them a small proportion of children (14% in Rajasthan, 9% in Madhya Pradesh and 6% in Odisha) failed to receive the third dose of DPT and polio vaccinations. Similarly, among the children who had vaccination cards, the overall drop-out rates between the BCG/Polio/DPT and measles vaccinations that is, the percentage of children who were eligible for measles vaccination but had not received it, were also small (19 to 22% in the state of Rajasthan, 14 to 15% in Madhya Pradesh and 11 to 13% in Odisha).

On the other hand, the drop-out rates (between first and third doses of polio and DPT and between the BCG/Polio/DPT and measles vaccinations) were much higher among children who had not presented vaccination cards at the time of survey. A large proportion of them in Rajasthan (50%) followed by Odisha and Madhya Pradesh 31 to 33 per cent had dropped out between the first and third doses of DPT vaccination and majority of them were dropped between second and third doses. Similarly, the drop-out rates between the BCG/Polio/DPT and measles vaccinations were also much higher among children who had not presented the vaccination cards at the time of survey in the three states. Thus, large differences are observed in the states in the drop-out rates between first and third doses of DPT and polio vaccines and between the BCG/Polio/DPT and measles vaccinations among children who had vaccination cards on the one hand and among those who had not presented vaccination cards on the other. However, the difference in the drop-out rates between the card-holders and non-card-holders was large in Rajasthan but small in Odisha and Madhya Pradesh.

e) Missed-out of only one dose of vaccine and total coverage status of immunization, if not missed-out of its one dose

As observed in the drop-out rates, missed-out rates of only one vaccine were also lower among children who had vaccination cards as compare with children who had not. Among children who had vaccination cards, about 8 to 11 per cent of them failed to reach full immunization and partial immunization due to miss-out of only one vaccination compared with 11 to 23 per cent (23% of children in Odisha, followed by 13% children in Madhya Pradesh and 11% in Rajasthan who had not presented vaccination cards at the time of survey. If these children had not missed the one dose of vaccination, the coverage rate of full immunization among the children who had vaccination cards would have increased to significant levels of 85 to 92 per cent from the current levels of 74 to 83 per cent in the states. Similarly, the proportion of partially immunized children would have to decrease to 8 to 15 per cent from the current levels of 17 to 26 per cent in the states.

If the children had not missed-out one dose of vaccination, similar increasing trend in the coverage of full immunization (from 20-39% to 31-52%) and decreasing trend in partially immunized children (from 51-69% to 28-58%) is observed among children who had not presented vaccination card at the time of survey in the states. Thus, large increase (from 39 to 52%) in the coverage rate of full vaccinations observed in Madhya Pradesh and a large

decrease (from 51 to 28 %) in the proportion of partially immunized children is observed in Odisha (Table 5.2).

This account shows that the coverage of specific vaccinations, full immunization, and rates of drop-out, left-out and missed-out of vaccines were considerably lower among children who had vaccination cards as compared with those who did not have it and whose vaccination data were collected from their mothers recall.

Coverage of specific child vaccinations and completeness status of immunization by social groups

a) Coverage of specific vaccinations

Table 5.3 presents a comparative picture of the coverage of recommended vaccinations in the UIP and immunization coverage status across the social groups. Among all the social groups, coverage of DPT and Polio vaccinations shows a decrement from the first dose of vaccine to the third dose. There has been substantial fall particularly in the coverage of DPT2 and DPT3 vaccines, resulting in lower coverage of full immunization among all the social groups. Thus, clear differences among social group are observed in the coverage of specific vaccinations and full immunization. The coverage of vaccinations was less among the scheduled tribe children as compared with 'other' castes. For instance, more than 80 per cent of SC, OBC and OC children and 64 and 70 per cent of ST children received a BCG vaccination in Odisha and Madhya Pradesh compared with 62 to 70 per cent of OC, OBC and SC children and 51 per cent of ST children in Rajasthan. Similar wide social group variations are observed for other vaccinations also. However, the difference between vaccination coverage for children of SC, ST and OC was much more pronounced in Rajasthan and Madhya Pradesh.

However, the difference between SC and OBC groups are small in these two states. On the other hand, no such uniformity is observed in the coverage of specific vaccinations in Odisha. In this state, higher coverage of specific vaccinations is observed among SC children compared with OC children. However, the coverage among SC children was marginally less than the OBC children. On the other hand, regardless of social group affiliation in Rajasthan, coverage for each type of vaccination was less among all the social groups compared with the social groups in the states of Odisha and Rajasthan. In short, except in Odisha, a striking disparity is observed among the social groups regarding the immunization coverage rates

which were the lowest among STs compared with those in 'other' castes for all types of vaccinations. Thus, SC/ST children were disadvantaged groups and immunization coverage among them was lower than for children from 'other' caste/class groups.

b) Completeness of immunization status

Social group differences are clearly observed in the coverage of full immunization and coverage was lowest among ST children compared with other caste/class children in the states. For instance, only seven per cent of ST children in Rajasthan compared with 45 per cent of OC children and 27 to 30 per cent of ST children compared with over half of the OC and OBC children in Madhya Pradesh and Odisha respectively received all the eight doses of vaccinations. On the other hand, the proportion of children who were partially immunized and who did not receive any vaccine was also the highest among ST's. For instance, the proportion of children who were partially immunized was the highest among ST children (77%) followed by OBC children (66%) in Rajasthan compared with other two study states.

c) Drop-out rates during multiple doses of vaccinations

Immunization coverage continues to be low despite availability of effective vaccines and accessibility of immunization services. Large social group differentials and relatively low percentage coverage of children vaccinated with the third dose of DPT and measles is mainly responsible for the low percentage of fully immunized children. There was a steady increase in the drop-out between consecutive vaccines among social groups, with the drop-out being the highest between DPT3 and measles vaccine. Therefore, it is important to understand at what stage children drop-out (i.e., between Polio, DPT and measles vaccinations) from receiving all the required vaccines among the social groups.

i) Drop-out rates between Polio vaccinations

Table 5.6 depicts the proportion of children who started vaccinations but failed to complete the three doses of DPT and polio vaccinations among social groups. Large social group differences are observed in the drop-out rates between first and third doses of DPT and polio and as well as among children who receive the first dose of DPT or polio vaccine. SC/ST children are less likely to complete the full series than 'other' caste/class children in the study states. The proportion of children who dropped during the first phase of polio vaccination is almost the same across social groups. Although the first and second doses of polio vaccine were well above 80 per cent across all the social groups, significant drop-outs are observed

between the coverage of second and third doses of Polio vaccine among social groups, particularly in Odisha. For instance, among the children who receive the first dose of polio vaccine in Odisha, one-fifth of OC and OBC children (20 to 21 per cent) missed its third dose compared with 27 and 35 per cent of SC and ST children respectively. However, social group differences in the drop-out rates between polio1 and 3 in Madhya Pradesh and Rajasthan were small, that is, only six to seven per cent of OC and OBC children in Madhya Pradesh failed to receive third dose as compared with 11 per cent of SC/ST children. The corresponding figures 12 to 14 per cent of OC and SC children compared with 17 to 19 per cent of ST and OBC children in Rajasthan.

ii) Drop-out rates between DPT vaccinations

Similarly, large differences are observed among social groups in the drop-out rates between the coverage of first and third doses of DPT, particularly in Rajasthan followed by Madhya Pradesh. For instance, among the children who received the first dose of DP1 vaccine, 71 and 43 per cent of scheduled tribe children compared with 26 and 19 per cent of OC children failed to receive the third dose of DPT vaccination in Rajasthan and Madhya Pradesh respectively. In Odisha, only 22 to 25 per cent of SC/ST children compared with 12 per cent of OC children failed to receive the third dose of DPT among the children who received the first dose of DP1 vaccine.

iii) Drop-out rates between BCG/Polio/DPT and measles vaccinations

Measles is another vaccine that children missed largely among all the social groups. In Rajasthan, all the social groups almost equally contributed to make the aggregate missed-out of measles vaccine. In the three states, that the proportion of drop-out rates between the BCG/Polio/DPT and measles vaccinations was large among ST children, while the lowest proportion of drop-out rates is observed among OC children. For instance, among the children who received Polio 1, a large proportion of ST children (78% in Rajasthan, 53% in Madhya Pradesh and 30% in Odisha) compared with OC (14% in Odisha, 19% in Madhya Pradesh and 37% in Rajasthan) eligible for measles vaccination had not received it. This clearly shows that although the availability of vaccine is there for the children, accessibility is not there. Further it is unusual among the social groups that the drop-out rate for DTP1 to DTP3 is higher than the DTP1 to Measles drop-out rate across the three states. This indicates that the children missed DTP3, but availed of measles immunisations three months later. This feature is most pronounced in Rajasthan, particularly among SC/ST children.

d) Missed-out of only one dose of vaccine and total coverage status of immunization, if not missed-out of one dose of vaccination

In the previous section, it was observed that a significant proportion of children in states (17% of children in Odisha, 12% in Madhya Pradesh and 11% in Odisha) failed to reach full immunization and were partially immunized due to miss-out of only one vaccination. Across the social groups also large differences are observed in the proportion of children who were eligible for vaccination but failed due to missing out of only one vaccination. In Madhya Pradesh and Rajasthan, there were about 9 to 12 per cent ST and OBC children, and 13 per cent of SC compared with 9 and 13 per cent of OC children who failed to reach full immunization and were partially immunized due to missed-out of only one vaccination. If these children had not missed-out of one dose of vaccination, the coverage rate of full vaccination would have reached to satisfactory levels among all the social groups. For instance, among ST, the coverage of full immunization increased from 27 to 38 per cent in Madhya Pradesh and 30 to 44 per cent in Odisha.

Coverage of immunization by age

Table 5.4 shows the extent of immunization coverage status for children aged 12-59 months by age in the three states. Since data were collected from such children, it was possible to assess trends in the coverage over the past five years, by dividing the total survey group into one year age cohorts. The Table indicates that although an increasing trend of coverage is evident for each of the eight vaccinations, except the increases for the coverage of third dose of Polio vaccination ($p \leq 0.001$) in all the three states, BCG and Polio1 vaccinations ($p=0.011$ and 0.026 , respectively) in Rajasthan, BCG, first and second dose of DPT vaccinations ($p = 0.023, 0.015, 0.039$, respectively) in Odisha, and none of the increases for other vaccinations are statistically significant ($p>0.05$). This suggests that there hasn't been any significant rise in the coverage of specific vaccinations, implying that the situation has not changed in recent years, despite the different strategies used. When examined the complete immunization uptake over the entire period, a significant increasing trend is evident in Odisha and Madhya Pradesh ($p \leq 0.001$ in the states of Odisha and Madhya Pradesh, and $p=0.084$ in Rajasthan) in the percentage of fully immunised children and a corresponding decrease in those with partial immunization and not immunized. Moreover, there was a steady increase in drop-out among consecutive vaccines observed, with drop-out being the highest between DPT3 and measles vaccine.

In conclusion it may be observed that the higher drop-out rates in coverage of DPT 2, DPT 3 and Measles vaccinations are found in Rajasthan and Madhya Pradesh, while in Odisha, the drop out in DPT 3, Polio3 and missed-out of only one vaccination may be attributed as the cause of lower as well as consistent decline in coverage of full immunisation.. Thus, the third doses of DPT and measles vaccinations were most frequently defaulted in the states. Non-administration of simultaneous injections was also a contributory factor to higher drop-out. Moreover, there was a steady increase in drop-out between consecutive vaccines, with drop-out being the highest between DPT3 and measles vaccine.

Vaccination card coverage: Gross differentials

Table 5.5 shows the percentage of children aged 12–59 months who have vaccination card at any time before the interview according to selected demographic and socioeconomic characteristics. Vaccination cards were available for only 13 and 15 per cent of children in the states of Rajasthan and Madhya Pradesh and 40 per cent of children in Odisha. A clear social group differences observed in the proportion of children with the immunization card in the states, and the availability of vaccination card were much less among the ST children as compared with OC children, particularly in Rajasthan and Madhya Pradesh. Only four per cent of ST children each, 15 per cent of SC and 12 and 18 per cent of OBC children were shown vaccination card at the time of survey compared with 20 and 25 per cent of OC children in Rajasthan and Madhya Pradesh, respectively. On the other hand, however, in Odisha, vaccination cards were available for about half (47-48 per cent) of the SC and OC children followed by other OBC (43 per cent) and lowest among ST children (23 per cent). Thus, the difference in the proportion of children with vaccination card between STs and OCs are large in the states as compared with the difference between SC-OC and OBC-OC children.

Like social group differentials, selected background characteristics also showing significant differentials in the possession of vaccination card in the states. Specifically, the proportion of children with vaccination cards were substantially higher among children of literate mothers, children with high household standard of living, children delivered at health facilities, children of mothers who were exposed to electronic media and children of mothers who have high access to health facility than their counterparts' children of illiterate mothers, children from low household standard of living, 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. Similarly, the proportion of children with vaccination cards were marginally high among children from urban areas, joint families, children of not working mothers, with lower birth orders as compared with children from rural areas, nuclear families, children of working mothers and higher order births. The differences are large in Odisha compared with Rajasthan and Madhya Pradesh states.

Social determinants of vaccination card coverage: Logistic regression results

Table 5.6 presents the results from multiple logistic regression analysis on possession of immunisation card among children aged 12-59 months in the states of Rajasthan, Odisha and Madhya Pradesh. In order to assess the role of social determinants, particularly, the role of social group affiliation on the possession of immunization card four models formulated and *Model 1* contained social group affiliation (Caste/tribe) as the only explanatory variable (Baseline). The unadjusted results show (Model 1) that ST (in all the three states), OBC (in Rajasthan and Madhya Pradesh) and SC (in Madhya Pradesh only) were significantly less likely to be possess vaccination card as compared with the reference category OC children. For instance, in the states of Rajasthan and Madhya Pradesh, ST children were 86 per cent each (OR= 0.144 and 0.145, in Rajasthan and Madhya Pradesh, respectively) and OBC were 47 and 32 per cent (OR=0.530 and 0.680, respectively) less likely to have a vaccination card as compared with the OC children. Similarly in Odisha, ST children were 45 per cent (OR=0.547) less likely to be possesses vaccination card as compared with the reference category (OC).

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In *Model 2*, along with the ‘social group affiliation’ variable (Model 1), three cues to action variables (programme factors viz., exposure to electronic media and place of delivery and mother’s access to health facility) introduced. Results from Model 2 also show that ST children were significantly less likely to possess vaccination card as compared with OC children in all the states. As compared with OC children, ST children were 74-75 per cent in Rajasthan and Madhya Pradesh and 50 per cent in Odisha less likely to hold immunization record, controlling all the three cues to action (programme factors). However, with the inclusion of programme factors, OBC children in Rajasthan and Madhya Pradesh and SC children in Odisha lost significance. Among the programme factor variables, Model 2 shows that children delivered in home (in all the three states), children of mothers who were not exposed to media and children of mothers were low or medium access to health facility (in

Rajasthan and Madhya Pradesh) were significantly less likely to hold immunization card than their counterparts, mothers exposed to electronic media, delivered in institutions and higher access to health facility.

In the third model (*Model 3*), socio-economic characteristics (other modifying factors) introduced along with social group affiliation (Model 1). As like in previous model (Model 2), in all the three states, ST children were the least likely (OR=0.352, 0.602 and 0.246 in Rajasthan, Odisha and Madhya Pradesh, respectively) to be possess immunization card as compared with the OC children after controlling for socio-economic characteristics. Moreover between models 1 and 3, the likelihood of ST children's to have vaccination card increased markedly in the three states. Nonetheless, though the odds of possession of vaccination card among OBCs children in Rajasthan and Madhya Pradesh, SC in Madhya Pradesh increases between model 1 and model 3, it lost significance and become insignificant in model 3. Among other modifying factors, household standard of living and mother education show a significant association and illiterate mothers and mothers from low and medium households were significantly less likely to have a vaccination card as compared with literate mothers and living in high household status.

Finally, in *Model 4* (full model) along with social group affiliation (Model 1), variables from both Models 2 and 3 included (socio-economic characteristics of mothers and programme factors) on the availability of vaccination card, to assess the combined net effect of social groups with other factors simultaneously in the states. Results from the model 4 were consistent with those seen in the Models 1 to 3 and social group affiliation remain significant in Rajasthan and Madhya Pradesh and ST children were less likely to have vaccination card as compared with OC children. In Model 4 also ST children are the least likely (OR=0.349, 0.668 and 0.499, respectively in Rajasthan, Madhya Pradesh and Odisha, respectively) to hold vaccination card as compared with OC children. However, there were attenuation (between model 3 and 4) of the likelihood of possession of vaccination card among ST children compared with OC children in Rajasthan and Madhya Pradesh and slight increase in Odisha. In addition to the social group affiliation, the effects of other background and programme factors used as controls remained the same as observed in Models 2 and 3 – place of delivery and household standard of living in all states; mother's education and mothers access to health facility in Rajasthan and Madhya Pradesh; residence in Odisha were observed to be other significant predictors of possession of vaccination card coverage.

In the next chapter (Chapter 6) an attempt has been made to examine the role of social group affiliation on the coverage of specific child vaccinations (third dose of DPT, Measles vaccinations and VAS) and full immunization coverage after controlling for other socio-economic and demographic characteristics and programme factors to understand whether the differences in the coverage of DPT3, measles and full immunization between social groups are due to mainly to differences in other socioeconomic, demographic background characteristics and programme factors or social group affiliation *per se*. Also the effects of coverage of full immunization and social determinants, particularly the role of social group affiliation (caste/tribe) on VAS coverage are examined, sequentially controlling for other risk factors.

Table 5.1. Percentage distribution of children aged 12-59 months according to coverage of specific vaccinations, immunization status, drop-out rates between multiple doses of vaccinations and missed-out only dose of vaccine, Rajasthan, Odisha and Madhya Pradesh

State	Rajasthan	Odisha	Madhya Pradesh
A. Source of immunization data			
Card coverage	12.8	40.0	15.4
Mother's recall coverage	87.2	60.0	84.6
B. Coverage of specific vaccinations			
(a) BCG	61.6	78.5	79.6
(b). DPT1	59.3	77.8	72.9
(c). DPT2	49.2	71.7	63.9
(d). DPT3	34.2	63.4	52.4
(e). Polio1	89.4	82	92.6
(f). Polio2	84.9	77.4	90.3
(g). Polio3	75.3	61.6	84.9
(h). Measles	42.2	66.9	60.5
C. Immunization coverage status			
Not immunized ¹ [none of (a) –(h)]	9.9	16.3	6.8
Partially immunized ² [Anyone of (a) –(h)]	63.2	37.5	47.7
Fully immunized ³ [All (a) –(h)]	26.9	46.3	45.5
D. Drop-out rates*			
<i>Between DPT vaccinations</i>			
DPT1-DPT2	17.0	7.8	12.3
DPT2-DPT3	30.5	11.6	18.0
DPT1-DPT3	42.3	18.5	28.1
<i>Between Polio vaccinations</i>			
Polio1-Polio2	5.0	5.6	2.5
Polio2 - Polio3	11.3	20.4	6.0
Polio1-Polio3	15.8	24.9	8.3
<i>Between BCG/Polio1/DPT1 & Measles vaccinations</i>			
BCG-Measles (Overall drop-out rate)	31.5	14.8	24.0
DPT1 – Measles	28.8	14.0	17.0
Polio1- Measles	52.8	18.4	34.7
E. Missed out only dose of vaccine			
<i>Coverage status of immunization, if not missed one dose of vaccination</i>			
Partially immunized ⁴	52.3	20.3	35.8
Fully immunized ⁵	37.8	63.6	57.5
Total number of children	1519	1366	2520

Note: This table based on the weighted sample.

¹None of (a)–(h): Children who have not received any of the vaccines from (a) to (h).

²Anyone of (a)–(h): Children who have received at least one vaccine from (a) to (h).

³All (a)–(h): Children who have received all the vaccines from (a) to (h).

*A drop out is defined as a child or a woman who failed to return for subsequent doses for which he or she is eligible. Calculation of drop-out rate: for example, BCG-DPT3 drop-out rate calculated as (BCG coverage minus DPT3 coverage) divided by BCG coverage

^{4&5}Total coverage status of partially/fully immunized, if not missed-out one dose of vaccination, is calculated as (actual partially/fully immunized + missed-out of one dose of vaccination)

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

Table 5.2. Percentage distribution of children aged 12-59 months according to coverage of specific vaccinations, immunization/vaccination status, drop-out rates between multiple doses of vaccinations and missed-out only dose of vaccine by source of data (vaccination card or mothers recall), Rajasthan, Odisha and Madhya Pradesh

State/source of data/caste/tribe/ specific vaccinations	Rajasthan		Odisha		Madhya Pradesh	
	Recall	Card	Recall	Card	Recall	Card
A. Caste/tribe*						
Scheduled caste	84.8	15.2	51.9	48.1	84.9	15.1
Scheduled tribe	96.4	3.6	76.6	23.4	95.6	4.4
Other backward class	88.0	12.0	56.8	43.2	81.9	18.1
Other caste	79.6	20.4	52.6	47.4	75.4	24.6
B. Coverage of specific vaccinations*						
(a) BCG	56.5	96.4	66.6	96.7	76.4	97.4
(b). DPT1	53.4	99.5	63.5	99.5	68.3	98.2
(c). DPT2	42.6	93.8	54.9	97.3	58.3	94.6
(d). DPT3	26.6	85.6	43.8	93.1	45.8	88.9
(e). Polio1	87.8	100.0	70.8	98.9	91.5	98.2
(f). Polio2	83.7	93.8	64.5	97.1	89.5	94.6
(g). Polio3	73.6	87.2	41.0	93.1	84.1	89.1
(h). Measles	36.9	78.1	54.4	85.7	56.3	83.5
C. Immunization coverage status†						
Not immunized ¹ [none of (a) –(h)]	11.4	0.0	26.9	0.0	8.0	0.0
Partially immunized ² [anyone of(a) –(h)]	68.7	25.9	51.0	17.0	52.9	18.7
Fully immunized ³ [All (a) –(h)]	19.9	74.1	22.1	83.0	39.1	81.3
D. Drop-out rates						
<i>Between DPT vaccinations</i>						
DPT1-DPT2	20.2	5.7	13.5	2.2	14.6	3.7
DPT2-DPT3	37.6	8.7	20.2	4.3	21.4	6.0
DPT1-DPT3	50.2	14.0	31.0	6.4	32.9	9.5
<i>Between Polio vaccinations</i>						
Polio1-Polio2	4.7	6.2	8.9	1.8	2.2	3.7
Polio2 - Polio3	12.1	7.0	36.4	4.1	6.0	5.8
Polio1-Polio3	16.2	12.8	42.1	5.9	8.1	9.3
<i>Between BCG/ Polio-1/DPT1 and Measles vaccinations</i>						
BCG-Measles (Overall drop-out rate)	34.7	19.0	18.3	11.4	26.3	14.3
DPT1 – Measles	30.9	21.5	14.3	13.9	17.6	15.0
Polio1- Measles	58.0	21.9	23.2	13.3	38.5	15.0
E. Missed-out only dose of vaccine						
<i>Immunization/ vaccination status, if not missed-out one dose of vaccine</i>						
Partially immunized ⁴	57.8	15.1	28.2	8.4	40.2	11.2
Fully immunized ⁵	30.8	84.9	44.9	91.6	51.8	88.8
Total number of children	1323	195	820	547	2133	386

Notes: As in Table 5.1 above

*Chi-square test for significance: $p \leq 0.001$ for caste/tribe, coverage of specific vaccinations (viz., BCG, DPT and polio 1,2 &3 doses and measles); †Chi-square test for significance: $p = 0.001$ for immunization coverage status (full, partial and no).

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

Table 5.3. Percentage distribution of children aged 12-59 months according to coverage of specific vaccinations, immunization/vaccination status, drop-out rates between multiple doses of vaccinations and missed-out only dose of vaccine by social groups, Rajasthan, Odisha and Madhya Pradesh

State/Social groups (caste/tribe)/ specific vaccinations	Rajasthan				Odisha				Madhya Pradesh			
	SC	ST	OBC	OC	SC	ST	OBC	OC	SC	ST	OBC	OC
A. Coverage of specific vaccines*												
(a). BCG	61.8	51.0	61.7	70.2	85.0	64.0	85.9	80.9	84.0	69.8	80.1	87.7
(b). DPT1	63.9	41.9	58.9	70.0	86.6	62.1	86.3	78.5	74.7	56.8	76.2	86.2
(c). DPT2	55.8	25.0	48.7	63.3	77.4	54.9	81.2	74.9	63.4	45.2	68.5	80.2
(d). DPT3	39.0	12.1	32.6	51.5	67.9	46.5	71.1	69.4	53.4	32.3	56.7	69.7
(e). Polio1†	88.5	84.5	90.2	92.6	89.4	69.6	90.2	80.7	92.6	89.7	93.0	95.9
(f). Polio2†	84.8	80.2	84.7	89.3	85.5	62.2	85.7	78.3	89.7	87.7	90.4	94.4
(g). Polio3†	77.7	68.9	74.9	79.3	65.6	45.2	72.3	64.1	82.3	79.9	86.8	90.3
(h). Measles	45.5	18.6	42.4	58.1	75.1	49.1	76.0	69.6	61.7	42.1	63.7	77.7
B. Immunization/vaccination status												
Not immunized ¹ [none of (a) –(h)]	10.2	15.5	9.5	5.9	8.8	27.8	9.4	17.0	5.8	9.8	6.7	3.7
Partially immunized ² [Anyone of (a) –(h)]	58.4	77.1	66.0	49.3	42.0	42.4	34.0	32.9	49.9	62.9	43.3	34.2
Fully immunized ³ [All (a) –(h)]	31.4	7.4	24.6	44.8	49.2	29.7	56.6	50.1	44.3	27.3	50.0	62.1
C. Drop-out rates												
<i>Between DPT vaccinations</i>												
DPT1-DPT2	12.7	40.3	17.3	9.6	10.6	11.6	5.9	4.6	15.1	20.4	10.1	7.0
DPT2-DPT3	30.1	51.6	33.1	18.6	12.3	15.3	12.4	7.3	15.8	28.5	17.2	13.1
DPT1-DPT3	39.0	71.1	44.7	26.4	21.6	25.1	17.6	11.6	28.5	43.1	25.6	19.1
<i>Between Polio vaccinations</i>												
Polio1-Polio2	4.2	5.1	6.1	3.6	4.4	10.6	5.0	3.0	3.1	2.2	2.8	1.6
Polio2 - Polio3	8.4	14.1	11.6	11.2	23.3	27.3	15.6	18.1	8.2	8.9	4.0	4.3
Polio1-Polio3	12.2	18.5	17.0	14.4	26.6	35.1	19.8	20.6	11.1	10.9	6.7	5.8
<i>Between BCG/Polio1/DPT1 and Measles vaccinations</i>												
BCG-Measles(Overall drop-out rate)	26.4	63.5	31.3	17.2	11.6	23.3	11.5	14.0	26.5	39.7	20.5	11.4
DPT1 – Measles	28.8	55.6	28.0	17.0	13.3	20.9	11.9	11.3	17.4	25.9	16.4	9.9
Polio1- Measles	48.6	78.0	53.0	37.3	16.0	29.5	15.7	13.8	33.4	53.1	31.5	19.0
D. Missed-out only one dose of vaccine	13.5	8.9	11.3	8.55	18.7	14.6	16.5	19.2	13.0	10.6	11.9	12.8
<i>Coverage of immunization/vaccination status, if not missed one dose of vaccine</i>												
Partially immunized ²	44.9	68.2	54.7	40.8	23.3	27.8	17.5	13.7	36.9	52.3	31.4	21.3
Fully immunized ³	44.9	16.3	35.8	53.3	67.9	44.4	73.1	69.8	57.3	37.9	61.9	75.0
Total number of children (N)	310	229	712	267	256	364	372	375	472	599	1041	408

Notes: As in Table 5.1 above; *Chi-square test for significance: $p \leq 0.001$ for coverage of specific vaccinations and social groups, for Odisha and Madhya Pradesh states; †Chi-square test for significance: $p = 0.021, 0.057, 0.039$, for coverage of Polio1, 2 and 3 doses, respectively in the state of Rajasthan.

Table 5.4. Percentage distribution of children aged 12-59 months according to coverage of specific vaccinations, immunization/vaccination status, drop-out rates between multiple doses of vaccinations and missed-out only dose of vaccine by age of the children, Rajasthan, Odisha and Madhya Pradesh

State/age group (in months)/ Vaccination coverage status (%)	Rajasthan*				Odisha†				Madhya Pradesh‡			
	12-23	24-35	36-47	48-59	12-23	24-35	36-47	48-59	12-23	24-35	36-47	48-59
A. Source of vaccinations data												
Mother's recall	79.2	86.5	87.8	94.9	46.2	53.4	71.3	69.1	75.1	81.6	88.6	92.0
Card	20.8	13.5	12.2	5.1	53.8	46.6	28.7	30.9	24.9	18.4	11.4	8.0
B. Coverage of specific vaccines												
(a). BCG	68.5	58.2	61.7	58.1	83.6	78.1	74.0	79.0	80.5	81.2	78.2	78.9
(b). DPT1	65.0	59.4	56.7	56.3	83.6	77.9	73.5	76.7	76.0	72.9	72.4	70.6
(c). DPT2	53.2	46.9	47.8	48.7	77.6	71.1	67.6	71.3	63.7	64.2	63.8	64.0
(d). DPT3	38.7	32.8	31.7	33.5	67.9	63.9	58.8	63.5	49.8	55.3	52.0	52.7
(e). Polio1	93.0	88.8	89.7	86.2	85.3	83.5	78.2	81.4	94.0	93.8	92.4	90.6
(f). Polio2	84.0	85.1	87.6	82.7	80.7	79.7	73.3	76.4	88.4	92.5	91.1	89.2
(g). Polio3§	65.2	76.9	79.7	79.3	65.1	67.3	55.0	59.8	75.6	88.8	88.7	86.0
(h). Measles	42.7	42.0	41.5	42.7	66.5	65.4	65.6	70.6	61.4	62.0	60.0	58.9
C. Immunization status¶												
Not immunized ¹ [none of (a) –(h)]	6.2	10.9	9.5	13.0	11.6	15.4	20.9	16.6	5.0	6.0	6.9	8.9
Partially ² [anyone of (a) –(h)]	67.3	61.2	63.7	60.5	36.6	34.6	38.9	39.5	54.7	44.7	45.6	46.2
Fully immunized ³ [All (a) –(h)]	26.5	27.9	26.8	26.5	51.8	50.0	40.1	43.9	40.3	49.3	47.5	44.9
D). Drop-out rates												
<i>Between DPT vaccinations</i>												
DPT1-DPT2	18.2	21.0	15.7	13.5	7.2	8.7	8.0	7.0	16.2	11.9	11.9	9.3
DPT2-DPT3	27.3	30.1	33.7	31.2	12.5	10.1	13.0	10.9	21.8	13.9	18.5	17.7
DPT1-DPT3	40.5	44.8	44.1	40.5	18.8	18.0	20.0	17.2	34.5	24.1	28.2	25.4
<i>Between Polio vaccinations</i>												
Polio1-Polio2	9.7	4.2	2.3	4.1	5.4	4.6	6.3	6.1	6.0	1.4	1.4	1.5
Polio2 - Polio3	22.4	9.6	9.0	4.1	19.3	15.6	25.0	21.7	14.5	4.0	2.6	3.6
Polio1-Polio3	29.9	13.4	11.1	8.0	23.7	19.4	29.7	26.5	19.6	5.3	4.0	5.1
<i>Between BCG/Polio1/ DPT1 &Measles</i>												
BCG-Measles	37.7	27.8	32.7	26.5	20.5	16.3	11.4	10.6	23.7	23.6	23.3	25.3
DPT1 – Measles	34.3	29.3	26.8	24.2	20.5	16.0	10.7	8.0	19.2	15.0	17.1	16.6
Polio1- Measles	54.1	52.7	53.7	50.5	22.0	21.7	16.1	13.3	34.7	33.9	35.1	35.0
E. Missed-out only dose of vaccine												
<i>Immunization status, if not missed one dose of vaccine</i>												
Partially immunized ⁴	54.9	51.5	53.5	49.4	21.0	19.9	19.0	21.1	39.8	33.3	36.9	33.3
Fully immunized ⁵	38.9	37.6	37.0	37.6	67.4	64.7	60.0	62.3	55.2	60.7	56.2	57.8
Total number of children (N)	374	369	395	381	342	338	341	345	602	579	681	659

Notes: As in Table 5.1 above; *Chi-square test for significance in the state of Rajasthan: p = 0.011, 0.058, 0.318, 0.171, 0.026, 0.265, 0.984 for coverage of BCG, DPT1,2,3 and polio1 and 2 doses, measles vaccinations, respectively. †Chi-square test for significance in the state of Odisha: p = 0.023, 0.015, 0.039, 0.107, 0.095, 0.087, 0.452 for coverage of BCG, DPT1,2,3 and polio1 and 2 doses, measles, respectively. ‡ Chi-square test for significance in the state of Madhya Pradesh: p = 0.553, 0.197, 0.996, 0.300, 0.077, 0.081, 0.671 for coverage of BCG, DPT1,2,3 and polio1 and 2 doses, measles, respectively; §Chi-square test for significance in the three study states :p ≤ 0.001 for coverage of **polio 3** and age of the child;¶ for immunization status, Chi-square test for significance: p=0.084 in the state of Rajasthan and p ≤ 0.001 in the states of Odisha and Madhya Pradesh.

Table 5.5. Percentage distribution of children aged 12-59 months according to coverage of vaccination card, Rajasthan, Odisha and Madhya Pradesh

State/ characteristics	% reporting possession of vaccination card		
	Rajasthan	Odisha	Madhya Pradesh
Caste/tribe*			
Scheduled caste	15.2	48.1	15.1
Scheduled tribe	3.6	23.4	4.4
Other backward class	12.0	43.2	18.1
Other caste	20.4	47.4	24.6
Residence†			
Urban	25.5	47.9	29.2
Rural	9.5	38.7	11.1
Household structure*			
Joint family	15.8	47.3	20.5
Nuclear family	10.5	34.1	11.8
Standard of living (index)*			
Low	6.9	30.7	6.8
Medium	8.6	46.9	15.1
High	24.5	58.1	32.9
Mother's education*			
Illiterate	7.8	29.5	9.0
Primary	18.9	44.1	13.7
Secondary and above	28.7	52.7	30.5
Father's education*			
Illiterate	9.2	27.8	8.7
Primary	9.7	40.5	13.3
Secondary and above	16.1	49.5	21.1
Mother's work status*			
No	16.0	44.0	17.8
Yes	9.0	29.4	11.7
Mother's age at child (index) birth			
<20	11.4	41.6	14.2
21-25	14.2	41.6	17.0
26+	12.4	36.8	14.3
Birth order of the child*			
1	15.7	50.9	21.9
2	16.8	38.1	19.3
3+	9.9	31.7	10.2
Sex of the child*			
Male	13.2	41.0	16.6
Female	12.5	38.9	14.0
Mother's exposure to media*			
Not exposed	6.5	31.1	8.9
Exposed	20.5	43.9	20.6
Place of delivery*			
Home	8.4	32.5	10.7
Institution	23.7	53.2	28.3
Mother's access to health facility (index)*			
Low	7.5	35.3	12.9
Medium	8.9	38.8	12.2
High	22.1	46.2	20.9
Total %	12.8	40.0	15.4
Total N	1519	1366	2520

Note: This table based on the weighted sample for states. * Chi-square test significance: $p \leq 0.001$; †For residence, Chi-square test significance: $p \leq 0.001$, 0.014 and $p \leq 0.001$, ‡ for mothers age at child birth, Chi-square test significance: $p = 0.442$, 0.229 and 0.176, for Rajasthan and Odisha Madhya Pradesh, respectively.

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

Table 5.6. Social determinants (Logistic regression analysis) of availability of child vaccination card, Rajasthan, Odisha and Madhya Pradesh

Background characteristics	Reference category	Odds of having vaccination card				Odds of having vaccination card				Odds of having vaccination card			
		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	0.698	1.063	1.432	1.568	1.018	1.260	1.504	1.596	0.547***	0.777	1.103	1.165
	Scheduled tribe	0.144***	0.260***	0.352**	0.349**	0.336***	0.503***	0.602***	0.668**	0.142***	0.246***	0.509***	0.499***
	Other backward class	0.530***	0.758	0.873	0.913	0.842	0.965	0.979	1.017	0.680***	0.920	1.338	1.356
Residence	Rural												
	Urban			1.335	0.864			0.973	0.901			1.851***	1.751***
Standard of living	High												
	Low			0.383***	0.475***			0.462***	0.505***			0.283***	0.281***
	Medium			0.420***	0.508***			0.749	0.809			0.566***	0.582***
Mother's work status	Working												
	No			1.254	1.267			1.249	1.266			0.923	0.911
Child's birth order	3+												
	1-2			1.040	0.957			1.311**	1.227	0.909		1.557***	1.508***
Mother's education	Secondary+												
	Illiterate			0.425***	0.534***			0.732	0.788			0.545***	0.588***
	Primary			0.874	1.026			0.956	0.970			0.583***	0.592***
Exposure to media	Exposed												
	Not exposed		0.518***		0.868		0.785		1.010		0.519***		0.937
Place of delivery	Institution												
	Home		0.442***		0.508***		0.548***		0.686***	0.326	0.439***		0.687***
Mother's access to health facility (Index)	High												
	Low		0.497***		0.589**		0.812		0.927		1.097		1.504**
	Medium		0.478***		0.524***		0.890		0.995		0.753**		0.934

Level of significance: * p≤0.100; ** p≤0.050; *** p≤0.001; Source of data: IIPS and ORC Macro, 2005-06, NFHS-3, Rajasthan, Odisha and Madhya Pradesh