



Analysis of pregnancy outcome and infant death data in HMIS

Study Completed by
Dr. Nikhilesh Parchure
(Research Investigator)

Honorary Director
Prof. K. K. N. Sharma

Population Research Centre
Dr. Harisingh Gour Vishwavidyalaya
(A Central University)
Sagar (M.P.) 470003

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Contents

Abbreviations	ii
List of Tables and Figures	iii
1. Introduction -----	1
2. Objectives -----	3
3. Data and Methods -----	3
4. Completeness of Births and Infant Deaths data -----	6
5. Trend of pregnancy outcomes -----	9
6. Association of pregnancy outcome and maternal care -----	12
7. Trend and changing pattern of causes of infant death -----	13
8. Summary and Conclusion -----	21
9. References -----	25

Abbreviations

ANC	Antenatal Care
CHC	Community Health Centre
CRS	Civil Registration System
DH	District Hospital
HMIS	Health Management Information System
ICD	International Classification of Deaths
MCCD	Medical Certification of Causes of Death
MTP	Medical Termination of Pregnancy
PHC	Primary Health Centre
PNC	Postnatal Care
PRC	Population Research Centre
RGI	Registrar General of India
SDG	Sustainable Development Goals
SDH	Sub district Hospital
SHC	Sub Health Centre
TT	Tetanus Toxoid
UT	Union Territory
WHO	World Health Organization

List of Tables and Figures

Table 1	Trend of number of births reported in HMIS by State (2010-2019)	26
Table 2	Trend of number of births registered in CRS by State (2010-2019)	28
Table 3	Trend of percentage difference in reported births in CRS and HMIS compared to CRS by State (2010-2019)	30
Table 4	Trend of number of infant deaths reported in HMIS by State (2010-2019)	32
Table 5	Trend of number of infant deaths registered in CRS by State (2010-2019)	34
Table 6	Trend of percentage difference in reported infant deaths in CRS and HMIS compared to CRS by State (2010-2019)	36
Table 7	Trend of number of still births reported in HMIS by State (2010-2019)	38
Table 8	Trend of still birth rate per 1000 births, HMIS by State (2010-2019)	40
Table 9	Number of live births, still births and abortions per 1000 deliveries by states (HMIS), 2014 and 2019	42
Table 10	Results of linear regression on effect of maternal indicators on pregnancy and delivery outcome	43
Table 11	Trend of infant deaths within 24 hours of birth by states /UTs, HMIS	44
Table 12	Trend of infant deaths between age 24 hours and 1 month caused due to Sepsis by states / UTs, HMIS	45
Table 13	Trend of infant deaths between age 24 hours and 1 month caused due to Asphyxia by state / UTs, HMIS	46
Table 14	Trend of infant deaths between age 24 hours and 1 month caused due to low birth weight by states / UTs, HMIS	47
Table 15	Trend of infant deaths between age 24 hours and 1 month due to other causes by states / UTs, HMIS	48
Table 16	Trend of infant deaths between age 1 month and 11 months caused due to Pneumonia by states / UTs, HMIS	49
Table 17	Trend of infant deaths between age 1 month and 11 months caused due to Diarrhoea by states / UTs, HMIS	50
Table 18	Trend of infant deaths between age 1 month and 11 months caused due to Fever by states / UTs, HMIS	51
Table 19	Trend of infant deaths between age 1 month and 11 months caused due to Measles by states / UTs, HMIS	52
Table 20	Trend of infant deaths between age 1 month and 11 months due to other causes by states / UTs, HMIS	53
Table 21	Number of medically certified deaths, infant deaths with causes and deaths reported in HMIS (2010-2019), India	54

Figure 1	Trend of births in HMIS and CRS (2010-2019), India	7
Figure 2	Trend of infant deaths in HMIS and CRS (2010-2019), India	8
Figure 3	Trend of still births in HMIS and CRS (2010-2019), India	11
Figure 4	Trend of infant deaths within 1 hour of births in major states, HMIS	15
Figure 5	Trend of causes of neonatal deaths (2010-2019), HMIS , India	16
Figure 6	State-wise distribution of neonatal deaths by causes (2010-2019), HMIS	17
Figure 7	Trend of causes of post-neonatal deaths (2010-2019), HMIS, India	17
Figure 8	State-wise distribution of post-neonatal deaths by causes (2010-2019), HMIS	18
Figure 9	Temporal variation in infant deaths due to various causes (2010 to 2019), HMIS, India	19

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1. Introduction

Pregnancy outcome and infant death data is crucial for understanding the improvement in quality of pregnancy care and child health care services. These data also provide information about accuracy and robustness of civil registration system which is essential in monitoring important child health care indicators. The United Nations Secretary-General's Global Strategy for Women's and Children's Health 2016–2030 further emphasizes the importance of these systems for monitoring maternal and child health^[1]. Moreover, the sustainable development goals (SDGs) include the target of achieving universal birth registration by 2030. This target stems from the overarching objective of improving data systems for monitoring health-related indicators and reflects a desire to improve equity among population groups^[2]. Health management information system (HMIS) presently available in India is a decade old system, which collect information from all the public health facilities and captures data from relatively very less number of private health care facilities. There are 205594 public (SHC-164984, PHC-32274, CHC-6016, SDH-1348, DH-972) and 14843 private health facilities (SHC-8, PHC-1702, CHC-10904, SDH-1993, DH-236) are mapped in the HMIS for data reporting. It also includes 55458 SHC-Health and Wellness Centre and 24823 PHC-Health and Wellness Centre.

According to population projections made by RGI for 2011-2036, it is estimated that in the year 2036, 63.8 percent of India's population will reside in just 6 states – Uttar Pradesh, Bihar, Madhya Pradesh, Rajasthan, Maharashtra and Gujarat.

Civil registration system (CRS) and medical certification of cause of death (MCCD) data have been available regularly on yearly basis at the state level. With the launch of HMIS and capturing vital statistics in terms of birth and deaths data at health facility level assumes importance in terms of reach and coverage of vital statistics. It also provides an opportunity to examine the trend and level of vital statistics available through HMIS data and also comparative analysis of HMIS data with CRS and MCCD data.

There are some fundamental differences in collecting and reporting of vital statistics in CRS, MCCD and HMIS. CRS captures data purely on the reported number of births, deaths

and stillbirths which are registered under the Registration of Birth and Deaths Act. Registration of births and deaths is mandatory. CRS captures these statistics through online registration system and compile the vital statistics at state and district level. It gives disaggregated data on male-female and rural-urban. CRS also estimate completeness of birth and death registration using Sample registration system estimates for the considering state as a unit. Death registration data is also reported according to age-group.

In MCCD reports, all the registered deaths, if they are medically certified according to the national list of cause of deaths are compiled. It primarily provides distribution of age segregated causes of deaths among children, adolescents, adults and older population. It also provides gender differentials in major causes of deaths in different age groups. It estimates proportion of medically certified deaths among all the registered deaths.

In India, majority of deaths occur outside the health facility and as per cultural norms, last rights of deceased persons are performed soon after the death. Death is usually registered after the last rights. There is very little awareness about importance of ascertaining the cause of death. It is also seen that adequately trained staffs are not available at all the death registration units to ascertain the cause of deaths. Verbal autopsy is a tool has been introduced recently for assessing cause of death. However, there is no mechanism to assess the utility of these tools and proportion of deaths certified for the cause of deaths using this tool.

In HMIS, although birth and deaths are captured instantly within a month mostly at the health facility, however, trueness of assessment of cause of deaths and pregnancy outcomes may differ due to varying degree of reporting. This is particularly true for death reporting. In earlier studies, done by PRC, Sagar it was found that in HMIS very few deaths were reported compared to CRS. There was no attempt made to compare the cause of deaths with the MCCD.

It is therefore, necessary to study the levels, and patterns of pregnancy outcome and cause of infant deaths with the available new HMIS data and assessing the trend and differentials in pregnancy outcome.

2. Objectives

- a. Estimation of completeness of births and infant deaths data reported in HMIS
- b. Study the trend of pregnancy outcomes reported in HMIS
- c. Study association of pregnancy outcome with maternal care indicators
- d. Analyze trend and changing pattern of causes of infant death
- e. Comparative analyses of causes of infant deaths reported in HMIS and MCCD

3. Data and Method

Primarily, data from HMIS monthly state and district consolidated reports from 2009-10 to 2019-20 have been used. Data on pregnancy outcomes - live births, MTP and abortion and still births have been extracted along with maternal health indicators. Data on cause specific infant deaths have been extracted for various years reported in HMIS. Trend analysis methods have been employed. Data from CRS and MCCD reports are used to compare the trend and levels in pregnancy outcome and cause of deaths among infants.

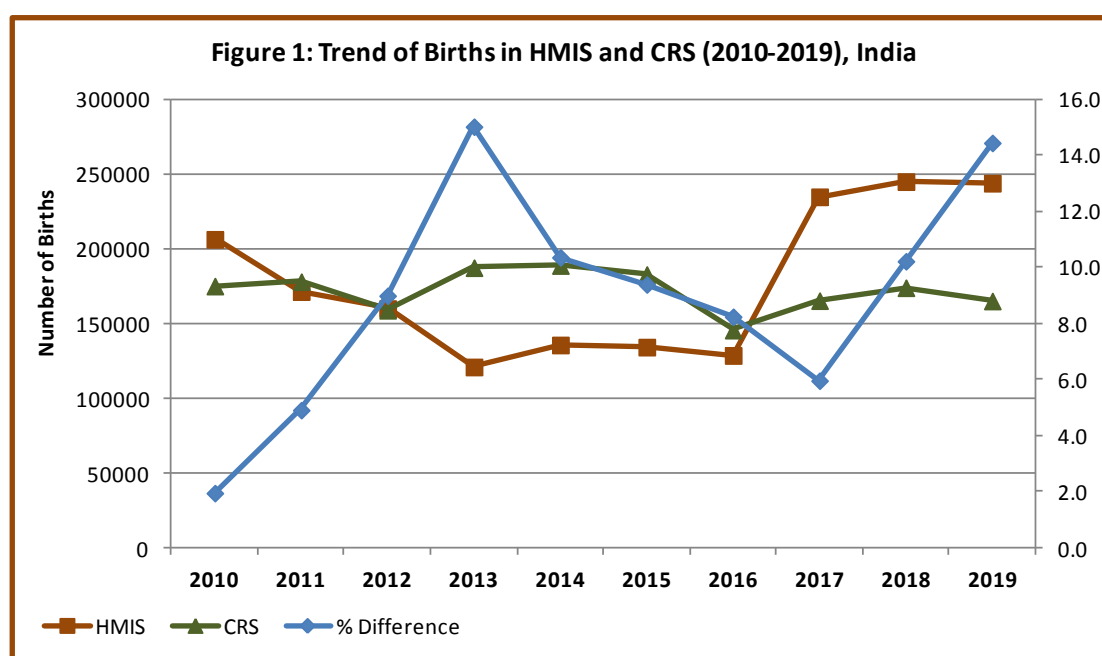
Cross tabulation, proportion and ratios are computed and results are presented in tables and graphs.

4. Completeness of Births and Infant Deaths data

In HMIS all the districts are supposed to report number of births and deaths that have taken place either at home or at health institutions. This reporting has been done on monthly basis for consolidated district, till 2014-15, and subsequently on health facility level. Similarly, under civil registration system, it is mandatory that all the births and deaths are registered as per the provisions of Births and Deaths Registration Act, 1969. Tables 1, 2 and 3 respectively provides state wise trend of number of births reported in HMIS, in CRS and percentage difference in reporting of births in two sources of data for the years 2010 to 2019. CRS reports that level of birth and death registration in India is 92 percent. In all the north-eastern states level of birth registration is 100 percent except Sikkim (61.2%) and

Manipur (67.6%). In bigger states it varies from 98.2% in Kerala, 96.7% in Rajasthan to 78.8% in Madhya Pradesh and 74.6% in Jammu and Kashmir.

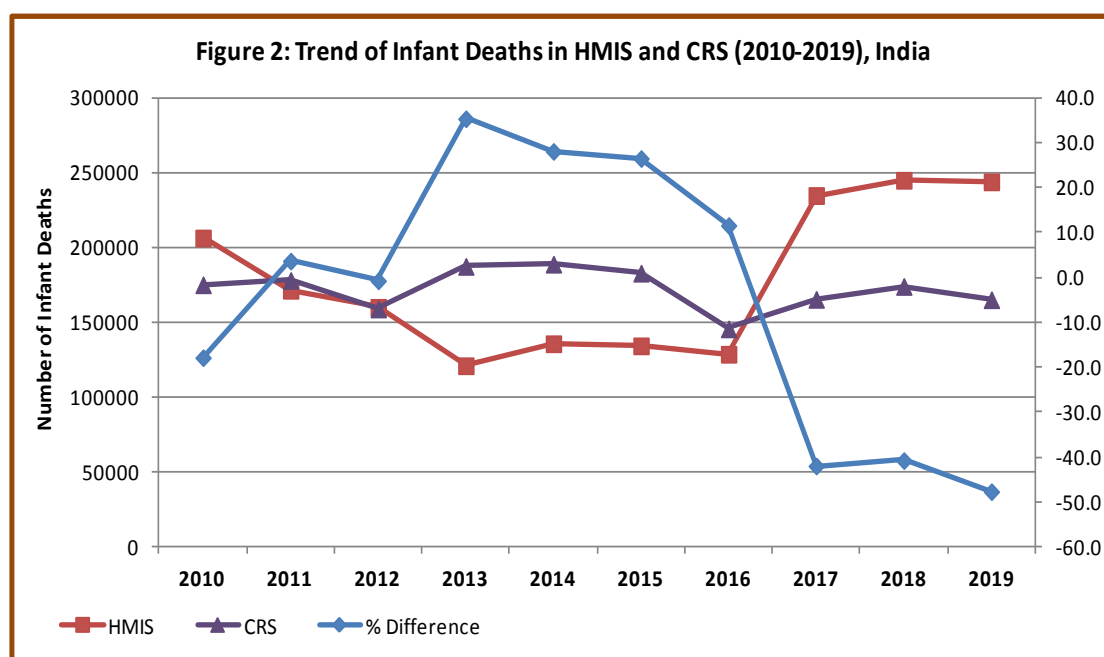
It is seen that overall 205.7 million births have been reported in HMIS, compared to 226.2 million births registered in CRS in during 2010-2019, which is 9.1 percent excess births in CRS compared to HMIS. There is wide variation in the percentage difference in reported number of births across the years, it ranges from 2.0% in 2010 and 4.9% in 2011 to 15% in 2013 and 14.5% in 2019. During 2014 to 2017 percentage difference in reported births in CRS and HMIS decreased gradually (Figure 1). Considering the level of birth registration in CRS for 2019, estimated births are 244.1 million, reflecting a 26% shortfall of birth reporting in HMIS.



State level assessment shows that in totality in Nagaland and Arunachal Pradesh, CRS has over 65% excess births registered compared to births reported in HMIS. In Rajasthan and Telangana there is 20% excess births in CRS, in Delhi it is 30%. Uttar Pradesh, Andhra Pradesh and Meghalaya have negligible difference in reported births and CRS and HMIS. It was found that in Jammu and Kashmir 34% lesser births have registered in CRS compared to HMIS. Similarly, in Dadra and Nagar Haveli (6.3%) and Jharkhand (8.7%) less number of birth registered in CRS compared to HMIS. A further disaggregated analysis show that in Arunachal Pradesh and Nagaland, more than 50% excess births are registered in CRS compared to HMIS during all the years. In majority other states there is fluctuation in

percentage of excess or deficit births reported in CRS as compared to HMIS. Variation in completeness of birth reporting in HMIS compared to CRS may be due to larger proportion of unreported births in HMIS and lack of awareness among masses about mandatory registration of births in CRS. Analysis also show that in the year 2017 to 2019 there is much larger variation between and within state in percentage excess or deficit in number of birth as registered in CRS and reported in HMIS.

Correct reporting of infant deaths and timely registration of infant deaths has very significant utility. It reflects the overall status of health care delivery system and its responsiveness. It is noted that there were 1722685 infant deaths registered in CRS compared to 1782625 infant deaths reported in HMIS during 2010 to 2019. The absolute difference is 59940 infant deaths in excess in HMIS compared to CRS. Tables 4, 5 and 6 respectively provides state-wise trend of number of infant deaths reported in HMIS, in CRS and percentage difference in reporting of infant deaths in two sources of data for the years 2010 to 2019. There is state-wide variation in absolute difference. In Jharkhand, no infant deaths are registered in CRS during 2010-2019. Overall there were only 3.5% lesser infant deaths reported in HMIS compared to CRS during 2010-2019. Figure 2 shows trend in infant deaths registered in CRS and reported in HMIS. During 2013 to 2016 there was gradual decrease in percentage difference in registered infant deaths compared to infant deaths reported in HMIS. It decreased from 35.4% to 11.6%.



It shows that during 2017 to 2019 there was significant deficit in registered infant deaths in CRS compared to reported infant deaths in HMIS, where it reduced from 42 to 47 percent. In Chandigarh, Goa, Kerala and Sikkim there were excess infant death registered compared to reported in HMIS throughout all the years during 2010 to 2019. In Chandigarh about 31% excess infant deaths reported than HMIS, followed by Sikkim (40.0%), Kerala (65.9%) and Goa (70.9%). In Puducherry, except in 2017, there were excess infant deaths registered compared to HMIS. Analysis also shows that in Bihar there was 166% deficit, followed by Madhya Pradesh (84%), Assam (67%), Rajasthan (52%) and West Bengal (44%) in registered infant deaths in CRS compared to infant deaths reported in HMIS. The excess of infant deaths were reported in Uttar Pradesh (63%), Delhi (59%), Karnataka (46%), and Jammu and Kashmir (43%).

There appears to be very high fluctuation in reporting and registering infant deaths. There is no enough supporting data to enumerate estimated infant deaths and compare the completeness of infant deaths data. Registration of infant deaths under CRS is also not validated and triangulated, due to reporting biases, especially tendency to omit early age infant deaths and not registering them under CRS or any other reporting system. HMIS is the only source which can be used to triangulate and assess the completeness since it captures the infant deaths at the health facility level, however, infant deaths occurring in the private health care facilities may still remain unreported under HMIS.

5. Trend of pregnancy outcomes

Study of pregnancy outcomes are very important from the public health perspective and overall well-being of the population. Globally strategies to ensure safe pregnancy and delivery attended by skilled professional have reduced foetal loss and pregnancy wastage to a certain extent.

A stillbirth occurs every 16 seconds somewhere in the world. WHO estimates about 2.6 million stillbirths per year. Stillbirth has a traumatic long-lasting impact on women and their families around the world, who often endure profound psychological suffering as well as stigma from their communities, even in high-income countries. Perhaps even more tragically, the majority of these deaths could have been avoided with high-quality antenatal

care and during birth. Over 40 per cent of all stillbirths occurred during labour – a loss that could be prevented with improved monitoring and access to emergency obstetric care when required.

Abortion is a common health intervention. It is safe when carried out using a method recommended by WHO, appropriate to the pregnancy duration and by someone with the necessary skills. Six out of 10 of all unintended pregnancies end in an induced abortion. Around 45% of all abortions are unsafe, of which 97% take place in developing countries. Unsafe abortion is a leading – but preventable – cause of maternal deaths and morbidities. It can lead to physical and mental health complications and social and financial burdens for women, communities and health systems. Lack of access to safe, timely, affordable and respectful abortion care is a critical public health and human rights issue. Throughout world, 73 million unsafe abortions take place each year and only 3 percent abortions are estimated to be safe abortions.

There are many challenges in capturing data on pregnancy wastage and foetal loss across many health settings. In India, various data sources only estimate still births that provides insufficient clue to arrive at the true burden of pregnancy or foetal loss in terms of still birth and abortion. Various estimates are also not able to capture trend of pregnancy outcome. Pregnancy or delivery outcome is distributed into live births, still births and abortions. HMIS provides pregnancy and delivery outcomes in terms of number of live births, number of abortions (spontaneous and induced including MTPs) and still births.

During 2010-2019, altogether there were 205 million live births, 3 million still births and 6.6 million abortions (both spontaneous and induced) reported in HMIS. It is found that during 2010 to 2019, number of live births per 1000 deliveries has not been consistently increasing or decreasing. It was 990 in 2010, gradually increased to 1028 in 2014 and again decreased to 991 in 2019. Table 7 and Table 8 respectively, provides trend of number of still births and still birth rate during 2010 to 2019. Ratio of foetal loss to live birth is 47 per 1000 live births. Number of still births were 17 per 1000 deliveries in 2011 and gradually deceased to 12 in 2019. Chandigarh has the highest still birth rate of 14, followed by Odisha 12 and Assam 11. Abortions, including both spontaneous and induced and MTPs were 29 in 2012 and increased to 33 per 1000 deliveries in 2018. Figure 3 shows that there is gradual decreasing trend in number of still births reported in HMIS and a slightly increasing trend

has been observed in number of still births registered in CRS during 2010 to 2019. The gap in reported still births in HMIS and registered still births in CRS has decreased from 261983 in 2011 to 97323 in 2019.

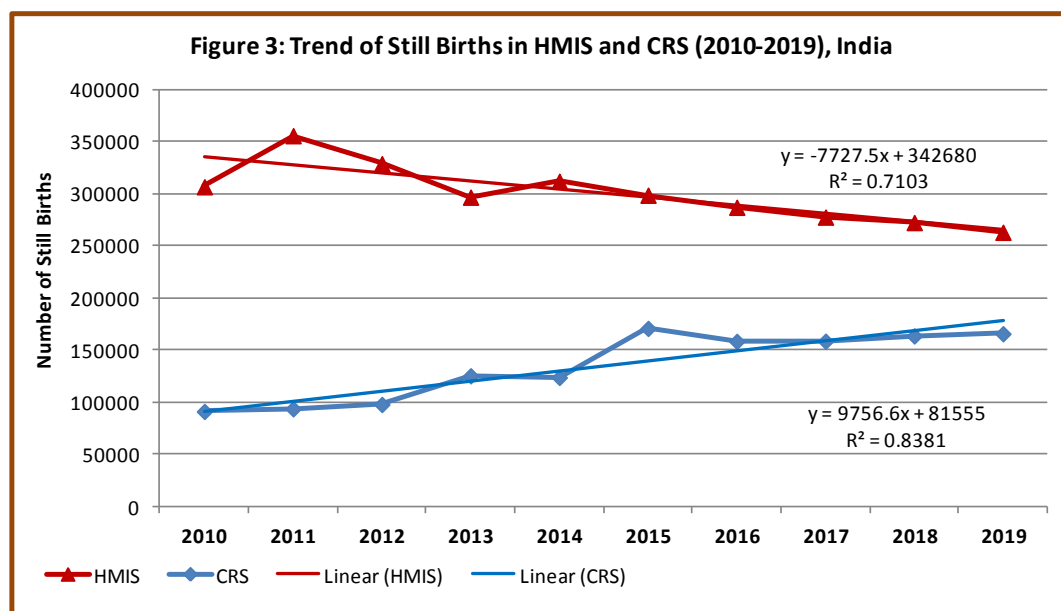


Table 9 compares the pregnancy and delivery outcome per 1000 deliveries in terms of live births, still births and abortions for 2014 and 2019 for all the states and union territories. It is noteworthy that there has been significant decline in number of live births per 1000 deliveries between 2014 and 2019 in Telangana (371), Andhra Pradesh (331), Bihar (59), Uttar Pradesh (99), Lakshadweep (22) and A & N Islands (71). In majority of the remaining states, there has not been much difference in number of live births per 1000 deliveries. For still births, there is not much difference in number of still births during 2014 and 2019 per 1000 live births and it ranges from no change in Sikkim to decline of 15 still births in Telangana and A & N Islands. Number of abortions both spontaneous and induced has increased in most of the states. Highest increase of 47 per 1000 births have been found in Assam and Daman & Diu.

Pregnancy and delivery outcomes reported in HMIS are very important source of information about the status of ANC care and its outcomes. It is already established that proper ANC care leads to safe delivery and healthy newborn. States need to focus on proper

reporting and analysis of available data collected through HMIS. Monitoring of data reporting and its triangulation with the other data sources need to be strengthened.

In India, HMIS is the only available source which provides longitudinal and cross-sectional data at the health facility level about pregnancy outcomes, which need more focused and frequent analysis and its dissemination among stakeholders.

6. Association of pregnancy outcome and maternal care

There is ample of evidence that maternal care influence pregnancy and delivery outcomes. Association of pregnancy outcomes in terms of births, still births and abortions with maternal care indicator have been analyzed using regression analysis.

Results of linear regression shows that effect of maternal variables on proportion of live births in delivery is significantly associated with proportion of women administered with proportion of 1st trimester ANC, TT1 among registered ANCs and proportion of women administered with TT2 among number of deliveries.

It does not indicate significant association with proportion of anemia among ANC, proportion of low birth weight children, and proportion of children who are breastfed within 1 hour of birth. Model explains overall variability of about 49.5% in the number of live births per 1000 deliveries.

For proportion of still births to all the deliveries, significant predictors are proportion of 1st trimester ANC, proportion of women given TT1, proportion of TT2 among deliveries, proportion of low birth weight children and proportion of children given early breastfeeding. All the predictors explain 44% of variability in number of still births per 1000 deliveries.

Analysis shows that abortion per 1000 deliveries does not show any significant association with maternal care indicators. In view of data quality limitations and completeness of reporting of still births and abortion these results need to be interpreted with caution.

7. Trend and changing pattern of causes of infant death

Study of changing pattern in cause of infant deaths as indicated in HMIS is necessary in order to make understand the relevant changes required in the child care policy. It is to mention that as per national list of cause of deaths based on ICD-10, medical certification of cause of deaths (MCCD) reports, causes of infant deaths are grouped in the five broad categories and 7 sub-categories. These are as follows –

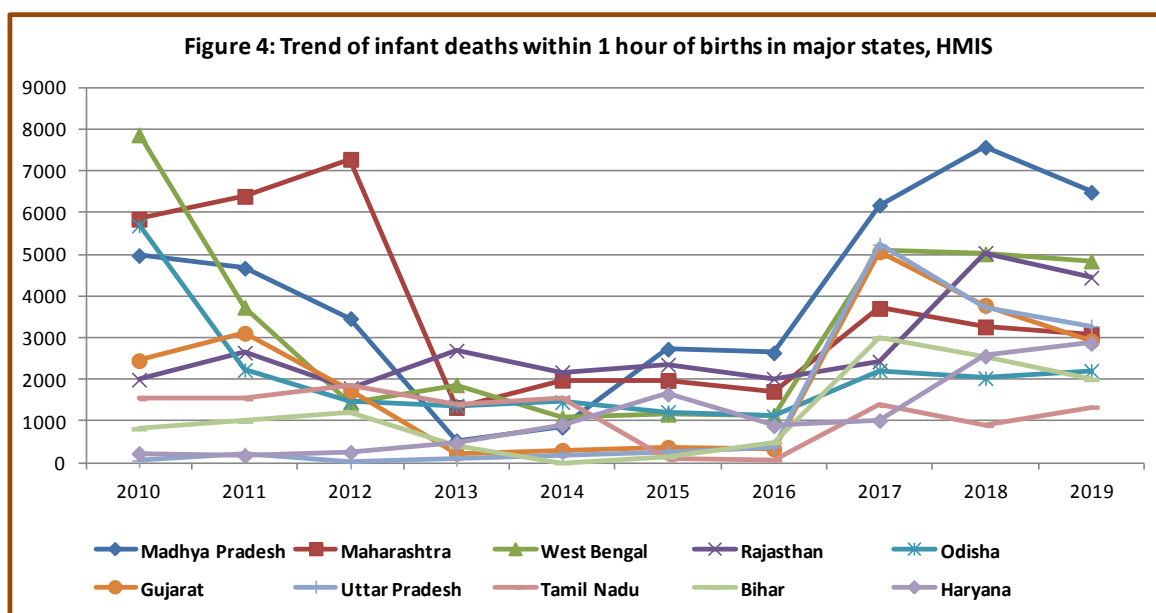
Leading cause of infant deaths as reported in MCCD reports		
Sr.	Cause of death group	Cause of death sub-group
1	Certain Conditions Originating in Perinatal Period (P00-P96)	Hypoxia, birth asphyxia and other respiratory conditions
		Slow foetal growth, foetal malnutrition and immaturity
2	Certain Infectious & Parasitic Diseases (A00-B99)	Septicemia
3	Diseases of Respiratory System (J00-J98)	Pneumonia
4	Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	Congenital malformations of the circulatory system
5	Diseases of the Circulatory System (I00-I99)	All forms of heart diseases including Pulmonary circulation

As per the MCCD-2019 report, 71% of the 119544 infant deaths are caused due to conditions originating in the perinatal period, followed by 28 percent deaths due to Hypoxia, Asphyxia and 24 percent infant deaths caused due to slow foetal growth, foetal malnutrition and immaturity. This clearly indicates that even today, mostly causes of infant deaths are confined to early infancy period.

In HMIS, data on infant deaths are reported in more age segregated causes which include, deaths within 24 hrs of birth, deaths within one month of age due to sepsis, asphyxia, low birth weight and other causes; deaths within 1 month to 1 year due to pneumonia, diarrhoea, fever, measles and other causes. Data on causes of infant deaths as reported in HMIS can be approximately equated with causes reported in MCCD. Deaths due to group 1 causes can be compared with deaths within 24 hours of births and in neonatal period. Pneumonia is the only distinct common cause compared directly in MCCD and HMIS.

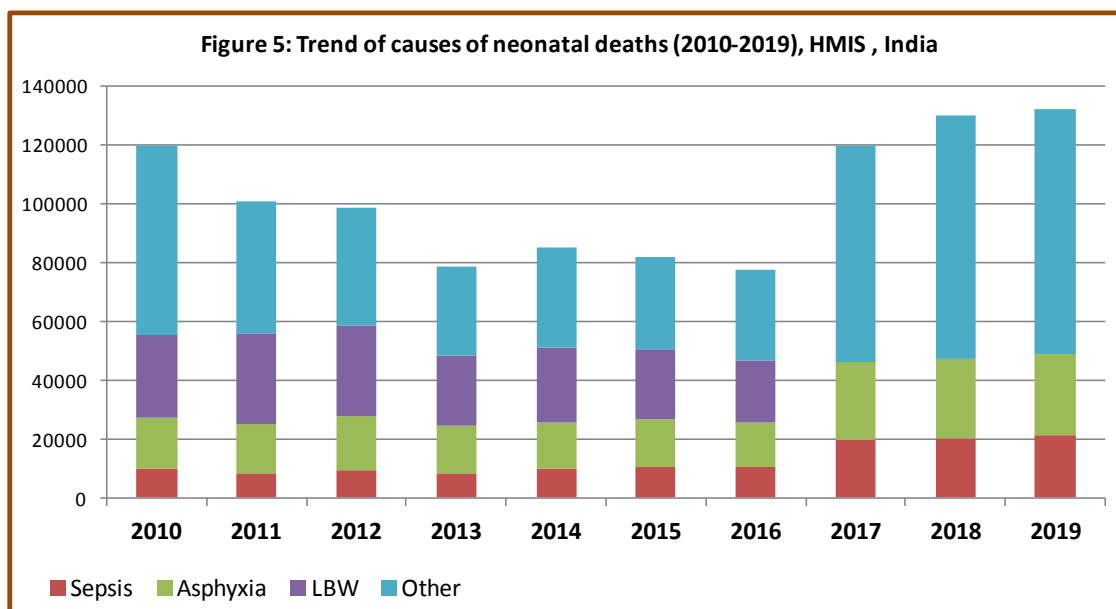
Table 11 to 20 provides state-wise trend of deaths in neonatal and post-neonatal ages by cause of death. It is noted that in totality, there were 286147 infant deaths within 24 hours of births during 2010-2019, about half of these deaths were reported during 2017-

2019. Nearly half of all the infant deaths that occurred within 24 hours of births accounted in just four states, highest being Madhya Pradesh (40109), followed by Maharashtra (36585), West Bengal (33287) and Rajasthan (27582). Figure 4 shows the all the major states have shown increasing trend in reporting of infant deaths within 24 hours of births. These states have reported more than ten thousand infant deaths within 1 hour of births during 2010-2019. In Uttar Pradesh, out of reported total 13424 infant deaths within 1 hour of birth more than 90% were reported during 2017-2019. Likewise more than half of all the reported deaths in Madhya Pradesh, Gujarat, Bihar and Haryana were reported during 2017-2019. This trend is particularly due to improved reporting of infant deaths in HMIS after its revamping in the year 2016. It is noteworthy that during 2013 to 2017 reported number of infant deaths within 1 hour of birth was stagnant. It was the duration when district level HMIS data was consolidated from health facility level HMIS reports and there were issues of under-reporting and non-reporting of morbidity and mortality data in many health facilities.



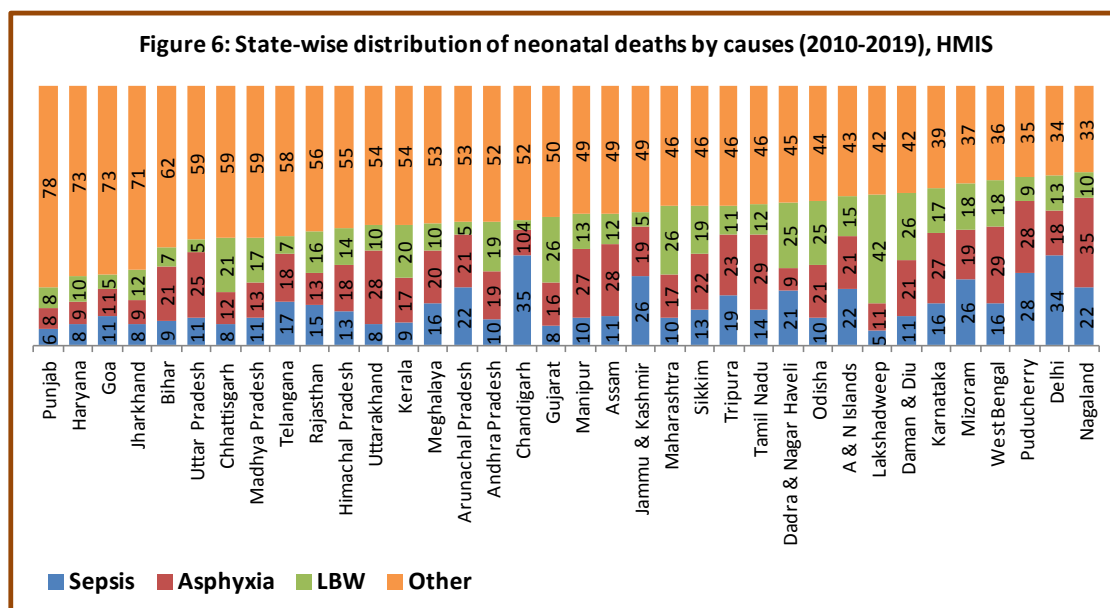
There were 1023351 infant deaths within 1 month of birth during 2010-2019, 45 percent of these deaths were reported during 2016-2019. Of all the deaths, 12% were due to sepsis, 19% due to asphyxia and 18% due to low birth weight. It is to mention that from 2017 onwards, low birth weight as a cause of neonatal death was omitted and all these deaths are now merged with 'Other' causes. Trend of deaths due to sepsis shows consistent increase during 2015-2019 and number of infant deaths due to sepsis increased by more

than twice from 10606 in 2015 to 21406 in 2019. Deaths due to asphyxia have shown fluctuation during 2010-2016 while it increased during 2017-2019. Number of infant deaths due to low birth weight has reduced during 2010-2016 (Figure 5).

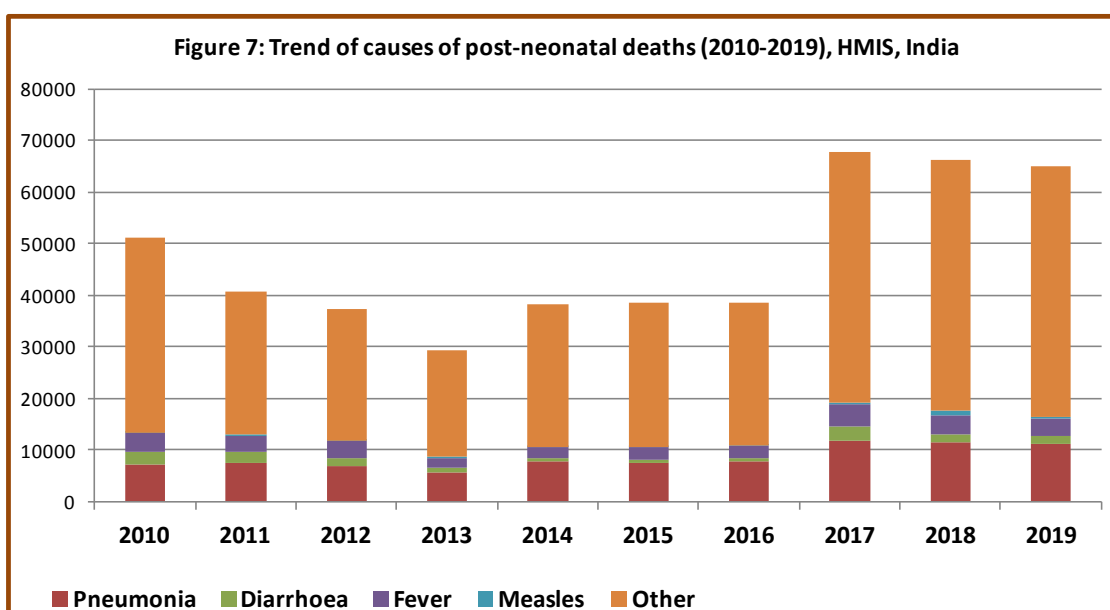


In nine states more than one-fifth of all neonatal deaths were due to Sepsis, highest in Chandigarh and Delhi 34%, followed by Puducherry (27%) and Jammu & Kashmir (26%). More than one-fourth of all the deaths were due to Asphyxia in Nagaland (34%), West Bengal (29%), Tamil Nadu, Uttarakhand, Puducherry (28% each), Assam, Karnataka and Manipur (27% each). In Lakshdweep 42% deaths were attributed to low birth weight followed by 26% deaths in Maharashtra and Gujarat, 25% in Odisha and 21% in Chhattisgarh (Figure 6).

More than two-fifths of neonatal deaths were attributed to 'Other' causes in Punjab (78%), Haryana and Goa (73% each), Jharkhand (71%), Bihar (62%) and Uttar Pradesh (59%). Two-fifths of all the deaths due to Sepsis were reported from just six states - West Bengal (15%), Rajasthan (13%), Madhya Pradesh and Maharashtra (10% each), Odisha and Tamil Nadu (6% each). Likewise, two-fifths of the deaths attributed due to Asphyxia were reported from West Bengal (18%), Maharashtra (10%), Odisha (9%), Madhya Pradesh and Tamil Nadu (8% each) and Gujarat (7%).

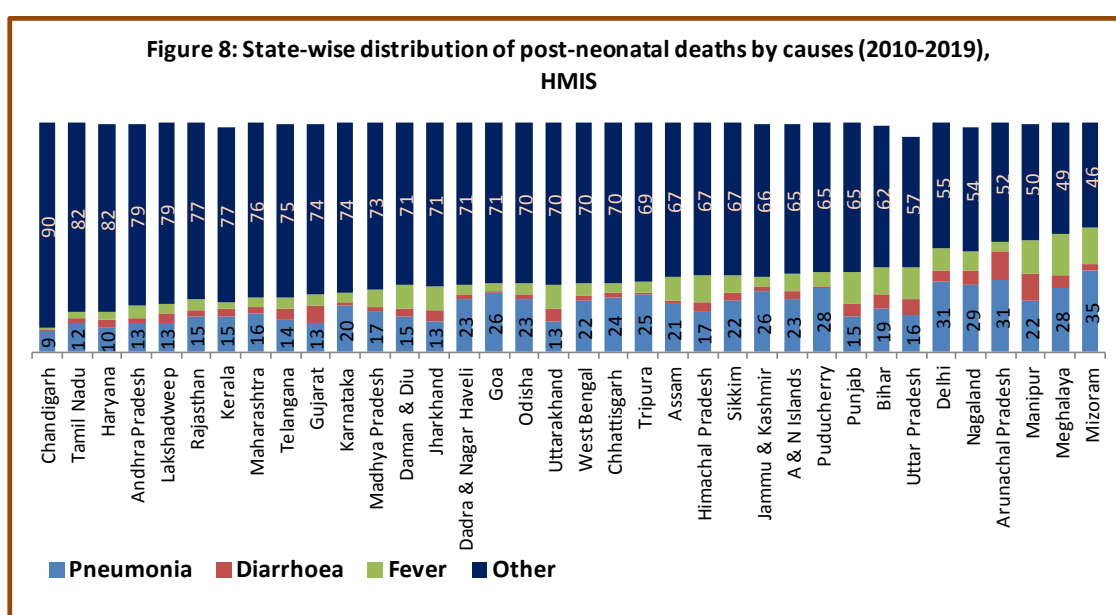


Deaths in post neonatal age i.e. between 1 to 11 months are grouped in causes that are exogenous in nature. In this age group 473127 infant deaths were reported in HMIS during 2010-2019 and half of these deaths were reported between 2016 to 2019. Analysis shows that during 2011 to 2016 total reported deaths due to all causes in post-neonatal period was less than forty-thousand and it increased to more than sixty thousand subsequent years. This shows the improvement in reporting of deaths in HMIS. Further, proportion of deaths due to Pneumonia was consistently similar during 2010 to 2016 barring in year 2013, where only 5597 deaths were attributed to Pneumonia.



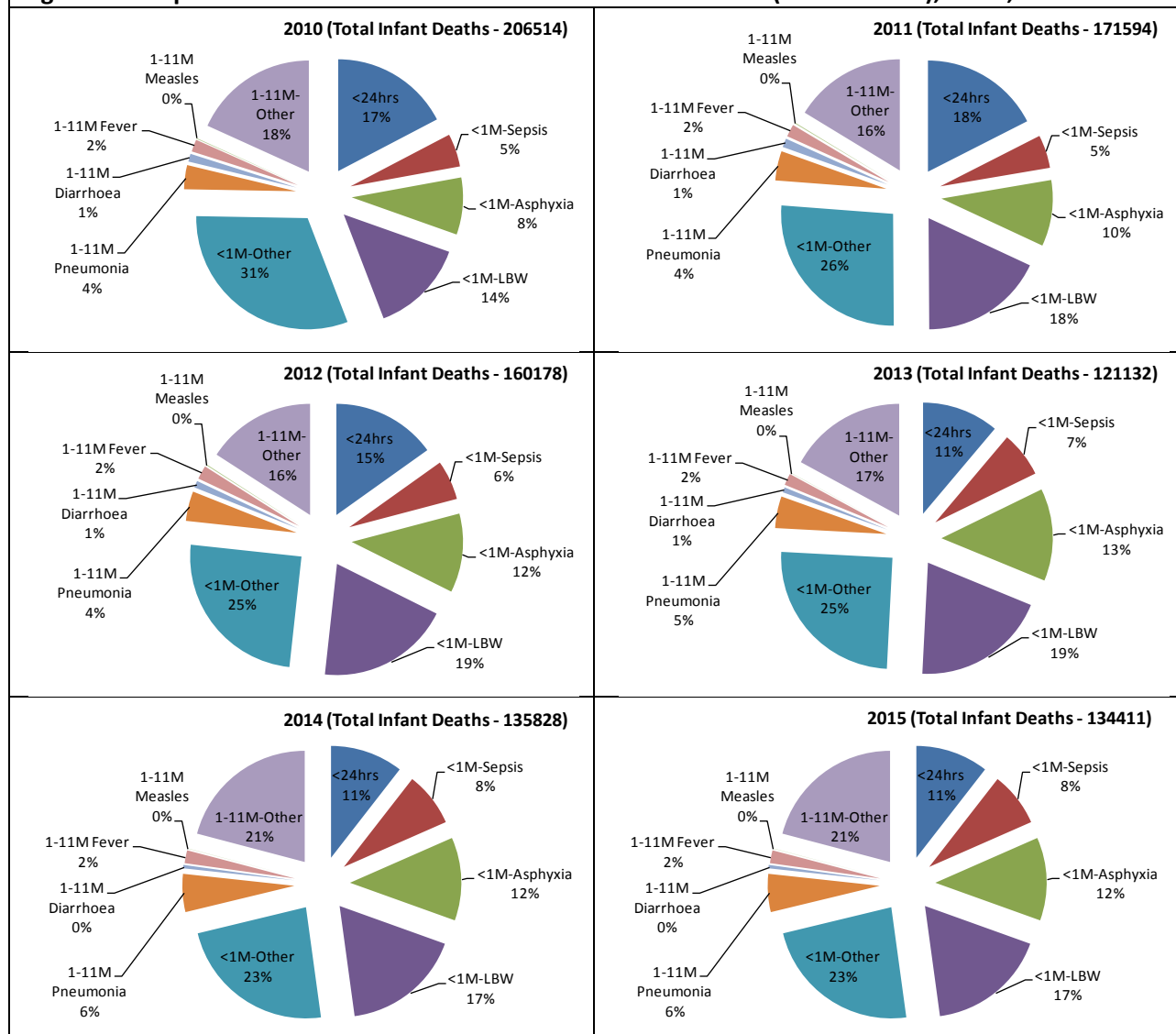
It is noted that there were only 2512 neonatal deaths caused due to measles reported in all during 2010-2019 and 1610 deaths were reported in just three years during 2017-2019. Out of these, 720 deaths were reported in Uttar Pradesh followed by Gujarat (246), Bihar (202), Maharashtra (199) and Madhya Pradesh (184). It is further found that out of 720 measles deaths in Uttar Pradesh, 620 deaths were reported in the year 2018 alone. Similarly, in Bihar 108 deaths were reported in 2012, in Maharashtra 125 deaths due to measles were reported in 2011 and in Gujarat 80 and 87 deaths were reported in 2010 and in 2017 respectively. This absurd reporting of deaths were also found in other states as well where more than half of all the deaths were concentrated in just one or two years.

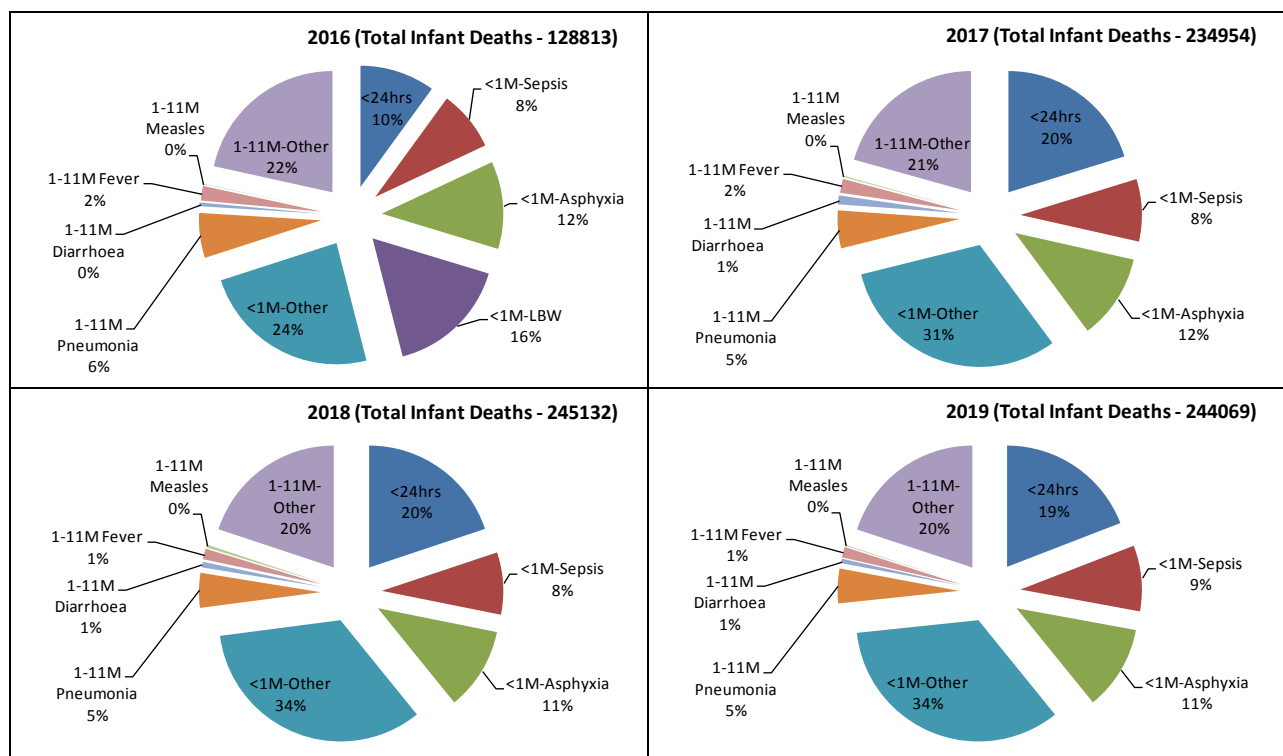
In Chandigarh 90% of all the post-neonatal deaths were attributed to 'Other' causes followed by 9% deaths due to Pneumonia. In Tamil Nadu, Haryana, Andhra Pradesh, Lakshadweep more than 90% of all the deaths in post-neonatal age were attributed to Pneumonia and Other causes. In Punjab, Manipur, Mizoram and Meghalaya relatively high proportion of post-neonatal deaths were reported to have caused due to Fever compared to other states. Of all the deaths due to diarrhoea, 17% were reported by Gujarat and 9% from Maharashtra and Rajasthan. Nearly 14% of all the deaths due to Fever were reported in Madhya Pradesh followed by 9% in Rajasthan and 7% each in Meghalaya, Assam and West Bengal during 2010-2019. This clearly indicates that reporting of majority deaths due to 'Other' causes need further action for medically certification of cause of deaths in post-neonatal as well as in neonatal period.



Looking to the reported data for causes of infant deaths in totality, it was found that nearly one in six infant still die in just 24 hours of birth which reflect poor health condition and inadequate access to post-natal care despite very high proportion of institutional deliveries. Temporal variation was observed in proportion of deaths within 24 hours of births and slight variation across period was also seen in the proportion of deaths due to Asphyxia and Pneumonia (Figure 9). Proportion of deaths due to sepsis in neonatal period has increased from 5% in 2010 and 2011 to 9% in 2019. Deaths due to Asphyxia has also increased to 12% from the 8% in 2010. This can be attributed to improved facility level HMIS reporting. Proportion of deaths due to Pneumonia has remained more or less constant in the range of 5% to 6% throughout the period.

Figure 9: Temporal variation in infant deaths due to various causes (2010 to 2019), HMIS, India





As per RGI-MCCD reports, there were 11.7 million registered deaths for which causes of death was medically certified. Out of these 1.03 million deaths were infant deaths. It is reported that nearly one-fifths of all the registered deaths under civil registration system are medically certified for their specific causes. According to the reports, proportion of medically certified deaths in all registered deaths has been around 20 to 22 percent during 2010 to 2019. It is found that there has been consistent increase in number of deaths for which cause of death was medically certified. In the year 2010 there were 970896 medically certified deaths compared to 1571540 medically certified deaths in 2019. Number of medically certified infant deaths also increased from 94177 in 2010 to 119544 in 2019.

It is noted that majority of medically certified infant deaths pertains to cause specific to certain conditions originating in the perinatal period. Proportion of these deaths are more than three-fourths in all the years during 2010-2019. Deaths under this cause also includes deaths due to Hypoxia, birth asphyxia and other respiratory conditions and Slow foetal growth, foetal malnutrition and immaturity. It is found that there were more than 72% more infant deaths reported in HMIS compared to medically certified infant deaths.

Number of medically certified infant deaths caused due to Pneumonia are 22901 compared to 84172 infant deaths due to Pneumonia reported in HMIS (Table 21). There has

been 4 times more infant deaths due to Diarrhoea reported in HMIS than medically certified infant deaths reported in MCCD reports. It is noteworthy, that reporting of infant deaths with specific causes segregated with age has increased, however, number of medically certified deaths are much lesser. For reporting of deaths due to various causes, it is necessary that each reported death is medically certified and cause of death is ascertained with all the guidelines for cause of death certification. The comparability of cause specific death under MCCD and HMIS need scrutiny of procedures adopted for certification.

8. Summary and Conclusion

Pregnancy outcome and infant death data is crucial for understanding the improvement in quality of pregnancy care and child health care services. The United Nations Secretary-General's Global Strategy for Women's and Children's Health 2016–2030 emphasizes the importance of civil registration systems for monitoring maternal and child health. Sustainable development goals (SDGs) also include the target of achieving universal birth registration by 2030. This target stems from the overarching objective of improving data systems for monitoring health-related indicators and reflects a desire to improve equity among population groups.

Health management information system (HMIS) presently available in India was started in 2008 across country and later scaled-up to capture information related to health care services and vital events at health facility level. This is one of the largest data system which collects crucial information on monthly basis for over 300 data items from more than 2 lakh public health facility. Presently it captures data from relatively very less number of private health care facilities. HMIS has also upgraded to create dashboard and thematic analysis of the collected data.

Civil registration system (CRS) and medical certification of cause of death (MCCD) data have been available regularly on yearly basis at the state level. With the launch of HMIS and capturing vital statistics in terms of birth and deaths data at health facility level assumes importance in terms of reach and coverage of vital statistics. There are some fundamental differences in collecting and reporting of vital statistics in CRS, MCCD and HMIS. This study has assessed the levels, and patterns of pregnancy outcome and cause of infant deaths with

the available new HMIS data and assessing the trend and differentials in pregnancy outcome and comparative analysis of reported data in CRS, MCCD and HMIS during 2010 to 2019.

This study has primarily analysed the HMIS monthly consolidated reports from 2009-10 to 2019-20. Data on pregnancy outcomes - live births, MTP and abortion and still births and causes of infant deaths have been analysed. Data from CRS and MCCD reports were used to compare the trend and levels in pregnancy outcome and cause of infant deaths with data reported in HMIS.

Key findings –

- Overall 205.7 million births have been reported in HMIS, compared to 226.2 million births registered in CRS in during 2010-2019, in other words there were 9.1% more births in CRS compared to HMIS.
- Considering the level of birth registration in CRS for 2019, estimated births are 244.1 million, reflecting a 26% shortfall of birth reporting in HMIS.
- Nagaland and Arunachal Pradesh has 65% more births registered in CRS as compared to births reported in HMIS. In Rajasthan and Telangana there is 20% excess births in CRS, in Delhi it is 30%.
- In Jammu and Kashmir 34% lesser births have registered in CRS compared to HMIS.
- Analysis shows that in the year 2017 to 2019 there is much larger variation between and within state in percentage excess or deficit in number of birth as registered in CRS and reported in HMIS.
- There were 1722685 infant deaths registered in CRS compared to 1782625 infant deaths reported in HMIS during 2010 to 2019. The absolute difference is 59940 infant deaths in excess in HMIS compared to CRS. Overall there were only 3.5% lesser infant deaths reported in HMIS compared to CRS during 2010-2019.
- In Jharkhand, no infant deaths are registered in CRS during 2010-2019. During 2013 to 2016 there was gradual decrease in percentage difference in registered infant deaths compared to infant deaths reported in HMIS. It decreased from 35.4% to 11.6%.
- In Chandigarh, Goa, Kerala and Sikkim there were excess infant death registered compared to reported in HMIS throughout all the years during 2010 to 2019.
- In Bihar there was 166% deficit, followed by Madhya Pradesh (84%), Assam (67%), Rajasthan (52%) and West Bengal (44%) in registered infant deaths in CRS compared to infant deaths reported in HMIS.

- Excess of infant deaths were reported in Uttar Pradesh (63%), Delhi (59%), Karnataka (46%), and Jammu and Kashmir (43%) compared to infant deaths registered in CRS.
- During 2010-2019, altogether there were 205 million live births, 3 million still births and 6.6 million abortions (both spontaneous and induced) reported in HMIS.
- During 2010 to 2019, number of live births per 1000 deliveries has not been consistently increasing or decreasing. It was 990 in 2010, gradually increased to 1028 in 2014 and again decreased to 991 in 2019.
- Ratio of foetal loss to live birth is 47 per 1000 live births. Number of still births were 17 per 1000 deliveries in 2011 and gradually decreased to 12 in 2019.
- Abortions, including both spontaneous and induced and MTPs were 29 in 2012 and increased to 33 per 1000 deliveries in 2018.
- The gap in reported still births in HMIS and registered still births in CRS has decreased from 261983 in 2011 to 97323 in 2019.
- There has been significant decline in number of live births per 1000 deliveries between 2014 and 2019 in Telangana (371), Andhra Pradesh (331), Bihar (59), Uttar Pradesh (99), Lakshadweep (22) and A & N Islands (71).
- Number of abortions both spontaneous and induced has increased in most of the states. Highest increase of 47 per 1000 births have been found in Assam and Daman & Diu.
- Results of linear regression show that effect of maternal variables on proportion of live births in delivery is significantly associated with proportion of women administered with proportion of 1st trimester ANC, TT1 among registered ANCs and proportion of women administered with TT2 among number of deliveries.
- In totality, there were 286147 infant deaths within 24 hours of births during 2010-2019, about half of these deaths were reported during 2017-2019.
- Nearly half of all the infant deaths that occurred within 24 hours of births accounted in just four states, highest being Madhya Pradesh (40109), followed by Maharashtra (36585), West Bengal (33287) and Rajasthan (27582).
- In Uttar Pradesh, out of reported total 13424 infant deaths within 1 hour of birth more than 90% were reported during 2017-2019. Likewise more than half of all the reported deaths in Madhya Pradesh, Gujarat, Bihar and Haryana were reported during 2017-2019.
- There were 1023351 infant deaths within 1 month of birth during 2010-2019, 45 percent of these deaths were reported during 2016-2019. Of all the deaths, 12% were due to sepsis, 19% due to asphyxia and 18% due to low birth weight.

- In nine states more than one-fifth of all neonatal deaths were due to Sepsis, highest in Chandigarh and Delhi 34%, followed by Puducherry (27%) and Jammu & Kashmir (26%).
- In Lakshadweep 42% neonatal deaths were attributed to low birth weight followed by 26% deaths in Maharashtra and Gujarat, 25% in Odisha and 21% in Chhattisgarh.
- More than two-fifths of neonatal deaths were attributed to 'Other' causes in Punjab (78%), Haryana and Goa (73% each), Jharkhand (71%) and Bihar (62%).
- In post-neonatal age there were 473127 deaths reported in HMIS during 2010-2019 and half of these deaths were reported between 2016 to 2019.
- There were only 2512 neonatal deaths caused due to measles reported in all during 2010-2019 and 1610 deaths were reported in just three years during 2017-2019. About one-third (29%) of all the neonatal deaths due to measles, were reported only in Uttar Pradesh.
- In Chandigarh 90% of all the post-neonatal deaths were attributed to 'Other' causes. In Tamil Nadu, Haryana, Andhra Pradesh, Lakshadweep more than 90% of all the deaths in post-neonatal age were attributed to Pneumonia and Other causes.
- Nearly 14% of all the deaths due to Fever were reported in Madhya Pradesh followed by 9% in Rajasthan and 7% each in Meghalaya, Assam and West Bengal during 2010-2019.
- Proportion of deaths due to sepsis in neonatal period has increased from 5% in 2010 and 2011 to 9% in 2019. Deaths due to Asphyxia has also increased to 12% from the 8% in 2010.
- Proportion of deaths due to Pneumonia has remained more or less constant in the range of 5% to 6% throughout the study period.
- As per MCDR reports, in the year 2010 there were 970896 medically certified deaths compared to 1571540 medically certified deaths in 2019. Number of medically certified infant deaths has also increased from 94177 in 2010 to 119544 in 2019.
- There were 72% more infant deaths reported in HMIS compared to medically certified infant deaths in MCDR reports. Number of medically certified infant deaths caused due to Pneumonia are 22901 compared to 84172 infant deaths due to Pneumonia reported in HMIS. There were about 4 times more infant deaths due to Diarrhoea reported in HMIS than medically certified infant deaths reported in MCDR reports.

For reporting of deaths due to various causes, it is necessary that each reported death is medically certified and cause of death is ascertained with all the guidelines for cause of death certification. The comparability of cause specific death under MCCD and HMIS need scrutiny of procedures adopted for certification.

Study has clearly highlighted that importance of reporting of vital events such as births, pregnancy outcomes and infant deaths. All the three data are crucial for monitoring the progress of outcome of the maternal and child health programme and health care infrastructure.

Analysis of data on cause of infant deaths is particularly sensitive due to under-reporting and omission of early infant deaths. Data suggested that medically certified deaths compared to deaths reported in HMIS need further investigation for usage of verbal autopsy for correctly assigning cause of infant death as per the international norms so as to make data comparable. Achieving goals for SDGs particularly required investments in terms of training, monitoring and adoption of IT based data capturing of vital events. It also calls for generating awareness and continuously educating communities about importance of registering of vital events.

9. References

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Table 1: Trend of number of births reported in HMIS by State (2010-2019)

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	5133	5174	5060	2548	5197	4692	4248	4275	3993	3618	43938
Andhra Pradesh	1511673	1535643	1005182	752325	653391	805572	748522	751555	742723	736774	9243360
Arunachal Pradesh	11091	9174	14931	15402	16160	16775	17087	18727	18708	20668	158723
Assam	525827	419195	461806	595774	612883	617367	613077	591248	584655	600797	5622629
Bihar	1284084	1701398	1888937	1458257	1980062	2034753	2042168	2085163	2050938	2114235	18639995
Chandigarh	22262	23219	24208	25869	26254	28032	28854	28950	28792	27957	264397
Chhattisgarh	579014	525685	483297	495898	500547	483375	461809	491628	484317	479404	4984974
Dadra & Nagar Haveli	8877	6942	7502	7724	7575	9092	8641	9255	9040	9539	84187
Daman & Diu	1524	1982	3117	3862	3732	3614	3506	3583	3861	4059	32840
Delhi	179082	212535	234663	238052	262900	267974	269366	267828	282190	283719	2498309
Goa	20085	21228	17798	15916	17712	18944	17477	18883	17962	18491	184496
Gujarat	1183538	1189806	1097350	1126667	1157813	1241585	1194917	1256711	1137636	1148115	11734138
Haryana	509185	516881	445665	488679	512260	496418	493322	516752	499905	511004	4990071
Himachal Pradesh	102226	99360	98715	95509	94525	89720	88856	87049	86872	88410	931242
Jammu & Kashmir	153338	140059	180771	193819	193748	190185	198433	190694	195931	191384	1828362
Jharkhand	591953	577041	607822	648409	633278	678992	729199	759132	732000	731400	6689226
Karnataka	845674	899315	894344	866064	892339	906599	913447	915244	907525	898459	8939010
Kerala	484752	484086	492595	498269	490794	477139	452958	493334	487790	464530	4826247
Lakshadweep	480	781	642	668	688	852	819	837	849	851	7467
Madhya Pradesh	1584801	1470963	1342931	1140328	1355552	1411362	1354479	1336337	1359708	1403115	13759576
Maharashtra	1841834	1790938	1814425	1774671	1752307	1525919	1578111	1753959	1720964	1796217	17349345
Manipur	33760	35722	36695	41326	40749	39640	40732	38577	37991	39462	384654
Meghalaya	70183	73818	79043	82793	84857	85790	85297	83269	83258	89449	817757

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Mizoram	22107	16944	20818	21192	21819	19945	19251	19393	19289	20577	201335
Nagaland	16984	18866	20630	21091	22064	21663	20345	19697	19606	20582	201528
Odisha	651808	718983	676754	700657	696009	671544	610612	608034	646666	632591	6613658
Puducherry	42276	38916	34473	24575	41060	41028	40064	42529	43695	43023	391639
Punjab	391340	414430	391935	394344	404212	390955	378752	371692	371274	377525	3886459
Rajasthan	1383257	1394413	1449114	1464513	1417729	1386223	1407570	1383200	1368982	1362923	14017924
Sikkim	8072	8055	7505	7915	7965	7703	7035	7268	7041	7188	75747
Tamil Nadu	1069853	1004215	1015218	1012886	970440	921035	901281	904547	939599	942471	9681545
Telangana	0	0	0	0	551560	601443	509817	636248	623664	633667	3556399
Tripura	47758	50735	51502	51962	50949	50276	48804	51166	50035	51339	504526
Uttar Pradesh	4229340	4012431	3785196	3769301	3688897	4000710	3679811	3587660	3860684	4071547	38685577
Uttarakhand	134643	139587	151536	157134	156842	147784	145299	143959	147253	152300	1476337
West Bengal	1462911	1204163	1133645	908921	1291382	1266118	1255116	1306391	1313330	1256148	12398125
Total	21010725	20762683	19975825	19103320	20616251	20960818	20369082	20784774	20888726	21233538	205705742

Source: Compiled from HMIS district consolidated reports <https://hmis.nhm.gov.in>

Table 2: Trend of number of births registered in CRS by State (2010-2019)

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	5785	5613	5448	5371	5672	5193	4897	4705	4653	4497	51834
Andhra Pradesh	1192721	1186895	1122879	722843	848883	851499	814754	818165	760716	754939	9074294
Arunachal Pradesh	37110	32513	41619	42261	43246	62058	47963	95539	77249	46837	526395
Assam	732788	600656	612576	688458	723482	1005681	734454	708744	767856	762318	7337013
Bihar	1268550	1626655	2058637	1596494	1694565	1758356	1697762	2052273	2241089	2809167	18803548
Chandigarh	24965	25723	26947	28592	29230	29885	31624	32255	32373	31342	292936
Chhattisgarh	315082	334288	448675	536256	845337	655847	763878	694030	570056	557723	5721172
Dadra & Nagar Haveli	6316	6865	6678	7015	6788	7858	8979	9532	9420	9731	79182
Daman & Diu	4044	4127	4226	4280	4084	4328	3996	4083	4046	4206	41420
Delhi	359463	353759	360473	370000	373693	374012	379161	367046	362803	365868	3666278
Goa	21168	21995	22339	21667	21415	21727	21610	20472	20436	19736	212565
Gujarat	1327404	1280441	1276330	1266047	1205140	1254838	1252090	1166848	1168516	1173759	12371413
Haryana	544620	563557	564280	581213	584739	569340	570747	535198	541405	529992	5585091
Himachal Pradesh	134719	129263	127611	121232	106818	115418	101595	101238	97031	94760	1129685
Jammu & Kashmir	145385	146370	N.A.	151585	154676	152550	151935	152660	153590	155486	1364237
Jharkhand	443182	479632	489953	620870	642286	691700	698026	699945	669766	715920	6151280
Karnataka	1071518	1108562	1124490	1068671	1087530	1053248	1107258	1099019	1028934	1047877	10797107
Kerala	546964	559828	544388	536352	534458	516013	496292	503597	488174	480113	5206179
Lakshadweep	675	734	734	693	658	819	844	823	820	947	7747
Madhya Pradesh	1605729	1688046	1710508	1655691	1613269	1519694	1465779	1468191	1486794	1602043	15815744
Maharashtra	1937727	1925204	1956286	2005538	1962601	1941352	1801451	1809353	1733501	1747145	18820158
Manipur	28487	28762	30172	47615	58756	59703	N.A.	74179	68733	30120	426527
Meghalaya	87103	92994	102012	76616	75223	87242	N.A.	75118	86999	130255	813562

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Mizoram	25752	25420	26042	24584	24516	24786	22497	20984	20984	23808	239373
Nagaland	45269	45669	45709	45769	58950	79539	72984	69121	47357	77706	588073
Odisha	767060	785524	790648	765388	800577	779963	772665	692658	676542	675276	7506301
Puducherry	45666	44023	40102	39854	40239	39298	39939	40863	42563	43810	416357
Punjab	507665	511058	478176	448409	463689	436170	463788	417460	403200	391125	4520740
Rajasthan	1745057	1728321	1757693	1770085	1751191	1769339	1806205	1689409	1743150	1795488	17555938
Sikkim	8424	8588	8591	8589	8057	7878	7132	7124	7035	6639	78057
Tamil Nadu	1065271	1157979	1205092	1185397	1206850	1167506	1062388	948573	915406	941059	10855521
Telangana	N.A.	N.A.	N.A.	596424	569470	612489	624581	617620	652791	841268	4514643
Tripura	40511	44615	46449	46498	45741	51930	43334	79200	73575	72053	543906
Uttar Pradesh	3906734	3641066	3237346	3895924	3916825	3881295	3488980	3545785	4634084	5131999	39280038
Uttarakhand	136196	146295	148078	143242	162869	210445	226175	164167	203822	238061	1779350
West Bengal	1295324	1495880	1530332	1357428	1330000	1337146	1415228	1318441	1473914	1507813	14061506
Total	21430434	21836920	21951519	22482951	23001523	23136145	22200991	22104418	23269383	24820886	226235170

Source: Civil Registration System (CRS) reports of various years <https://censusindia.gov.in> N.A. : Not available

Table 3: Trend of percentage difference in reported births in CRS and HMIS compared to CRS by State (2010-2019)											
State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	11.3	7.8	7.1	52.6	8.4	9.6	13.3	9.1	14.2	19.5	15.2
Andhra Pradesh	-26.7	-29.4	10.5	-4.1	23.0	5.4	8.1	8.1	2.4	2.4	-1.9
Arunachal Pradesh	70.1	71.8	64.1	63.6	62.6	73.0	64.4	80.4	75.8	55.9	69.8
Assam	28.2	30.2	24.6	13.5	15.3	38.6	16.5	16.6	23.9	21.2	23.4
Bihar	-1.2	-4.6	8.2	8.7	-16.8	-15.7	-20.3	-1.6	8.5	24.7	0.9
Chandigarh	10.8	9.7	10.2	9.5	10.2	6.2	8.8	10.2	11.1	10.8	9.7
Chhattisgarh	-83.8	-57.3	-7.7	7.5	40.8	26.3	39.5	29.2	15.0	14.0	12.9
Dadra & Nagar Haveli	-40.5	-1.1	-12.3	-10.1	-11.6	-15.7	3.8	2.9	4.0	2.0	-6.3
Daman & Diu	62.3	52.0	26.2	9.8	8.6	16.5	12.3	12.2	4.6	3.5	20.7
Delhi	50.2	39.9	34.9	35.7	29.6	28.4	29.0	27.0	22.2	22.5	31.9
Goa	5.1	3.5	20.3	26.5	17.3	12.8	19.1	7.8	12.1	6.3	13.2
Gujarat	10.8	7.1	14.0	11.0	3.9	1.1	4.6	-7.7	2.6	2.2	5.2
Haryana	6.5	8.3	21.0	15.9	12.4	12.8	13.6	3.4	7.7	3.6	10.7
Himachal Pradesh	24.1	23.1	22.6	21.2	11.5	22.3	12.5	14.0	10.5	6.7	17.6
Jammu & Kashmir	-5.5	4.3	--	-27.9	-25.3	-24.7	-30.6	-24.9	-27.6	-23.1	-34.0
Jharkhand	-33.6	-20.3	-24.1	-4.4	1.4	1.8	-4.5	-8.5	-9.3	-2.2	-8.7
Karnataka	21.1	18.9	20.5	19.0	17.9	13.9	17.5	16.7	11.8	14.3	17.2
Kerala	11.4	13.5	9.5	7.1	8.2	7.5	8.7	2.0	0.1	3.2	7.3
Lakshadweep	28.9	-6.4	12.5	3.6	-4.6	-4.0	3.0	-1.7	-3.5	10.1	3.6
Madhya Pradesh	1.3	12.9	21.5	31.1	16.0	7.1	7.6	9.0	8.5	12.4	13.0
Maharashtra	4.9	7.0	7.3	11.5	10.7	21.4	12.4	3.1	0.7	-2.8	7.8
Manipur	-18.5	-24.2	-21.6	13.2	30.6	33.6	--	48.0	44.7	-31.0	9.8
Meghalaya	19.4	20.6	22.5	-8.1	-12.8	1.7	--	-10.9	4.3	31.3	-0.5

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Mizoram	14.2	33.3	20.1	13.8	11.0	19.5	14.4	7.6	8.1	13.6	15.9
Nagaland	62.5	58.7	54.9	53.9	62.6	72.8	72.1	71.5	58.6	73.5	65.7
Odisha	15.0	8.5	14.4	8.5	13.1	13.9	21.0	12.2	4.4	6.3	11.9
Puducherry	7.4	11.6	14.0	38.3	-2.0	-4.4	-0.3	-4.1	-2.7	1.8	5.9
Punjab	22.9	18.9	18.0	12.1	12.8	10.4	18.3	11.0	7.9	3.5	14.0
Rajasthan	20.7	19.3	17.6	17.3	19.0	21.7	22.1	18.1	21.5	24.1	20.2
Sikkim	4.2	6.2	12.6	7.8	1.1	2.2	1.4	-2.0	-0.1	-8.3	3.0
Tamil Nadu	-0.4	13.3	15.8	14.6	19.6	21.1	15.2	4.6	-2.6	-0.2	10.8
Telangana	--	--	--	100.0	3.1	1.8	18.4	-3.0	4.5	24.7	21.2
Tripura	-17.9	-13.7	-10.9	-11.8	-11.4	3.2	-12.6	35.4	32.0	28.7	7.2
Uttar Pradesh	-8.3	-10.2	-16.9	3.3	5.8	-3.1	-5.5	-1.2	16.7	20.7	1.5
Uttarakhand	1.1	4.6	-2.3	-9.7	3.7	29.8	35.8	12.3	27.8	36.0	17.0
West Bengal	-12.9	19.5	25.9	33.0	2.9	5.3	11.3	0.9	10.9	16.7	11.8
Total	2.0	4.9	9.0	15.0	10.4	9.4	8.3	6.0	10.2	14.5	9.1

Table 4: Trend of number of infant deaths reported in HMIS by State (2010-2019)

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	88	122	96	36	43	61	15	83	52	67	663
Andhra Pradesh	12063	12812	9681	3350	2206	3748	3147	9014	8902	9325	74248
Arunachal Pradesh	19	15	40	40	36	66	76	127	153	85	657
Assam	2461	1531	4581	4883	4716	4741	5324	11663	11676	12418	63994
Bihar	1431	2376	4022	1585	1	1856	6022	12705	10625	8913	49536
Chandigarh	1294	1708	1480	1178	1419	969	750	1355	1553	1497	13203
Chhattisgarh	10500	3162	3902	4347	4757	4798	4466	7475	7184	7938	58529
Dadra & Nagar Haveli	113	136	169	136	209	165	143	258	250	243	1822
Daman & Diu	15	5	35	70	44	52	32	35	53	36	377
Delhi	2889	1271	2375	2560	3479	3161	3330	4958	5059	4649	33731
Goa	0	1	5	46	59	36	69	108	153	131	608
Gujarat	18613	19981	15269	5827	8357	7579	7663	23230	19181	18594	144294
Haryana	4553	5603	4243	2908	4499	7847	4339	4933	10457	12420	61802
Himachal Pradesh	1098	1215	957	1277	1070	923	969	1124	1465	1363	11461
Jammu & Kashmir	106	46	82	244	361	643	503	1426	2143	4618	10172
Jharkhand	857	723	1108	1117	1620	1288	1533	4022	4480	5150	21898
Karnataka	5390	3170	3237	4640	6760	7280	7453	12024	10669	10211	70834
Kerala	1425	1477	1104	1058	281	131	86	2665	1765	1662	11654
Lakshadweep	5	4	5	1	3	6	7	15	11	5	62
Madhya Pradesh	23946	21139	14764	8234	14138	22008	20791	28802	31952	33052	218826
Maharashtra	33419	30767	34357	11252	14666	11786	11029	17265	17353	16630	198524
Manipur	60	39	38	36	70	90	79	141	82	115	750
Meghalaya	2074	1485	2165	2148	2307	2451	2359	2512	2073	2524	22098

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Mizoram	585	202	575	744	821	436	387	390	340	369	4849
Nagaland	9	57	73	89	107	124	171	216	213	174	1233
Odisha	21869	16535	12539	12833	15282	11028	10648	13433	13453	12977	140597
Puducherry	243	124	165	48	32	45	90	532	410	358	2047
Punjab	1887	2792	2063	1690	1553	1408	1539	3405	2629	2475	21441
Rajasthan	14110	16019	10891	17433	17118	17334	15537	17852	31158	29132	186584
Sikkim	99	6	7	57	147	101	75	107	128	91	818
Tamil Nadu	12392	9666	13264	9897	11152	4924	4109	7644	7305	9599	89952
Telangana	0	0	0	0	942	930	778	2614	4384	2694	12342
Tripura	210	277	280	346	521	515	572	999	859	982	5561
Uttar Pradesh	1291	1229	984	1116	1206	2037	2227	16991	12381	11409	50871
Uttarakhand	282	142	76	385	546	352	480	822	1154	1232	5471
West Bengal	31118	15757	15546	19521	15300	13492	12015	24009	23427	20931	191116
Total	206514	171594	160178	121132	135828	134411	128813	234954	245132	244069	1782625

Source: Compiled from HMIS district consolidated reports <https://hmis.nhm.gov.in>

Table 5: Trend of number of infant deaths registered in CRS by State (2010-2019)

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	118	112	136	115	86	106	105	85	80	78	1021
Andhra Pradesh	5048	9586	7561	2130	2897	4788	4450	9115	7815	6967	60357
Arunachal Pradesh	1	5	6	8	13	0	0	0	0	8	41
Assam		5016	620	11794	3738	4097	4490	3372	2808	2217	38152
Bihar	10220			1746	283	233	289	840	2790	2211	18612
Chandigarh	1815	1892	2140	2075	2054	1366	854	2057	2584	2319	19156
Chhattisgarh	2025	2716	N.A.	N.A.	10922	9835	10323	8779	7182	5936	57718
Dadra & Nagar Haveli	53	29	21	36	16	78	110	158	163	277	941
Daman & Diu	8	13	9	39	40	14	30	22	34	41	250
Delhi	8078	7752	8628	8278	8097	8695	8095	7645	8639	8823	82730
Goa	202	188	215	156	205	246	239	242	192	201	2086
Gujarat	8954	8468	8223	12464	14301	12884	N.A.	16093	14328	15602	111317
Haryana	5793	6873	6692	6202	6219	5655	5794	5481	5868	5921	60498
Himachal Pradesh	976	1012	1034	1158	593	798	766	826	751	747	8661
Jammu & Kashmir	1693	1632		1581	2661	2242	2180	2131	2022	1670	17812
Jharkhand	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	0
Karnataka	13199	10231	13435	15221	17286	16849	12052	10832	10732	10648	130485
Kerala	4059	4218	4352	3873	3445	3050	2774	3176	2777	2488	34212
Lakshadweep	12	9	9	4	11	16	5	15	7	2	90
Madhya Pradesh	13854	13437	12658	12771	12272	10517	10514	11359	10729	10688	118799
Maharashtra	21778	19339	21734	22159	21349	22470	14515	16951	18495	17125	195915
Manipur	191	347	392	146	205	148	N.A.	35	21	103	1588
Meghalaya	1984	2308	2173	2237	2252	3010	N.A.	1836	1921	2224	19945

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Mizoram	854	856	933	957	953	464	285	304	304	317	6227
Nagaland	76	72	116	72	10	2	1	4	0	8	361
Odisha	20482	17808	18001	15076	15671	13838	13886	11868	11618	11427	149675
Puducherry	937	1109	963	741	708	540	336	384	426	458	6602
Punjab	3090	3417	3216	3106	3241	3578	3119	2455	2501	1816	29539
Rajasthan	9495	9713	15324	12862	12908	17439	12004	10435	10815	11587	122582
Sikkim	143	173	134	148	183	134	109	112	128	123	1387
Tamil Nadu	9204	10061	10321	13206	12072	10743	9429	9730	9985	10463	105214
Telangana	0	0	0	3410	2345	2926	5777	5390	8848	6349	35045
Tripura	240	N.A.	884	478	823	916	771	523	739	705	6079
Uttar Pradesh	17781	22823	N.A.	18760	19642	15410	10104	10204	12312	10726	137762
Uttarakhand	899	653	461	522	553	326	327	N.A.	1811	3630	9182
West Bengal	11988	16304	18669	14012	10954	9575	12034	13035	14721	11352	132644
Total	175250	178172	159060	187543	189008	182988	145767	165494	174146	165257	1722685

Source: Civil Registration System (CRS) reports of various years <https://censusindia.gov.in> N.A. : Not available

Table 6: Trend of percentage difference in reported infant deaths in CRS and HMIS compared to CRS by State (2010-2019)

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	25.4	-8.9	29.4	68.7	50.0	42.5	85.7	2.4	35.0	14.1	35.1
Andhra Pradesh	-139.0	-33.7	-28.0	-57.3	23.9	21.7	29.3	1.1	-13.9	-33.8	-23.0
Arunachal Pradesh	-1800.0	-200.0	-566.7	-400.0	-176.9					-962.5	-1502.4
Assam		69.5	-638.9	58.6	-26.2	-15.7	-18.6	-245.9	-315.8	-460.1	-67.7
Bihar	86.0			9.2	99.6	-696.6	-1983.7	-1412.5	-280.8	-303.1	-166.2
Chandigarh	28.7	9.7	30.8	43.2	30.9	29.1	12.2	34.1	39.9	35.4	31.1
Chhattisgarh	-418.5	-16.4			56.4	51.2	56.7	14.9	0.0	-33.7	-1.4
Dadra & Nagar Haveli	-113.2	-369.0	-704.8	-277.8	-1206.3	-111.5	-30.0	-63.3	-53.4	12.3	-93.6
Daman & Diu	-87.5	61.5	-288.9	-79.5	-10.0	-271.4	-6.7	-59.1	-55.9	12.2	-50.8
Delhi	64.2	83.6	72.5	69.1	57.0	63.6	58.9	35.1	41.4	47.3	59.2
Goa	100.0	99.5	97.7	70.5	71.2	85.4	71.1	55.4	20.3	34.8	70.9
Gujarat	-107.9	-136.0	-85.7	53.2	41.6	41.2		-44.3	-33.9	-19.2	-29.6
Haryana	21.4	18.5	36.6	53.1	27.7	-38.8	25.1	10.0	-78.2	-109.8	-2.2
Himachal Pradesh	-12.5	-20.1	7.4	-10.3	-80.4	-15.7	-26.5	-36.1	-95.1	-82.5	-32.3
Jammu & Kashmir	93.7	97.2		84.6	86.4	71.3	76.9	33.1	-6.0	-176.5	42.9
Jharkhand											
Karnataka	59.2	69.0	75.9	69.5	60.9	56.8	38.2	-11.0	0.6	4.1	45.7
Kerala	64.9	65.0	74.6	72.7	91.8	95.7	96.9	16.1	36.4	33.2	65.9
Lakshadweep	58.3	55.6	44.4	75.0	72.7	62.5	-40.0	0.0	-57.1	-150.0	31.1
Madhya Pradesh	-72.8	-57.3	-16.6	35.5	-15.2	-109.3	-97.7	-153.6	-197.8	-209.2	-84.2
Maharashtra	-53.5	-59.1	-58.1	49.2	31.3	47.5	24.0	-1.9	6.2	2.9	-1.3
Manipur	68.6	88.8	90.3	75.3	65.9	39.2		-302.9	-290.5	-11.7	52.8
Meghalaya	-4.5	35.7	0.4	4.0	-2.4	18.6		-36.8	-7.9	-13.5	-10.8

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Mizoram	31.5	76.4	38.4	22.3	13.9	6.0	-35.8	-28.3	-11.8	-16.4	22.1
Nagaland	88.2	20.8	37.1	-23.6	-970.0	-6100.0	-17000.0	-5300.0		-2075.0	-241.6
Odisha	-6.8	7.1	30.3	14.9	2.5	20.3	23.3	-13.2	-15.8	-13.6	6.1
Puducherry	74.1	88.8	82.9	93.5	95.5	91.7	73.2	-38.5	3.8	21.8	69.0
Punjab	38.9	18.3	35.9	45.6	52.1	60.6	50.7	-38.7	-5.1	-36.3	27.4
Rajasthan	-48.6	-64.9	28.9	-35.5	-32.6	0.6	-29.4	-71.1	-188.1	-151.4	-52.2
Sikkim	30.8	96.5	94.8	61.5	19.7	24.6	31.2	4.5	0.0	26.0	41.0
Tamil Nadu	-34.6	3.9	-28.5	25.1	7.6	54.2	56.4	21.4	26.8	8.3	14.5
Telangana				100.0	59.8	68.2	86.5	51.5	50.5	57.6	64.8
Tripura	12.5		68.3	27.6	36.7	43.8	25.8	-91.0	-16.2	-39.3	8.5
Uttar Pradesh	92.7	94.6		94.1	93.9	86.8	78.0	-66.5	-0.6	-6.4	63.1
Uttarakhand	68.6	78.3	83.5	26.2	1.3	-8.0	-46.8		36.3	66.1	40.4
West Bengal	-159.6	3.4	16.7	-39.3	-39.7	-40.9	0.2	-84.2	-59.1	-84.4	-44.1
Total	-17.8	3.7	-0.7	35.4	28.1	26.5	11.6	-42.0	-40.8	-47.7	-3.5

Table 7: Trend of number of still births reported in HMIS by State (2010-2019)

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	92	77	82	66	156	139	95	58	76	61	902
Andhra Pradesh	11629	13167	10967	9240	9824	8704	6837	6797	7492	7148	91805
Arunachal Pradesh	241	239	256	188	259	274	248	216	252	250	2423
Assam	15081	11406	11426	14272	14185	13334	13270	12702	12230	12692	130598
Bihar	28185	33074	33037	24496	32393	28656	26078	25697	24267	23110	278993
Chandigarh	639	742	772	831	773	906	886	702	640	628	7519
Chhattisgarh	9815	11817	10806	10771	11893	11540	10331	9519	9736	9602	105830
Dadra & Nagar Haveli	106	56	111	95	66	174	250	164	165	180	1367
Daman & Diu	12	17	10	28	37	39	36	23	23	36	261
Delhi	3749	3967	4621	4291	4465	5028	5111	5051	5065	5002	46350
Goa	220	301	247	297	336	348	210	153	166	161	2439
Gujarat	16460	17707	16198	18515	16859	15945	14702	13534	12186	12256	154362
Haryana	5298	6366	6445	6660	7333	7285	7337	7265	7569	6692	68250
Himachal Pradesh	1261	1386	1283	1402	1404	1511	1288	1193	1112	993	12833
Jammu & Kashmir	3422	2901	3182	3894	4154	3538	4135	3652	3814	3530	36222
Jharkhand	7377	10098	9118	9696	9467	8948	9728	9442	9106	9025	92005
Karnataka	14935	16458	12951	10703	10459	10545	10115	10054	8847	8883	113950
Kerala	2252	2338	2363	2259	2089	2104	2010	2058	2028	1712	21213
Lakshadweep	34	12	8	7	13	12	15	10	10	5	126
Madhya Pradesh	24734	25311	24336	19251	23586	24994	23265	22234	22979	23475	234165
Maharashtra	24887	29570	29886	24978	19421	16572	16689	16639	16392	14614	209648
Manipur	295	278	282	243	208	189	267	181	189	159	2291
Meghalaya	1681	1924	1912	1899	1856	1866	1817	1796	1758	1995	18504

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Mizoram	187	255	219	228	219	202	175	184	189	156	2014
Nagaland	171	252	305	269	380	360	344	351	306	306	3044
Odisha	17116	18507	17373	18119	17736	16224	14600	13734	14361	13906	161676
Puducherry	926	923	926	443	749	641	556	486	510	428	6588
Punjab	6279	6209	5744	5992	6249	5925	5930	5392	5268	4919	57907
Rajasthan	25032	26567	26753	26463	26719	25665	25301	24815	23896	24775	255986
Sikkim	165	186	94	112	130	130	139	145	146	113	1360
Tamil Nadu	10992	10405	10238	10215	8864	5287	5254	7205	6028	5946	80434
Telangana	0	0	0	0	7971	7999	4895	4273	3654	3403	32195
Tripura	1104	1005	1078	953	951	879	891	958	862	850	9531
Uttar Pradesh	47372	78954	64693	52571	47960	50774	52687	48015	48825	45556	537407
Uttarakhand	1437	2146	2100	2529	2466	2110	1896	1524	1795	1835	19838
West Bengal	23845	21394	19350	15054	20667	20073	19951	21722	20753	18940	201749
Total	307031	356015	329172	297030	312297	298920	287339	277944	272695	263342	3001785

Source: Compiled from HMIS district consolidated reports <https://hmis.nhm.gov.in>

Table 8: Trend of still birth rate per 1000 births, HMIS by State (2010-2019)

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	9.3	7.4	8.0	14.2	15.6	15.6	11.5	7.1	9.7	8.4	10.5
Andhra Pradesh	3.8	4.3	5.5	6.7	8.6	5.5	4.6	4.5	5.0	4.9	5.1
Arunachal Pradesh	10.8	12.9	8.5	6.1	8.0	8.2	7.3	5.7	6.7	6.0	7.6
Assam	14.2	13.5	12.3	11.9	11.5	10.7	10.7	10.6	10.4	10.5	11.5
Bihar	10.3	9.4	8.8	8.4	8.2	6.9	6.3	6.1	5.9	5.3	7.4
Chandigarh	14.3	15.9	15.8	16.0	14.6	16.0	15.3	12.0	11.1	11.2	14.1
Chhattisgarh	8.2	11.0	11.2	10.9	11.8	11.9	11.1	9.6	10.0	10.0	10.5
Dadra & Nagar Haveli	7.0	4.0	7.4	6.1	4.4	9.5	14.4	8.8	9.1	9.4	8.2
Daman & Diu	2.7	4.3	1.6	3.6	4.9	5.4	5.1	3.2	3.0	4.4	3.9
Delhi	10.5	9.3	9.8	9.0	8.5	9.3	9.4	9.4	9.0	8.8	9.2
Goa	5.5	7.1	6.9	9.3	9.4	9.1	6.0	4.1	4.6	4.4	6.6
Gujarat	6.9	7.4	7.4	8.2	7.3	6.4	6.2	5.5	5.4	5.3	6.6
Haryana	5.3	6.1	7.2	6.8	7.1	7.3	7.4	7.0	7.6	6.5	6.8
Himachal Pradesh	6.1	6.9	6.5	7.3	7.4	8.4	7.2	6.8	6.4	5.6	6.9
Jammu & Kashmir	10.1	10.4	8.8	10.0	10.7	9.3	10.4	9.5	9.6	9.2	9.8
Jharkhand	6.3	8.8	7.5	7.5	7.5	6.6	6.7	6.2	6.2	6.2	6.9
Karnataka	9.3	9.6	7.4	6.2	5.9	5.8	5.5	5.5	4.9	4.9	6.4
Kerala	2.3	2.4	2.4	2.3	2.1	2.2	2.2	2.2	2.1	1.9	2.2
Lakshadweep	47.4	9.2	6.3	5.2	9.4	7.0	9.2	5.9	5.9	2.9	8.7
Madhya Pradesh	7.8	8.5	9.0	8.5	8.7	8.8	8.5	8.3	8.4	8.3	8.5
Maharashtra	6.8	8.2	8.2	7.1	5.5	5.4	5.3	4.7	4.8	4.1	6.0
Manipur	4.4	3.9	3.8	2.9	2.6	2.4	3.3	2.3	2.5	2.0	3.0
Meghalaya	12.0	12.9	12.0	11.4	10.8	10.8	10.6	10.7	10.5	11.1	11.2

State	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
Mizoram	4.2	7.5	5.2	5.4	5.0	5.0	4.5	4.7	4.9	3.8	5.0
Nagaland	5.0	6.6	7.4	6.4	8.6	8.3	8.4	8.9	7.8	7.4	7.5
Odisha	13.0	12.7	12.7	12.8	12.6	12.0	11.9	11.2	11.0	10.9	12.1
Puducherry	10.8	11.8	13.3	9.0	9.1	7.8	6.9	5.7	5.8	5.0	8.4
Punjab	7.9	7.5	7.3	7.6	7.7	7.5	7.8	7.2	7.1	6.5	7.4
Rajasthan	9.1	9.5	9.2	9.0	9.4	9.2	9.0	8.9	8.7	9.0	9.1
Sikkim	10.2	11.6	6.3	7.0	8.1	8.4	9.8	9.9	10.3	7.9	9.0
Tamil Nadu	5.1	5.0	5.0	5.0	4.6	2.9	2.9	4.0	3.2	3.2	4.1
Telangana					8.4	6.9	4.8	3.5	3.0	2.7	4.7
Tripura	11.6	9.8	10.4	9.1	9.3	8.7	9.1	9.3	8.6	8.2	9.4
Uttar Pradesh	5.6	10.3	9.2	7.4	6.8	6.5	7.2	6.7	6.2	5.6	7.1
Uttarakhand	5.2	7.7	6.9	8.0	7.8	7.1	6.5	5.3	6.1	6.0	6.7
West Bengal	8.3	8.9	8.6	8.2	7.9	7.9	7.9	8.3	7.9	7.5	8.1
Total	7.3	8.6	8.4	7.9	7.7	7.1	7.0	6.7	6.5	6.2	7.3

Table 9: Number of live births, still births and abortions per 1000 deliveries by states (HMIS), 2014 and 2019

States / UTs	2014			2019		
	Live Births	Still Births	Abortions	Live Births	Still Births	Abortions
A & N Islands	1076	32	20	1004	17	54
Andhra Pradesh	1334	20	3	1003	10	4
Arunachal Pradesh	999	16	108	992	12	94
Assam	982	23	90	988	21	137
Bihar	1016	17	2	958	10	5
Chandigarh	987	29	44	993	22	57
Chhattisgarh	994	24	11	988	20	24
Dadra & Nagar Haveli	998	9	63	996	19	43
Daman & Diu	996	10	23	1003	9	70
Delhi	993	17	69	991	17	63
Goa	990	19	18	1003	9	55
Gujarat	1002	15	21	997	11	11
Haryana	991	14	69	994	13	71
Himachal Pradesh	991	15	24	997	11	48
Jammu & Kashmir	988	21	43	990	18	28
Jharkhand	998	15	13	997	12	11
Karnataka	1001	12	25	997	10	35
Kerala	1013	4	5	1008	4	23
Lakshadweep	1000	19	7	978	6	12
Madhya Pradesh	991	17	28	993	17	25
Maharashtra	996	11	101	999	8	74
Manipur	1001	5	90	1002	4	78
Meghalaya	983	22	7	988	22	3
Mizoram	992	10	13	993	8	10
Nagaland	987	17	63	991	15	57
Odisha	982	25	31	986	22	24
Puducherry	993	18	22	996	10	29
Punjab	990	15	39	996	13	64
Rajasthan	996	19	15	990	18	18
Sikkim	995	16	10	1011	16	8
Tamil Nadu	995	9	60	1000	6	91
Telangana	1391	20	5	1020	5	3
Tripura	989	18	56	984	16	39
Uttar Pradesh	1094	14	14	994	11	10
Uttarakhand	991	16	38	998	12	26
West Bengal	986	16	28	992	15	41

Source: Compiled from HMIS data, <https://hmis.nhp.gov.in>

Table 10: Results of linear regression on effect of maternal indicators on pregnancy and delivery outcome.

Predictor variable	Live Births/1000 deliveries		Still Births/1000 deliveries		Abortion/1000 deliveries	
	Std (β)	p	Std (β)	p	Std (β)	p
Proportion of 1 st Trimester ANC	-.112	.039	-.293	.000	.043	.561
Proportion of TT1 to ANC	-.162	.002	-.248	.000	-.178	.011
Proportion of TT2 to Delivery	.771	.000	.653	.000	-.071	.211
Proportion of Anaemia to ANC	.037	.402	.067	.154	.103	.090
Proportion of LBW children to live births	.022	.577	.278	.000	.056	.302
Proportion of births breastfed within 1 hr. of birth to live births	.024	.556	.200	.000	-.066	.233
Model R ²	49.50%		44.30%		4.60%	

Table 11: Trend of infant deaths within 24 hours of birth by states /UTs, HMIS

States / UTs	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	1	5	7	1	0	0	0	11	2	12	39
Andhra Pradesh	921	631	314	89	31	184	71	1536	1635	1452	6864
Arunachal Pradesh	2	0	3	7	17	5	17	43	42	38	174
Assam	204	195	329	280	174	165	146	1467	1650	1916	6526
Bihar	816	996	1207	392	0	149	483	2998	2549	2001	11591
Chandigarh	252	259	257	274	350	261	260	242	299	288	2742
Chhattisgarh	523	494	352	369	361	331	265	1335	1136	1047	6213
Dadra & Nagar Haveli	15	7	7	0	0	4	26	43	28	22	152
Daman & Diu	2	2	10	17	16	15	6	10	11	10	99
Delhi	300	168	204	126	97	155	158	942	1099	769	4018
Goa	0	1	0	8	12	14	26	59	62	17	199
Gujarat	2451	3109	1725	228	299	372	334	5064	3780	2926	20288
Haryana	223	171	252	475	916	1645	888	1013	2560	2866	11009
Himachal Pradesh	285	300	244	200	55	50	87	264	314	293	2092
Jammu & Kashmir	13	2	4	29	24	26	11	258	241	2616	3224
Jharkhand	234	211	261	200	246	166	191	1181	1157	1234	5081
Karnataka	111	423	500	614	413	360	371	1780	1630	1456	7658
Kerala	433	380	231	200	0	0	0	762	258	241	2505
Lakshadweep	0	0	2	0	1	3	1	7	3	2	19
Madhya Pradesh	4976	4671	3462	528	853	2728	2638	6184	7576	6493	40109
Maharashtra	5847	6396	7285	1328	1982	1976	1715	3706	3262	3088	36585
Manipur	10	12	5	4	5	4	8	22	26	27	123
Meghalaya	428	323	422	384	328	295	314	499	382	404	3779
Mizoram	38	25	9	12	13	14	7	30	46	42	236
Nagaland	1	10	4	4	3	3	2	26	31	38	122
Odisha	5698	2226	1473	1374	1457	1220	1113	2216	2030	2208	21015
Puducherry	59	56	34	12	1	6	1	96	107	40	412
Punjab	348	766	452	263	84	34	59	692	584	429	3711
Rajasthan	1995	2643	1792	2692	2175	2355	2017	2429	5040	4444	27582
Sikkim	25	1	2	4	3	2	1	19	24	9	90
Tamil Nadu	1541	1538	1862	1395	1557	80	74	1378	898	1337	11660
Telangana	0	0	0	0	24	41	11	488	1065	311	1940
Tripura	25	36	13	9	4	14	31	153	189	190	664
Uttar Pradesh	53	202	29	89	163	265	373	5237	3736	3277	13424
Uttarakhand	59	37	22	18	34	19	24	190	234	278	915
West Bengal	7871	3733	1452	1872	1083	1166	1147	5103	5016	4844	33287
Total	35760	30029	24227	13497	12781	14127	12876	47483	48702	46665	286147

Table 12: Trend of infant deaths between age 24 hours and 1 month caused due to Sepsis by states / UTs, HMIS

States / UTs	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	13	18	15	7	6	12	1	9	9	5	95
Andhra Pradesh	413	594	472	80	47	151	104	721	1021	1150	4753
Arunachal Pradesh	7	0	0	1	1	4	0	22	20	6	61
Assam	78	71	188	216	177	241	405	806	934	1049	4165
Bihar	124	81	323	108	0	47	149	582	457	441	2312
Chandigarh	218	418	304	385	412	129	90	55	136	101	2248
Chhattisgarh	589	97	136	151	173	158	153	398	436	470	2761
Dadra & Nagar Haveli	12	12	21	25	63	36	8	35	16	8	236
Daman & Diu	0	0	1	3	6	10	1	0	2	2	25
Delhi	586	226	485	577	921	578	654	904	873	846	6650
Goa	0	0	2	1	0	0	0	1	2	18	24
Gujarat	349	292	384	75	104	130	177	1730	1614	1871	6726
Haryana	19	155	163	45	75	187	107	342	699	607	2399
Himachal Pradesh	74	83	78	80	56	56	63	106	113	81	790
Jammu & Kashmir	13	9	17	23	46	115	87	192	300	627	1429
Jharkhand	27	13	26	29	29	29	52	180	193	217	795
Karnataka	344	206	286	414	797	902	703	1321	1214	1114	7301
Kerala	28	45	31	56	10	9	5	177	104	109	574
Lakshadweep	0	1	0	0	0	0	0	0	0	0	1
Madhya Pradesh	1120	1097	735	426	864	1272	1071	2111	2151	2215	13062
Maharashtra	786	1343	1710	672	1038	758	732	1463	1915	1779	12196
Manipur	3	0	1	0	2	4	4	4	9	4	31
Meghalaya	95	46	84	95	83	106	105	128	143	177	1062
Mizoram	24	12	28	49	48	28	40	51	29	34	343
Nagaland	0	0	6	8	14	13	19	25	30	20	135
Odisha	1517	730	504	526	568	594	723	928	1024	1219	8333
Puducherry	26	9	20	6	11	15	24	82	97	76	366
Punjab	28	48	66	52	38	30	65	100	66	114	607
Rajasthan	789	812	639	1051	1677	2309	2367	1609	2221	2723	16197
Sikkim	3	0	0	3	15	7	5	5	6	3	47
Tamil Nadu	572	471	736	634	887	855	642	1020	850	935	7602
Telangana	0	0	0	0	9	17	38	688	282	103	1137
Tripura	41	30	39	35	50	63	51	59	37	57	462
Uttar Pradesh	164	110	84	55	52	112	117	766	624	717	2801
Uttarakhand	15	4	7	8	18	16	22	52	57	44	243
West Bengal	1852	1243	1645	2126	1388	1613	1551	2863	2639	2464	19384
Total	9929	8276	9236	8022	9685	10606	10335	19535	20323	21406	127353

Table 13: Trend of infant deaths between age 24 hours and 1 month caused due to Asphyxia by state / UTs, HMIS

States / UTs	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	19	14	12	2	4	10	1	10	10	9	91
Andhra Pradesh	914	1109	840	260	254	540	563	1345	1471	1825	9121
Arunachal Pradesh	2	0	0	2	0	1	3	10	29	10	57
Assam	188	148	673	852	706	906	881	1654	1815	2423	10246
Bihar	58	69	411	249	0	140	663	1484	1346	1026	5446
Chandigarh	90	86	86	77	89	36	25	56	48	73	666
Chhattisgarh	226	155	255	298	361	386	358	646	688	851	4224
Dadra & Nagar Haveli	7	5	6	6	9	14	9	6	14	26	102
Daman & Diu	4	0	1	4	5	11	4	5	10	3	47
Delhi	274	74	234	237	352	374	379	452	525	509	3410
Goa	0	0	0	0	1	3	1	4	5	10	24
Gujarat	1389	1383	1107	681	1010	869	896	2402	2296	2361	14394
Haryana	41	207	308	138	214	292	170	254	522	505	2651
Himachal Pradesh	105	142	96	132	100	119	116	81	116	83	1090
Jammu & Kashmir	8	6	10	28	41	120	96	181	345	217	1052
Jharkhand	24	13	32	40	83	66	91	132	152	313	946
Karnataka	1017	451	464	803	1445	1578	1550	1808	1676	1434	12226
Kerala	194	150	130	113	32	37	18	175	109	161	1119
Lakshadweep	0	0	0	0	0	0	0	0	1	1	2
Madhya Pradesh	1277	1540	1116	573	852	1604	1403	2624	2656	2773	16418
Maharashtra	1367	2952	3737	1673	1614	1409	1252	1736	1908	1942	19590
Manipur	3	0	1	3	9	10	9	15	7	24	81
Meghalaya	133	102	107	170	115	113	125	147	158	154	1324
Mizoram	15	3	13	28	20	41	30	32	37	36	255
Nagaland	6	5	11	23	19	31	28	29	32	28	212
Odisha	1473	1567	1510	1637	1630	1615	1579	1866	1840	1935	16652
Puducherry	81	31	47	13	3	6	19	70	56	47	373
Punjab	62	104	94	47	54	59	89	138	83	98	828
Rajasthan	1328	1720	1220	1871	1078	1014	680	926	1558	2162	13557
Sikkim	8	0	0	7	20	9	13	8	9	2	76
Tamil Nadu	2199	1700	2769	1889	1855	1089	868	1159	1311	1387	16226
Telangana	0	0	0	0	48	81	74	170	658	200	1231
Tripura	14	23	29	67	64	76	65	70	59	87	554
Uttar Pradesh	164	120	106	134	135	179	187	2515	1412	1565	6517
Uttarakhand	44	10	1	225	191	60	102	85	117	40	875
West Bengal	4407	2624	2977	4009	3573	3354	2691	4328	3924	3186	35073
Total	17141	16513	18403	16291	15986	16252	15038	26623	27003	27506	196756

Table 14: Trend of infant deaths between age 24 hours and 1 month caused due to low birth weight by states / UTs, HMIS

States	2010	2011	2012	2013	2014	2015	2016	Total
A & N Islands	13	14	12	9	7	9	3	67
Andhra Pradesh	1963	2505	2139	705	429	815	590	9146
Arunachal Pradesh	0	0	0	1	2	7	3	13
Assam	321	280	708	798	703	792	710	4312
Bihar	111	133	336	121	0	230	880	1811
Chandigarh	45	95	46	13	14	17	7	237
Chhattisgarh	272	781	1016	1279	1361	1255	1068	7032
Dadra & Nagar Haveli	22	40	68	27	44	45	42	288
Daman & Diu	0	1	7	28	6	5	9	56
Delhi	385	133	301	336	464	437	526	2582
Goa	0	0	0	7	2	1	1	11
Gujarat	4543	5499	4268	1947	2557	2003	1889	22706
Haryana	256	326	381	328	476	756	426	2949
Himachal Pradesh	153	197	102	132	131	71	91	877
Jammu & Kashmir	10	4	5	31	51	116	80	297
Jharkhand	110	95	146	182	257	158	213	1161
Karnataka	1406	538	596	872	1378	1504	1625	7919
Kerala	249	377	289	320	70	20	8	1333
Lakshadweep	4	2	1	0	0	1	0	8
Madhya Pradesh	2834	2871	2157	1829	3282	4238	3722	20933
Maharashtra	4002	6360	8091	3381	3897	2541	2270	30542
Manipur	6	3	4	2	6	9	10	40
Meghalaya	94	58	123	120	98	92	97	682
Mizoram	10	5	35	37	59	47	51	244
Nagaland	0	4	4	7	16	12	15	58
Odisha	3413	3898	3488	3155	3149	1607	1308	20018
Puducherry	28	13	27	6	5	11	31	121
Punjab	119	189	135	58	104	95	115	815
Rajasthan	2482	3051	1942	3098	2520	2354	1550	16997
Sikkim	9	1	2	18	16	12	7	65
Tamil Nadu	1097	807	1216	813	962	894	837	6626
Telangana	0	0	0	0	159	193	127	479
Tripura	8	20	25	28	69	51	73	274
Uttar Pradesh	220	157	182	115	107	249	304	1334
Uttarakhand	35	21	7	30	71	67	77	308
West Bengal	4165	2334	3145	3898	2913	2606	2272	21333
Total	28385	30812	31004	23731	25385	23320	21037	183674

Table 15: Trend of infant deaths between age 24 hours and 1 month due to other causes by states / UTs, HMIS

States	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	20	30	22	8	13	19	1	34	22	18	187
Andhra Pradesh	4807	4417	3465	1398	647	962	944	3256	2881	2653	25430
Arunachal Pradesh	4	1	18	12	4	20	26	27	27	7	146
Assam	808	368	1186	1192	1230	1075	1304	3692	3677	3665	18197
Bihar	158	437	747	424	0	593	1882	4500	3817	3258	15816
Chandigarh	341	396	412	252	342	322	281	280	321	405	3352
Chhattisgarh	5919	607	827	983	967	1129	1072	2710	2769	3016	19999
Dadra & Nagar Haveli	9	9	22	23	48	33	20	94	115	139	512
Daman & Diu	6	0	8	10	5	8	5	17	19	13	91
Delhi	444	135	310	423	627	645	752	1035	1112	1152	6635
Goa	0	0	0	19	8	3	7	18	49	56	160
Gujarat	4984	5621	4662	1601	2503	2366	2310	6850	6885	6923	44705
Haryana	2605	2428	1878	977	1451	2348	1265	1422	3352	4158	21884
Himachal Pradesh	218	214	203	428	419	244	267	351	526	493	3363
Jammu & Kashmir	20	10	9	50	84	103	105	599	931	716	2627
Jharkhand	247	150	227	245	374	342	410	1377	1711	2030	7113
Karnataka	1230	453	446	758	1299	1332	1618	3976	3413	3301	17826
Kerala	334	376	286	236	83	20	16	766	795	598	3510
Lakshadweep	1	0	1	0	1	0	3	1	0	1	8
Madhya Pradesh	8284	6224	4382	2653	4183	5775	5559	10016	11207	12972	71255
Maharashtra	12004	6859	7195	2239	2753	2433	2301	6164	5985	5967	53900
Manipur	11	4	3	3	15	15	9	35	17	36	148
Meghalaya	433	254	317	298	271	213	234	491	419	550	3480
Mizoram	66	20	20	45	54	39	45	74	52	86	501
Nagaland	2	8	13	9	7	9	43	49	40	24	204
Odisha	5042	4279	2573	2812	3758	2084	2187	4485	4496	3861	35577
Puducherry	44	14	30	5	10	3	9	143	75	135	468
Punjab	707	890	740	695	645	529	540	1177	975	959	7857
Rajasthan	4234	4690	2975	5050	5035	4337	3662	4338	12967	11992	59280
Sikkim	25	0	0	5	26	18	11	33	36	8	162
Tamil Nadu	3635	2937	3518	2842	3124	1271	1094	2084	2002	3104	25611
Telangana	0	0	0	0	285	275	217	690	1331	1102	3900
Tripura	27	18	26	37	52	66	75	328	246	233	1108
Uttar Pradesh	353	262	292	464	517	551	567	5688	3259	3502	15455
Uttarakhand	79	40	10	42	99	76	114	260	460	477	1657
West Bengal	7161	2983	3174	4095	2948	2163	1947	6403	6763	5807	43444
Total	64262	45134	39997	30333	33887	31421	30902	73463	82752	83417	515568

Table 16: Trend of infant deaths between age 1 month and 11 months caused due to Pneumonia by states / UTs, HMIS

States	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	8	16	4	3	2	2	2	3	0	2	42
Andhra Pradesh	246	274	204	79	99	186	134	431	327	406	2386
Arunachal Pradesh	1	7	6	5	3	11	5	10	8	8	64
Assam	161	136	290	263	358	340	397	921	692	735	4293
Bihar	41	142	186	53	0	167	361	620	448	339	2357
Chandigarh	56	53	58	35	49	30	9	29	28	11	358
Chhattisgarh	135	332	405	447	540	456	448	505	529	563	4360
Dadra & Nagar Haveli	14	19	17	11	9	5	7	21	14	5	122
Daman & Diu	0	0	1	1	1	0	0	0	2	4	9
Delhi	267	170	244	248	258	300	207	577	555	384	3210
Goa	0	0	1	4	14	4	4	10	5	7	49
Gujarat	368	331	163	173	322	264	402	923	827	764	4537
Haryana	46	284	165	156	140	208	128	114	346	536	2123
Himachal Pradesh	64	85	70	57	52	44	47	41	46	56	562
Jammu & Kashmir	10	6	6	19	32	49	35	35	85	125	402
Jharkhand	49	36	51	45	75	60	74	143	183	190	906
Karnataka	337	271	229	294	304	333	317	532	495	443	3555
Kerala	37	27	25	32	16	8	5	98	72	84	404
Lakshadweep	0	0	0	0	0	1	0	0	2	0	3
Madhya Pradesh	739	788	535	397	803	1082	1123	1321	1494	1409	9691
Maharashtra	1012	1312	1198	238	848	361	485	667	721	670	7512
Manipur	6	3	7	5	7	13	6	11	8	6	72
Meghalaya	218	165	241	253	381	512	516	315	309	348	3258
Mizoram	155	52	181	194	250	83	64	64	49	64	1156
Nagaland	0	3	11	11	16	25	20	18	21	20	145
Odisha	920	1111	940	708	876	707	788	840	1040	1001	8931
Puducherry	1	0	1	2	1	0	1	35	28	16	85
Punjab	120	139	98	91	100	107	93	159	111	127	1145
Rajasthan	528	559	228	688	862	1002	1105	1168	865	974	7979
Sikkim	8	2	0	6	27	13	3	6	10	10	85
Tamil Nadu	442	220	508	302	318	112	67	298	221	248	2736
Telangana	0	0	0	0	50	51	31	113	120	150	515
Tripura	18	62	61	49	97	97	77	67	42	52	622
Uttar Pradesh	91	84	51	25	45	146	109	584	352	336	1823
Uttarakhand	17	12	9	9	28	18	11	17	31	43	195
West Bengal	1072	642	725	694	675	592	590	1069	1277	1144	8480
Total	7187	7343	6919	5597	7658	7389	7671	11765	11363	11280	84172

Table 17: Trend of infant deaths between age 1 month and 11 months caused due to Diarrhoea by states / UTs, HMIS											
States	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	3	1	0	2	0	0	0	0	1	0	7
Andhra Pradesh	77	91	22	11	6	21	4	53	14	16	315
Arunachal Pradesh	0	4	6	0	1	2	1	5	6	1	26
Assam	24	12	26	35	26	30	29	34	31	35	282
Bihar	9	131	182	62	0	28	81	135	87	49	764
Chandigarh	7	0	1	1	0	0	0	3	3	2	17
Chhattisgarh	60	22	35	38	41	26	25	73	37	34	391
Dadra & Nagar Haveli	0	4	0	4	0	2	0	2	0	0	12
Daman & Diu	0	0	0	0	0	0	1	0	0	1	2
Delhi	131	21	40	23	46	26	48	47	45	41	468
Goa	0	0	0	0	0	0	0	1	0	0	1
Gujarat	411	370	208	20	24	39	37	844	422	256	2631
Haryana	11	377	66	0	0	0	0	49	118	122	743
Himachal Pradesh	13	34	19	8	9	15	7	10	10	10	135
Jammu & Kashmir	1	0	1	4	4	7	7	3	4	4	35
Jharkhand	8	5	13	12	17	12	19	64	48	104	302
Karnataka	20	23	26	20	9	18	16	56	50	46	284
Kerala	4	0	0	2	0	0	0	57	6	11	80
Lakshadweep	0	0	0	0	0	0	1	0	0	0	1
Madhya Pradesh	192	135	99	47	79	113	102	174	173	134	1248
Maharashtra	325	466	225	137	59	0	2	55	67	68	1404
Manipur	8	2	1	4	6	5	4	6	1	3	40
Meghalaya	58	34	69	82	48	76	70	94	53	46	630
Mizoram	17	10	11	14	15	9	12	8	2	4	102
Nagaland	0	4	6	2	3	4	1	3	8	1	32
Odisha	349	60	53	34	55	42	19	50	23	20	705
Puducherry	0	0	1	0	0	0	0	0	1	1	3
Punjab	67	45	30	34	51	45	39	59	29	32	431
Rajasthan	187	167	265	212	53	61	61	84	144	165	1399
Sikkim	2	0	0	0	0	0	0	1	1	8	12
Tamil Nadu	132	87	93	49	38	10	9	40	37	28	523
Telangana	0	0	0	0	2	0	2	49	105	19	177
Tripura	1	3	2	2	1	6	4	2	0	4	25
Uttar Pradesh	48	24	37	19	13	37	25	220	224	159	806
Uttarakhand	2	0	4	4	5	5	6	27	15	11	79
West Bengal	195	53	46	20	24	20	9	477	44	10	898
Total	2362	2185	1587	902	635	659	641	2785	1809	1445	15010

Table 18: Trend of infant deaths between age 1 month and 11 months caused due to Fever by states / UTs, HMIS

States	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	1	3	2	0	0	2	0	1	1	3	13
Andhra Pradesh	206	238	116	41	22	58	22	158	114	109	1084
Arunachal Pradesh	0	0	1	0	2	1	2	1	0	1	8
Assam	103	61	172	197	202	191	213	321	282	353	2095
Bihar	49	196	275	91	0	50	149	299	185	182	1476
Chandigarh	15	1	1	0	1	4	1	1	2	2	28
Chhattisgarh	69	64	96	59	71	64	64	95	76	86	744
Dadra & Nagar Haveli	3	4	3	4	1	1	1	1	3	0	21
Daman & Diu	0	0	0	0	1	0	2	0	3	0	6
Delhi	117	53	109	86	108	81	62	133	151	92	992
Goa	0	0	1	0	0	0	0	2	0	3	6
Gujarat	293	360	72	65	78	94	88	311	224	200	1785
Haryana	22	113	63	0	0	0	0	54	207	267	726
Himachal Pradesh	20	37	38	35	35	42	38	44	45	42	376
Jammu & Kashmir	4	1	4	6	6	11	7	7	6	19	71
Jharkhand	46	36	54	42	70	69	78	126	98	126	745
Karnataka	87	87	70	58	66	68	68	128	63	77	772
Kerala	2	1	4	6	0	0	0	54	3	5	75
Lakshadweep	0	0	0	0	0	0	0	0	1	0	1
Madhya Pradesh	460	384	212	200	391	650	656	585	408	459	4405
Maharashtra	366	275	391	158	13	0	0	285	199	187	1874
Manipur	3	4	6	4	0	4	8	16	0	1	46
Meghalaya	191	127	217	221	293	349	251	208	96	161	2114
Mizoram	60	24	74	105	94	34	28	32	33	15	499
Nagaland	0	5	7	4	11	1	3	5	7	0	43
Odisha	438	252	201	114	208	164	142	178	116	83	1896
Puducherry	0	0	0	0	0	0	3	6	8	2	19
Punjab	132	177	75	6	96	112	120	193	98	67	1076
Rajasthan	271	181	485	204	199	188	215	281	466	363	2853
Sikkim	2	1	2	2	5	4	1	4	5	2	28
Tamil Nadu	77	53	34	34	37	18	3	282	38	29	605
Telangana	0	0	0	0	20	14	15	12	70	46	177
Tripura	7	18	8	12	12	12	7	18	10	8	112
Uttar Pradesh	62	78	77	75	36	125	165	360	268	281	1527
Uttarakhand	10	1	7	13	13	11	15	24	31	33	158
West Bengal	538	267	296	205	159	87	66	138	161	127	2044
Total	3654	3102	3173	2047	2250	2509	2493	4363	3478	3431	30500

Table 19: Trend of infant deaths between age 1 month and 11 months caused due to Measles by states / UTs, HMIS											
States	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	0	0	0	0	1	0	0	0	0	1	2
Andhra Pradesh	6	12	30	8	0	0	0	5	35	23	119
Arunachal Pradesh	0	0	0	0	0	0	0	0	0	0	0
Assam	2	0	4	5	6	0	4	11	12	10	54
Bihar	4	13	108	3	0	1	2	43	8	20	202
Chandigarh	2	0	0	0	0	0	0	1	1	2	6
Chhattisgarh	0	2	1	4	1	3	3	40	9	6	69
Dadra & Nagar Haveli	0	0	0	0	0	0	0	0	0	0	0
Daman & Diu	0	0	0	0	0	0	0	0	0	0	0
Delhi	19	1	0	0	1	1	0	3	11	8	44
Goa	0	0	0	0	0	0	0	0	0	0	0
Gujarat	80	13	9	4	7	0	1	87	34	11	246
Haryana	1	10	0	3	10	12	20	11	28	36	131
Himachal Pradesh	0	0	0	1	1	1	1	2	2	0	8
Jammu & Kashmir	0	0	0	0	0	0	0	0	1	8	9
Jharkhand	4	0	0	0	2	1	0	4	5	11	27
Karnataka	6	2	3	0	0	3	1	17	28	15	75
Kerala	0	0	0	0	0	0	0	44	0	9	53
Lakshadweep	0	0	0	0	0	0	0	0	0	0	0
Madhya Pradesh	18	7	13	5	1	8	4	38	46	44	184
Maharashtra	0	125	31	1	7	2	15	8	10	0	199
Manipur	2	0	0	0	0	0	0	1	1	0	4
Meghalaya	4	1	1	0	0	4	4	5	2	2	23
Mizoram	2	0	0	0	0	2	1	1	3	0	9
Nagaland	0	0	0	0	0	0	6	3	1	1	11
Odisha	23	5	6	3	4	1	5	8	0	0	55
Puducherry	0	0	0	0	0	0	0	0	0	0	0
Punjab	2	1	0	0	1	0	1	1	5	13	24
Rajasthan	4	4	1	0	4	3	1	6	19	12	54
Sikkim	0	0	0	0	0	0	1	0	0	0	1
Tamil Nadu	13	2	3	2	0	0	0	11	0	17	48
Telangana	0	0	0	0	1	1	0	6	21	7	36
Tripura	0	0	1	0	0	0	1	2	2	0	6
Uttar Pradesh	0	38	11	0	2	1	1	23	630	14	720
Uttarakhand	0	0	0	0	0	0	0	2	0	4	6
West Bengal	25	5	3	2	8	1	1	15	22	5	87
Total	217	241	225	41	57	45	73	398	936	279	2512

Table 20: Trend of infant deaths between age 1 month and 11 months due to other causes by states / UTs, HMIS

States	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Total
A & N Islands	10	21	22	4	10	7	7	15	7	17	120
Andhra Pradesh	2510	2941	2079	679	671	831	715	1509	1404	1691	15030
Arunachal Pradesh	3	3	6	12	6	15	19	9	21	14	108
Assam	572	260	1005	1045	1134	1001	1235	2757	2583	2232	13824
Bihar	61	178	247	82	1	451	1372	2044	1728	1597	7761
Chandigarh	268	400	315	141	162	170	77	688	715	613	3549
Chhattisgarh	2707	608	779	719	881	990	1010	1673	1504	1865	12736
Dadra & Nagar Haveli	31	36	25	36	35	25	30	56	60	43	377
Daman & Diu	3	2	7	7	4	3	4	3	6	3	42
Delhi	366	290	448	504	605	564	544	865	688	848	5722
Goa	0	0	1	7	22	11	30	13	30	20	134
Gujarat	3745	3003	2671	1033	1453	1442	1529	5019	3099	3282	26276
Haryana	1329	1532	967	786	1217	2399	1335	1674	2625	3323	17187
Himachal Pradesh	166	123	107	204	212	281	252	225	293	305	2168
Jammu & Kashmir	27	8	26	54	73	96	75	151	230	286	1026
Jharkhand	108	164	298	322	467	385	405	815	933	925	4822
Karnataka	832	716	617	807	1049	1182	1184	2406	2100	2325	13218
Kerala	144	121	108	93	70	37	34	532	418	444	2001
Lakshadweep	0	1	1	1	1	1	2	7	4	1	19
Madhya Pradesh	4046	3422	2053	1576	2830	4538	4513	5749	6241	6553	41521
Maharashtra	7710	4679	4494	1425	2455	2306	2257	3181	3286	2929	34722
Manipur	8	11	10	11	20	26	21	31	13	14	165
Meghalaya	420	375	584	525	690	691	643	625	511	682	5746
Mizoram	198	51	204	260	268	139	109	98	89	88	1504
Nagaland	0	18	11	21	18	26	34	58	43	42	271
Odisha	2996	2407	1791	2470	3577	2994	2784	2862	2884	2650	27415
Puducherry	4	1	5	4	1	4	2	100	38	41	200
Punjab	302	433	373	444	380	397	418	886	678	636	4947
Rajasthan	2292	2192	1344	2567	3515	3711	3879	7011	7878	6297	40686
Sikkim	17	1	1	12	35	36	33	31	37	49	252
Tamil Nadu	2684	1851	2525	1937	2374	595	515	1372	1948	2514	18315
Telangana	0	0	0	0	344	257	263	398	732	756	2750
Tripura	69	67	76	107	172	130	188	300	274	351	1734
Uttar Pradesh	136	154	115	140	136	372	379	1598	1876	1558	6464
Uttarakhand	21	17	9	36	87	80	109	165	209	302	1035
West Bengal	3832	1873	2083	2600	2529	1890	1741	3613	3581	3344	27086
Total	37617	27959	25407	20671	27504	28083	27747	48539	48766	48640	340933

Table 21: Number of medically certified deaths, infant deaths with causes and deaths reported in HMIS (2010-2019), India

Year	Medically Certified Deaths					Deaths Reported in HMIS		
	Total	Infant Deaths and Causes				Infant Deaths and Causes		
		Total	Perinatal	Pneumonia	Diarrhoea	Age < 1 month	Pneumonia	Diarrhoea
2010	970896	94177	67009	3078	478	155477	7187	2362
2011	965992	95813	71060	2198	472	130764	7343	2185
2012	1005804	97565	68882	2510	539	122867	6919	1587
2013	928858	101345	74946	1836	507	91874	5597	902
2014	1066221	105148	76727	1983	443	97724	7658	635
2015	1183052	99493	78084	2413	348	95726	7389	659
2016	1198503	100479	76216	1894	282	90188	7671	641
2017	1411060	105605	81014	1720	338	167104	11765	2785
2018	1456023	114955	85436	2369	590	178780	11363	1809
2019	1571540	119544	84821	2900	643	178994	11280	1445
Total	11757949	1034124	764195	22901	4640	1309498	84172	15010