

# National Neonatal-Perinatal Database

*Report*  
**2002-2003**



**NNPD NETWORK**

*Supported by*  
**Indian Council of Medical Research**  
New Delhi



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NNPD Nodal Center at Department of Pediatrics, WHO Collaborating Centre Newborn Training & Research, All India Institute of Medical Sciences, New Delhi for National Neonatology Forum NNPD Network, India.

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## **PREFACE**

The National Neonatal-Perinatal Database (NNPD) report for the year 2002-03 is another milestone in the development of Neonatal Health care services in India. The National Neonatology Forum (NNF) first launched this initiative in 1995. This is first time when detailed information on individual babies from all centres was gathered prospectively over two full calendar years. The report will be of considerable help to planners, researchers and healthcare providers, who are committed to improve neonatal health care services in the country.

For the participating institutions, it has been a educative and rewarding experience. A systematic approach for collection of data and team-work has been the hallmark of this effort and we are sure that you will see these reflected in the report.

In the present phase, the NNPD network has functioned with generous funding from Indian Council of Medical Research, New Delhi and this venture has taught us many lessons. In comparison to previous non-funded initiatives, we were able to ensure a much wider coverage with more centers joining the Network. We were also able to ensure that data collection from each centre was fully computerized and there was a qualitative improvement as compared to previous initiatives. We hope that in the coming years, this initiative of networking all the centres that care for newborns in the country would continue and multi-centric studies on priority research issues relevant to our country would be addressed through this Network. We invite your valuable suggestions and constructive criticisms on the report as well as suggestions for future funding.

On behalf of the Faculty of Investigators of the NNPD institutions, we wish to thank each and every consultant, nurse, resident doctor and data entry staff without whose help this mammoth national task of data collection would not have been possible. We would also like to thank all the secretarial staff who has helped in this effort with their secretarial skills.

Editors

## **RATIONALE**

1. Improvement in neonatal-perinatal survival is a priority health agenda in India. Over 1 million newborn infants die every year before completing first four weeks of life, amounting to the highest burden of newborn deaths for any country in the world. The current neonatal mortality rate of 44 per 1000 live births accounts for two thirds of the infant mortality in India. Likewise, perinatal mortality continues to be unacceptably high due to maternal undernutrition, anemia and hypertension; lack of basic antenatal care and deliveries by untrained personnel.
2. Recognizing the key importance of neonatal-perinatal health, the Government of India introduced Essential Newborn Care in the Child Survival and Safe Motherhood and Reproductive and Child Health programmes. It is an important responsibility of the professionals engaged in newborn care to provide research inputs that strengthen and support government efforts.
3. A fundamental pre-requisite for planning, implementing and monitoring the health care programmes is to ensure an accurate and ongoing assessment of the morbidity and mortality derived from a reliable database.
4. Realizing this the National Neonatology Forum developed tools and protocols for data collection on neonatal-perinatal morbidity and mortality through workshops supported by the Government of India. This led to the establishment of the National Neonatal-Perinatal



Database Network in 1995 with the Nodal Centre at AIIMS. A total of 16 centres from all over the country joined hands to provide detailed information on over 38,000 intramural deliveries in that year. In 2000, the second cycle of data collection was undertaken. This time 2002-03, in addition to 18 centres providing data on 151,436 intramural deliveries, 17 extramural units provided data on 11,026 outborn admissions.

5. The comprehensive generic data on neonatal morbidity and mortality was a unique achievement because this was based on the largest neonatal population representing various states of the country. It also provided a successful model of multi-centre collaboration on a health agenda of national importance steered by a professional body.
6. The initiative of the National Neonatology Forum in establishing a multi-centre Database has been widely acclaimed. The information generated has been put to academic and operational use.
7. The present report is presented to carry forward this much-appreciated initiative of the NNF by channeling the Network for providing programme-relevant insights into the current status of neonatal-perinatal health.

## AIM

To strengthen the National Neonatal-Perinatal Database (NNPD) Network for providing programme-relevant insights into the current status of neonatal-perinatal health.

## OBJECTIVES

The objectives of the present phase of the National Neonatal Perinatal Database Network are:

1. To generate and disseminate prospective data on neonatal-perinatal morbidity and mortality among intramural deliveries at the Network institutions, with focus on :
  - *Causes of maternal, perinatal and neonatal deaths*
  - *Incidence of LBW and prematurity*
  - *Incidence and outcome of birth asphyxia*
  - *Organisms causing infections in neonates*
  - *Antibiotic resistance pattern of neonatal infections*
  - *Incidence of other morbidity : hypothermia, respiratory distress, hyperbilirubinemia, intraventricular hemorrhage etc.*
  - *Incidence and profile of birth defects*
2. To describe the profile of morbidity and mortality of extramural neonatal admissions at the Network institutions.

## METHODOLOGY

The members of the NNF Database and other institutions of expertise in neonatal-perinatal care in the country were approached for their willingness to be part of this phase of the Network. A total of 18 centres in different states were identified for the Network.

### *Preparatory phase (August – December 2001)*

During this phase, preparations for computerized data entry on a standardized performa were made. In August 2001, a meeting of investigators was held to finalize the methodology for data collection from all the units. In this meeting the following were decided:

- *Data collection forms for intramural births, still births and extramural births These forms were labeled as Performa A, B and C (see Annexure I, II, III).*
- *Standard definitions for common morbidities were finalised. (see Annexure IV)*
- *Computerized data entry on individual babies at each centre.*
- *Computerised data was sent to the nodal center on a monthly basis.*
- *The software for data collection was composed at the Nodal Center using MS Access.*
- *A pilot study using these forms and the software was done at all the centres and suggestions included.*

- *A document outlining detailed steps for sending computerized data was also sent to all the centers.*

By the last week of December, Data collection forms, MS Access program, Instruction Manual, Definitions and Report Sending Manual were sent to all the participating centers.

### ***Data collection phase (January 2002 – March 2004)***

All centers started data collection from 1<sup>st</sup> January 2002 and sent monthly data to the nodal centre. This was either sent on floppy diskettes or by e-mail to the Nodal Center at the All India Institute of Medical Sciences, New Delhi.

At the Nodal Center, quality checks were conducted on the data received and feedback was sent to the individual centres. After due corrections, data from all the centres was amalgamated.

The data thus collated was analysed using the Stata 7 statistical software and Microsoft Excel 97. The database has taken into consideration over about 300 variables while still retaining ease of data collection.

### ***Analysis and report***

The results obtained were scrutinized by the Coordinators of the participating centers and any discrepancy noted was submitted to re-analyses. Part of the results were presented at a meeting of the investigators held at the ICMR headquarters on September 23-24, 2004. The final report is being presented after all the inconsistencies that were noted have been resolved.

## ***REPORT FOR THE YEAR 2002-2003: SALIENT FINDINGS***

### ***Intramural Live-births – Salient Findings***

1. Data from a total of **151,436 deliveries** are included in this report from 18 centres over a period of two years.
2. There were 145,623 live births, 5,813 stillbirths, and 3,680 neonatal deaths.
3. Males constituted 52.9% of all live births, females 47.0 %
4. Amongst livebirths, there were 889 females per 1000 males.
5. Majority of livebirths were full-term infants (84.5%); 14.5% were preterms and a minority (1.0%) were post-term infants.
6. Of the 145,623 livebirths, 31.3% were low-birth-weight infants.
7. Small for gestational age infants formed 9.65% of all livebirths, large for gestational age 4.92% while 85.4% of infants were appropriate for gestational age.
8. There were 97.1% singleton births. The remaining 2.9% were multiple gestations which consisted of 3987 twins, 256 triplets and 2 set of quadruplets..
9. While 96.5% of infants were discharged home, 2.5% died and 1.0% left against medical advice.
10. There were 3680 neonatal deaths amongst the 145,623 live-borns, thus the Neonatal Mortality Rate (NMR) was 25.3 per 1000 live births.

11. Of those who died in the neonatal period, 33 % died within 24 hours of birth, 54.8 % died after 24 hrs but before 7 days of life and 12.2% died beyond the first week in the neonatal period.
12. Early neonatal deaths accounted for 87.8 % of all neonatal deaths.
13. The percentage of infants delivered by caesarean section was 28.7%.
14. Meconium stained liquor complicated 8.4% of all livebirths while fetal distress was detected in 4.2%. Prolonged rupture of membranes was reported in 4.0 %.
15. Of the 145,623 live births for whom data on Apgar scores was available, scores of <7 at 1 minute were documented in 8.4% while 2.4 % continued to have scores of <7 at 5 minutes of life.
16. Administration of oxygen was the most commonly used resuscitative measure in 9.5%, followed by bag and mask ventilation in 6.3%. Intubation for meconium was resorted to in 2.4% while intubation for indications other than meconium was needed in 1.6%. Chest compressions were used to resuscitate 0.8% while use of medications was resorted to in 0.5%.
17. Amongst birth trauma reported, cephalhematoma was the commonest (0.3 %) followed by cuts (0.1%).
18. Respiratory system morbidity figures indicate the incidence of respiratory distress syndrome 1.2% and meconium aspiration to be 1.3%, while transient tachypnea was seen in 3.2%.

19. Amongst disorders of the central nervous system. Hypoxic ischemic encephalopathy accounted for 1.4%; seizures 1.0% and Intraventricular Hemorrhage 0.3 %.
20. The commonest congenital malformations were cardiac in nature (0.5%) followed by limb defects in 0.3 %.
21. Hyperbilirubinemia was detected in 3.3 % neonates; hypoglycemia in 0.9 %; Retinopathy of Prematurity in 0.1 % while polycythemia was seen in 0.2 %.
22. Conjunctivitis was the most common superficial infection, affecting 0.9%.
23. The incidence of systemic infection was 3.0 %
24. Of the 1248 isolates, Klebsiella pneumoniae was the most frequently isolated pathogen (32.5%), followed by Staphylococcus aureus (13.6 %) and Escherchia coli (10.6%).
25. Most strains of Klebsiella pneumoniae showed poor sensitivity to antibiotics including amikacin (114/365, 31.23%), ceftazidime (24/303, 7.9%), ciprofloxacin (102/381, 26.8%), cefotaxime (88/366, 24.0%) and gentamicin (82/363, 22.6%). Among the Staphylococcus aureus isolates, most were sensitive to vancomycin (28/44, 63.6%), and amikacin (48/121, 39.7%), but not to penicillin (10/110, 9.1%).
26. Antibiotics were used in 12.9%, and oxygen therapy in 8.2% while phototherapy was given to 5.7% of neonates. Assisted ventilation was provided to 2.2% and TPN to 0.2% of all neonates.

27. The commonest primary cause of neonatal death was perinatal asphyxia (28.8%). Other major causes were Septicemia /meningitis (18.6%), Extreme prematurity (26.3%) and congenital malformations (9.2%)

### ***Intramural Still-births – Salient Findings***

1. Data from 5813 still-births is presented in this report.
2. Males formed 52.2% of all still-births and females 47.3%
3. Majority of still-births were pre-term (62.7%); 36.5% were term and 0.8% were post-term.
4. Of the 5813 still-births, 76.4% were low-birth-weight.
5. Appropriate for gestational age still-births formed 65.2%, small for gestational age 31.0% and large for gestational age 3.8% of all still-births.
6. Normal vaginal delivery accounted for 76.8% of all still-born infants; 2.5% were forceps extractions; 0.6% needed ventouse application while 13.3% were delivered following cesarean sections.
7. The still-birth rate was 38.4 per 1000 births.
8. The Perinatal Mortality Rate was 59.7 per 1000 births.
9. Of all still-births, 60.4% were detected before onset of labour, 35.3% during labour and 4.3% of still-births were detected only upon delivery.
10. Fresh still-births contributed to 64.3% while macerated ones formed 33.8% of all still-births.



11. Asphyxia was the single most important cause of still-births, accounting for 45.1% of all cases, followed by congenital malformations seen in 7.9% and infections in 2.7%. The cause of still-birth could not be established in 43.0% cases.

### ***Extramural Admissions – Salient Findings***

A total of 11,026 neonates were admitted to the 17 centers of the Network.

1. The sex distribution was as follows: males 67.2%; females 32.7%, thus there were only 487 females per 1000 males.
2. At admission, 37.4% of all neonates were < 24 hours of age, 27.9% were 1 to 2 days of age; 15.9% were between 3 to 6 days of age, 8.8% were 7 to 13 days of age; 5.8% were 14 to 20 days and 4.4% were 21 days or more of age.
3. In 81.4%, delivery was in a hospital; 16.9% were born at home, 0.7% elsewhere and in 0.9% cases, the place of delivery was not known.
4. In majority of cases (81.9%) delivery was attended by a doctor. A nurse or auxillary nurse midwife delivered 1.5% of them, while a Dai delivered 11.2% of them. Information regarding person conducting the delivery was not available in 5.4% of cases.
5. Birth weight was less than 2500 g in 52.1% infants, 2500g or more in 39.9% while in 7.9%, birth weight was not available.
6. At birth, 67.7% were assessed to be full term, 31.5% preterm, and 0.8%, post-term.

7. Of the different types of birth trauma, cephalhematoma was the commonest (1.4 %), followed by cuts, seen in 0.2 %.
8. The predominant morbidities among these babies included were: systemic sepsis (39.7%); hyperbilirubinemia (22.1%); hypothermia (18.4%); neonatal seizures (18.1%); hypoxic ischemic encephalopathy (16.0%); hypoglycemia (9.3%); meconium aspiration syndrome (7.9%) and hyaline membrane disease (6.4%).
9. Conjunctivitis was the most common superficial infection seen in 3.1% neonates, followed by umbilical sepsis in 2.1 %.
10. Septicemia (88.1%) was the most common clinical category of systemic infection, while pneumonia was diagnosed in 32.8% of infants with systemic sepsis. There were 40 cases of tetanus neonatorum.
11. Of the 645 isolates culture positive infants, Klebsiella pneumonia was the commonest (30.1%), followed by Staphylococcus aureus (16.2%), E coli (13%) and Pseudomonas species (9.3%).
12. Most strains of Klebsiella pneumoniae showed poor sensitivity to antibiotics including amikacin (32/166, 19.3%), ceftizoxime (0/129, 0.0%), ciprofloxacin (43/180, 23.4%), cefotaxime (10/125, 8.0%) and gentamicin (12/174, 6.7%). Among the Staphylococcus aureus isolates, most were sensitive to vancomycin (11/28, 32.3%), ciprofloxacin (27/85, 31.8% ) and amikacin (32/93, 34.4%), but not to penicillin (1/77, 1.3%).

13. The most common therapeutic intervention used for admitted babies was the administration of antibiotics (84.2%) followed by IV fluid administration (82%) and oxygen administration (45.3%). Assisted ventilation was given to 23.6% while 32.9% received phototherapy.
14. The mortality rate of extramural neonates was 16.9 % , while 0.7% left against medical advice and 13.1% were referred to other centers/Departments.
15. Admission to time of death was < 24 hours in 10.4%, between 24 and 48 hours in 26.8%, day 3 to 6 in 29.9%, and 7 days or more in 30.7% of the 1878 infants who died.
16. The commonest primary cause of death was sepsis (37.6 %), followed by prematurity and related complications in 19.3 % and birth asphyxia in 18.5%.

***NEONATAL PERINATAL DATABASE***  
***2002-2003***

**TABLES OF DATA**

**PART – 1**

**REPORT ON INTRAMURAL BIRTHS**

**PART – 2**

***REPORT ON EXTRAMURAL ADMISSIONS***

**PART – 1**  
**REPORT ON INTRAMURAL BIRTHS**

*1.1 Intramural Live Birth*

*1.2 Intramural Still Birth*

# PART - 1

## REPORT ON INTRAMURAL BIRTHS

**Following 18 centres contributed data on intramural births**

<b>CENTERS</b>
All India Institute of Medical Sciences <i>New Delhi</i>
Baroda Medical College & SSG Hospital <i>Vadodara</i>
Christian Medical College & Hospital <i>Ludhiana</i>
Christian Medical College & Hospital <i>Vellore</i>
Government Medical College & Hospital <i>Chandigarh</i>
Indira Gandhi Medical College <i>Nagpur</i>
Institute of Obstetrics & Gynecology <i>Chennai</i>
JIPMER <i>Pondicherry</i>
KEM <i>Mumbai</i>
KEM Hospital <i>Pune</i>
KGMC <i>Lucknow</i>
KMC <i>Manipal</i>

LTMG, Sion <i>Mumbai</i>
Maulana Azad Medical College <i>New Delhi</i>
MS Ramaiah Medical College Hospital <i>Bangalore</i>
PGIMER <i>Chandigarh</i>
St. Johns Medical College & Hospital <i>Bangalore</i>
SVICH <i>Chennai</i>

**Panel 1**  
**Major neonatal and maternal outcomes**  
*(All -- centres provided data for these indices)*

<b>Total births</b>	<b>151,436</b>	
<b>Total live births</b>	<b>145,623</b>	
<b>Total neonatal deaths</b>	<b>3680</b>	
<i>Early neonatal deaths</i>		3230 (87.8%)
<i>Late neonatal deaths</i>		426 (11.6%)
<b>Post-neonatal deaths</b> <i>(but before discharge)</i>		24 (0.7%)
<b>Neonatal Mortality Rate (NMR)</b>	<b>25.3</b>	<b>per 1000 live births</b>
<i>Early Neonatal Mortality Rate</i>	–	22.2 per 1000 live births
<i>Late Neonatal Mortality Rate</i>	–	2.9 per 1000 live births
<b>Maternal deaths</b>	<b>93</b>	
<i>Obstetric causes</i>		60
<i>Non-obstetric causes</i>		33
<b>Maternal Mortality Ratio</b>	<b>63.8</b>	<b>per 100,000 live births</b>



**Panel 2**  
*Perinatal outcomes*

<b>Total births</b>	<b>151,436</b>
<b>Live births</b>	<b>145,623</b>
<b>Still births</b>	<b>5,813</b>
<b>Early neonatal deaths</b>	<b>3,230</b>
<b>Perinatal deaths</b>	<b>9,043</b>
<i>Still birth rate</i>	<i>38.4 per 1000 births</i>
<i>Perinatal mortality rate</i>	<i>59.7 per 1000 live births</i>

## **1.1 INTRAMURAL LIVE BIRTHS**

## 1.1 REPORT ON INTRAMURAL LIVE BIRTHS

**Table 1 : Sex distribution and gestation group details**

Category	Number of infants (n = 145623)	Proportion (%)
<b>Sex distribution</b>		
<i>Males</i>	77034	52.9
<i>Females</i>	68493	47.0
<i>Ambiguous</i>	96	0.1
<b>Gestation groups</b>		
<i>Preterm (&lt;37 weeks)</i>	21125	14.5
<i>Term</i>	123108	84.5
<i>Post term (&gt;41 weeks)</i>	1390	1.0

**Table 2 : Birth weight and Intrauterine growth categories**

Category	Number of infants (n = 145623)	Proportion (%)
<b>A. Birth weight*</b>		
<i>Total LBW</i>	45523	31.3
<i>Very low birth weight<sup>#</sup></i>	5018	3.4
<i>Extremely low birth weight<sup>\$</sup></i>	973	0.7
<i>Neonates &lt;2000 gm</i>	12664	8.7
<b>B Intrauterine growth</b>		
<i>Small for dates</i>	14054	9.6
<i>Appropriate for dates</i>	124403	85.4
<i>Large for dates</i>	7166	4.9

Table 32 *Low birth weight: (<2500 gm)*

<sup>#</sup> *Very low birth weight: (< 1500 gm)*

<sup>\$</sup> *Extremely low birth weight: (< 1000 gm)*

**Tables 3 : Details of singletons and multiple live births**

<b>Category</b>	<b>Number of infants (n = 145623)</b>	<b>Proportion (%)</b>
Singletons	141372	97.1
Twins	3987	2.7
Triplets	256	0.2
Quadruplets	8	0.0

**Tables 4 : Details of labour and fetal distress**

<b>Category</b>	<b>Number of infants (n = 145623)</b>	<b>Proportion (%)</b>
Oxytocin use	25314	17.4
Prolonged rupture of membranes	5853	4.0
Meconium stained liquor	12156	8.4
Foul smelling liquor	538	0.4
Fetal distress detected		
(a) <i>Fetal bradycardia</i>	4858	3.3
(b) <i>Fetal tachycardia</i>	1300	0.9

**Tables 5 : Mode of delivery**

<b>Category</b>	<b>Number of infants (n = 145623)</b>	<b>Proportion (%)</b>
Vaginal delivery	95112	65.3
Cesarean section	41720	28.6
Forceps extraction	5443	3.7
Vaccum extraction	2079	1.4
Others	1269	0.9

**Table 6 : Apgar scores**

<b>Apgar score</b>	<b>At 1 minute No of infants (n = 145623)</b>	<b>At 5 minutes No of infants (n = 145623)</b>
0-3	4100(02.8)	996(00.7)
4-6	8126(05.6)	3291(02.3)
7 or more	133397(91.6)	141336(97.0)

**Table 7 : Resuscitation measures used\***

<b>Resuscitation measure</b>	<b>Number of infants (n = 145623)</b>	<b>Proportion (%)</b>
Free flow oxygen	13878	9.5
Bag-mask ventilation	9111	6.3
Chest compressions	1121	0.8
Overall Intubations	5825	4.0
(a) Intubation for meconium	3468	2.4
(b) Intubation otherwise	2357	1.6
Drug(s)	707	0.5

*\*Resuscitation measures are not mutually exclusive, hence more than one measure may have been used on a given infant.*

**Table 8 : Birth trauma**

<b>Type of trauma</b>	<b>Number of infants (n = 145623)</b>	<b>Proportion (%)</b>
Cephalhematoma	489	0.3
Cuts	197	0.1
Nerve palsies	139	0.1
Subgaleal bleed	240	0.2
Fractures	81	0.1
Intracranial trauma	42	0.0

**Table 9 : Respiratory morbidity**

<b>Type of morbidity</b>	<b>Number of infants (n = 145623)</b>	<b>Proportion (%)</b>
Hyaline membrane disease	1674	1.2
Transient tachypnea	4685	3.2
Meconium aspiration	1896	1.3
Air-leak syndromes	146	0.1

**Table 10 : Central nervous system morbidity**

<b>Type of morbidity</b>	<b>Number of infants (n = 145623)</b>	<b>Proportion (%)</b>
Hypoxic ischemic encephalopathy	2075	1.4
Seizures	1501	1.0
Intraventricular hemorrhage	413	0.3

Intracranial bleed other than intraventricular	128	0.1
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**Table 11 : Congenital malformations**

Type of malformation	Number of infants (n = 145623)	Proportion (%)
Cardiac	715	0.5
Meningomyelocele	207	0.1
Other neural tube defect	90	0.1
Limb defects	472	0.3
Gastro-intestinal	272	0.2
Genito-urinary	360	0.3
Cleft lip/palate	167	0.1
Down syndrome	102	0.1

**Table 12 : Miscellaneous morbidity\***

Morbidity	Number of infants (n = 145623)	Proportion (%)
Hyperbilirubinemia	4813	3.3
Hypoglycemia	1306	0.9
Apnea	1026	0.7
Polycythemia	280	0.2
Anemia	768	0.5
Hypocalcemia	396	0.3
Hypothermia	1289	0.9
Rh-isoimmunization	388	0.3
Retinopathy of prematurity	96	0.1

PDA	263	0.2
Hemorrhagic disease	124	0.1

Table 32 *Not mutually exclusive***Table 13 : Superficial infections**

Type of infection	Number of infants (n = 145623)	Proportion (%)
Conjunctivitis	1346	0.9
Pyoderma	465	0.3
Umbilical sepsis	269	0.2
Thrush	448	0.3

**Table 14 : Systemic infections**

Category	Number of infants (n = 145623)	Proportion (%)
<b>Overall incidence</b>	4360	3.0
<b>Time of onset (n = 3308)</b>		
<i>Early onset</i>	2219	67.0
<i>Late onset</i>	1046	31.6
<i>Not Specified</i>	43	1.3
<b>Clinical category*</b>		
<i>Septicemia</i>	3308	2.3
<i>Pneumonia</i>	1578	1.1
<i>Meningitis</i>	463	0.3
<i>Bone/Joint Infection</i>	20	0.0
UTI	24	0.0
Infective diarrhea	24	0.0
Tetanus neonatorum	0	0.0



NEC	285	0.2
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Table 32 *Not mutually exclusive*

**Table 15 : Indicators of conditions of care**

<b>Category</b>	<b>Number of infants (n = 145623)</b>	<b>Proportion (%)</b>
<b>Outcome</b>		
Discharged	140572	96.5
Died*	3680	2.5
<i>Neonatal period</i>	3656	2.5
<i>Post-neonatal period (but before discharge)</i>	24	0.0
Left against advise	1232	0.9
Referred	139	0.10
<b>Therapy given<sup>#</sup></b>		
IV Fluids	16001	10.9
Antibiotics	18722	12.9
Oxygen	11925	8.2
Phototherapy	8244	5.7
Assisted ventilation	3223	2.2
Blood/plasma transfusion	1776	1.2
Parenteral nutrition	302	0.2
Exchange transfusion	900	0.6
Surgery	204	0.1
Cryotherapy/laser for ROP	22	0.0

Table 32 This includes 24 infants who died beyond 28 days and before discharge.

# Not mutually exclusive

**Table 16 : Neonatal Mortality – major indices (live births = 145623)**

<b>Index</b>	<b>Number of infants (n = 145623)</b>	<b>Proportion (%)</b>
Neonatal deaths	3680	-
Early neonatal deaths	3230	87.8
<i>Deaths &lt; 24 hrs</i>	1215	37.6
<i>Deaths 1 to 7 days</i>	2015	62.4
Late neonatal deaths (7-28 days)	426	11.6
Post neonatal deaths	24	0.7
<i>Neonatal mortality rate - 25.3 per 1000 live births</i>		
<i>Early neonatal mortality rate - 22.2 per 1000 live births</i>		
<i>Late neonatal mortality rate - 02.9 per 1000 live births</i>		

**Table 17 : Neonatal mortality in selected categories**

<b>Category</b>	<b>No of infants (n<sup>1</sup> =145623)</b>	<b>No of deaths (n<sup>2</sup>=3680)</b>	<b>Mortality rate (%)</b>
Low birth weight neonates	45523	2778	6.1
Preterm neonates	21125	2285	10.8
VLBW neonates	5018	1490	29.7
ELBW neonates	973	535	55.0

**Table 18 : Neonatal mortality in different birth weight groups**

<b>Birth weight (gms)</b>	<b>No of infants (n = 145623)</b>	<b>No of deaths (n =3680)</b>	<b>Mortality rate (%)</b>
<1000	973	535	55.0
1000-1249	1662	520	31.3
1250-1499	2383	435	18.3
1500-1749	4174	432	10.4
1750-1999	5691	297	5.2
2000-2249	12319	298	2.4
2250-2499	18321	261	1.4
2500-2999	59558	579	1.0
3000-3449	32615	261	0.8
3500 and above	7927	62	0.8

**Table 19 : Primary causes of mortality**

<b>Cause</b>	<b>Number of deaths (n = 3680)*</b>	<b>Proportion (%)</b>
Perinatal asphyxia	1060	28.8
Septicemia/meningitis	590	16.0
Other causes	508	13.8
Hyaline membrane disease	495	13.5
Congenital malformation	337	9.2
Extreme Prematurity	324	8.8
Intraventricular hemorrhage	149	4.1
Birth trauma	5	0.1
Pneumonia	93	2.5
Not established	119	3.2

Table 32 Total deaths include 24 deaths beyond 28 days in patients still admitted to the nursery

**Table 20 : Primary cause of death by broad categories**

<b>Cause</b>	<b>Number of deaths (n = 3680)*</b>	<b>Proportion (%)</b>
Perinatal hypoxia	1060	28.8
Prematurity	968	26.3
Infection	683	18.6
Malformation	337	9.2
Other causes	632	17.2

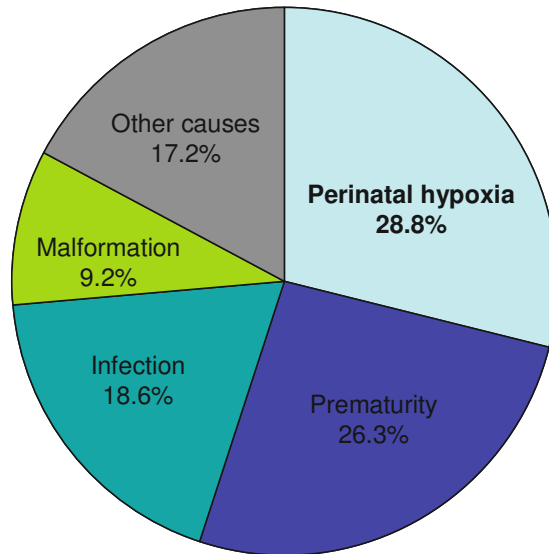
*Total deaths include 24 deaths beyond 28 days in patients still admitted to the nursery*

**Table 21 : Bacterial isolates (intramural data)**

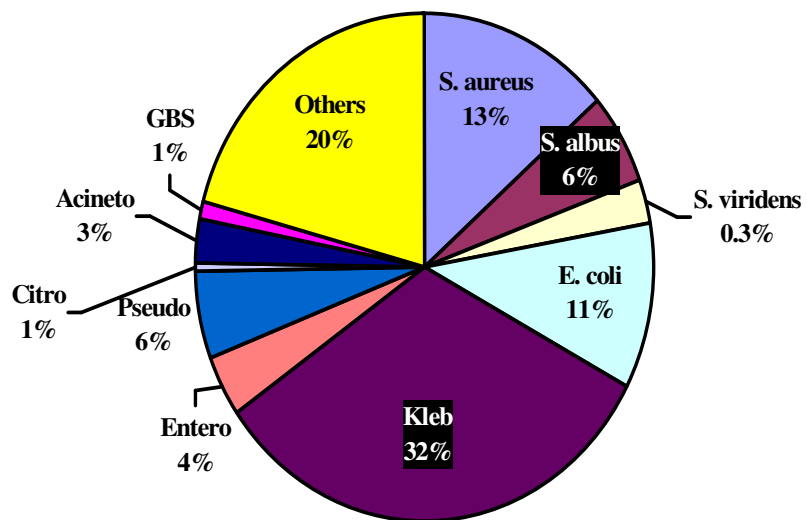
<b>Organisms</b>	<b>No. of isolates (n=1158) (+ve culture =1248)</b>	<b>Proportion (%)</b>
Klebsiella pneumoniae	406	32.5
S. aureus	170	13.6
E. coli	132	10.6
Pseudomonas	70	5.6
S. albus	74	5.9
Enterobacter	47	3.8
Acinetobacter	34	2.7
S. viridans	34	2.7
GBS	13	1.0
Citrobacter	8	0.6
Others	260	20.8
<b>Total</b>	<b>1248</b>	<b>100.0</b>



## Primary causes of death (n = 3680)



## Bacterial isolates causing sepsis intramural neonates (n=1248)



**Table 22 : Antibiotic sensitivity pattern**

	<b>Klebsiella (%)</b>	<b>S. aureus (%)</b>	<b>E. coli (%)</b>	<b>Pseudomonas (%)</b>	<b>S. albus (%)</b>
<i>Peni</i>	5/296 (1.7)	10/110 (9.1)	34/87 (39.1)	1/16 (6.3)	6/22 (27.3)
Ampi	49/354 (13.8)	17/102 (16.6)	11/78 (14.1)	17/45 (37.8)	44/61 (72.1)
Clox	8/303 (2.6)	15/93 (16.1)	0/50 (0.0)	0/15 (0.0)	13/27 (48.2)
Gen	82/363 (22.6)	38/111 (34.2)	38/88 (43.2)	22/51 (43.1)	27/52 (51.9)
Ami	114/365 (31.2)	48/121 (39.7)	92/120 (76.7)	39/53 (73.6)	24/37 (64.9)
Neti	9/306 (2.9)	16/92 (17.4)	14/60 (23.3)	11/31 (35.5)	38/54 (70.4)
Cefa	7/299 (2.3)	16/91 (17.6)	3/51 (5.9)	0/14 (0.0)	35/51 (68.6)
Ceph	6/302 (2.0)	9/87 (10.3)	6/57 (10.5)	5/28 (17.9)	7/25 (28.0)
Cefti	32/326 (9.8)	5/79 (6.3)	41/86 (47.7)	6/22 (27.3)	3/27 (11.1)
Cefo	88/366 (24.0)	49/118 (41.5)	43/95 (45.3)	33/50 (66.0)	14/26 (53.9)
Ceftri	31/334 (9.3)	18/92 (19.6)	29/77 (37.6)	21/40 (52.5)	9/28 (32.1)
Cefap	33/161 (20.5)	19/43 (44.2)	23/54 (42.6)	16/22 (72.7)	43/43 (100.0)
Cefta	24/303 (7.9)	11/87 (12.6)	51/99 (51.5)	16/34 (47.1)	1/18 (5.6)
Piper	18/287 (6.3)	2/72 (2.8)	2/48 (4.2)	5/19 (26.3)	3/43 (7.0)
Vanco	6/54 (11.1)	28/44 (63.6)	1/10 (10.0)	5/8 (62.5)	7/17 (41.2)
Cipro	102/381 (26.7)	37/115 (32.2)	75/112 (66.9)	38/58 (65.5)	21/46 (45.7)



**Table 23 : Antibiotic sensitivity pattern**

	<b>Enterobacter</b>	<b>S.viridans</b>	<b>GBS</b>	<b>Citrobacter</b>	<b>Others</b>
<i>Peni</i>	4/15 (26.7)	1/1 (100)	9/9 (100)	0/1 (0)	9/82 (11.0)
Ampi	12/30 (40.0)	0/0	4/4 (100)	2/4 (50)	42/80 (52.5)
Clox	4/10 (40.0)	0/0	1/1 (100)	0/2 (0)	13/46 (28.3)
Gen	29/39 (74.4)	33/33 (100)	4/5 (80.0)	2/5 (40)	71/129 (55.0)
Ami	24/28 (85.7)	1/1 (100)	4/4 (100)	1/6 (16.7)	77/127 (60.6)
Neti	4/9 (44.4)	0/0	0/0 (0)	0/1 (0)	40/89 (44.9)
Cefa	6/7 (85.7)	0/0	0/0 (0)	0/1 (0)	11/44 (25.0)
Ceph	6/10 (60.0)	33/33 (100)	1/1 (100)	0/1 (0)	7/41 (17.1)
Cefti	18/23 (78.3)	0/0	3/3 (100)	½ (50)	4/32 (12.5)
Cefo	10/27 (37.0)	0/1 (0.0)	9/9 (100)	3/7 (42.8)	59/122 (48.4)
Ceftri	5/13 (38.5)	0/0	2/2 (100)	2/6 (33.3)	7/43 (16.3)
Cefap	13/18 (72.2)	33/33 (100)	4/4 (100)	½ (50)	2/18 (11.1)
Cefta	4/10 (40.0)	0/0	0/1 (0)	0/1 (0)	12/42 (28.6)
Piper	2/7 (28.6)	0/0	0/0 (0)	0/1 (0)	5/48 (10.4)
Vanco	6/13 (46.2)	2/2 (100)	3/3 (100)	0/1 (0)	47/59 (79.7)
Cipro	25/30 (83.3)	33/33 (100)	2/2 (100)	1/6 (16.7)	94/125 (75.2)

## **1.2 STILL BIRTHS**

## 1.2 REPORT ON INTRAMURAL STILL BIRTHS

**Table 1 : Sex distribution and gestation group details**

Category	Number of infants (n = 5813)	Proportion (%)
<b>Sex distribution</b>		
<i>Males</i>	3037	52.2
<i>Females</i>	2749	47.3
<i>Ambiguous</i>	27	0.5
Preterm (<37weeks)	3642	62.7
Term	2122	36.5
Post-term (>41weeks)	49	0.8

**Table 2 : Birth weight and Intrauterine growth categories**

Category	Number of infants (n = 5813)	Proportion (%)
<b>Birth weight</b>		
Total LBW*	4444	76.4
<i>Preterm LBW</i>	3454	77.7
<i>Term LBW</i>	974	21.9
<i>Post term LBW</i>	16	0.4
Very low birth weight <sup>#</sup>	2398	41.3
Extremely low birth weight <sup>\$</sup>	1215	20.9
<b>Intrauterine growth</b>		
<i>Small for dates</i>	1800	31.0
<i>Appropriate for dates</i>	3790	65.2
<i>Large for dates</i>	223	3.8

Table 32 Low birth weight (<2500 gm)

# Very low birth weight < 1500 gm

\$ Extremely low birth weight < 1000 gm

**Tables 3 : Details of singletons and multiple still births**

<b>Category</b>	<b>Number of infants (n = 5813)</b>	<b>Proportion (%)</b>
Singletons	5499	94.6
Twins	296	5.1
Triplets	18	0.3

**Tables 4 : Mode of delivery**

<b>Category</b>	<b>Number of infants (n = 5813)</b>	<b>Proportion (%)</b>
Vaginal delivery	4464	76.8
Cesarean section	770	13.3
Forceps extraction	143	2.5
Vaccum extraction	32	0.6
Other	404	7.0

**Table 5: Time of detection of still birth**

<b>Category</b>	<b>Still births (n = 5813)</b>	<b>Proportion (%)</b>
Detected before labor	3508	60.4
Detected during labor	2055	35.3
Not known	250	4.3

**Table 6 : Types of still birth**

<b>Category</b>	<b>Still births (n = 5813)</b>	<b>Proportion (%)</b>
Fresh	3739	64.3
Macerated	1963	33.8
Not Known	111	1.9

**Table 7 : Birth weight distribution of still births**

<b>Birth weight group (gm)</b>	<b>No of still births (n = 5813)</b>	<b>Proportion (%)</b>
<1000	1215	20.9
1000-1249	735	12.6
1250-1499	448	7.7
1500-1749	640	11.0
1750-1999	428	7.4
2000-2249	620	10.7
2250-2499	358	6.2
2500-2999	910	15.7
3000-3499	341	5.9
≥3500	118	2.0

**Table 8 : Gestational age distribution of still births**

<b>Gestational group (weeks)</b>	<b>No of still births (n = 5813)</b>	<b>Proportion (%)</b>
≤28	1117	19.2
29-30	579	10.0
31-32	686	11.8
33-34	669	11.5
35-36	591	10.2
37-41	2122	36.5
≥42	49	0.8

**Table 9 : Primary causes of still births**

<b>Causes</b>	<b>No of still births (n = 5813)</b>	<b>Proportion (%)</b>
Asphyxia	2622	45.1
Congenital malformations	457	7.9
Infection	156	2.7
Trauma	40	0.7
Rh-isoimmunization	40	0.7
Others / Not established	2498	43.0

**PART – 2**  
***REPORT ON EXTRAMURAL ADMISSIONS***

## PART – 2

### REPORT ON EXTRAMURAL INFANTS

**The following 18 centers provided data on extramural admissions**

<b>CENTERS</b>
All India Institute of Medical Sciences <i>New Delhi</i>
Baroda Medical College & SSG Hospital <i>Vadodara</i>
Christian Medical College & Hospital <i>Ludhiana</i>
Christian Medical College & Hospital <i>Vellore</i>
Government Medical College & Hosptial <i>Chandigarh</i>
Indira Gandhi Medical College <i>Nagpur</i>
Institute of Obstetrics & Gynecology <i>Chennai</i>
JIPMER <i>Pondicherry</i>
KEM <i>Mumbai</i>
KEM Hospital <i>Pune</i>
KGMC <i>Lucknow</i>



KMC <i>Manipal</i>
LTMG, Sion <i>Mumbai</i>
Maulana Azad Medical College <i>New Delhi</i>
MS Ramaiah Medical College Hospital <i>Bangalore</i>
PGIMER <i>Chandigarh</i>
St. Johns Medical College & Hospital <i>Bangalore</i>
SVICH <i>Chennai</i>

**Table 1 : Sex distribution and gestation group details**

<b>Category</b>	<b>Number of infants (n=11026)</b>	<b>Proportion (%)</b>
<b>Sex distribution</b>		
<i>Males</i>	7406	67.2
<i>Females</i>	3610	32.7
<i>Ambiguous</i>	10	0.1
Preterm (<37 weeks)	3471	31.5
Term	7466	67.7
Post-term (>41 weeks)	89	0.8

**Table 2 : Age at admission**

<b>Age (days)</b>	<b>Number of infants (n = 11026)</b>	<b>Proportion (%)</b>
<1 day	4125	37.4
1 to <3 days	3078	27.9
3 to <7 days	1756	15.9
7 to <14 days	1064	9.6
14 to <21 days	602	5.5
≥21 days	401	3.6

**Table 3 : Place of delivery**

<b>Place</b>	<b>Number of infants (n=11026)</b>	<b>Proportion (%)</b>
Home	1860	16.9
Hospital	8980	81.4
Elsewhere	82	0.7
Not known	104	0.9

**Table 4 : Person conducting delivery**

Person	Number of infants (n=11026)	Proportion (%)
Doctor	9033	81.9
Nurse/ANM*	168	1.5
Trained Dai	593	5.4
Untrained Dai	634	5.8
Other	192	1.7
Not known	406	3.7

Table 32 ANM = Auxillary Nurse Midwife

**Table 5 : Birth weight category of admitted neonates**

Category	Number of infants (n=11026)	Proportion (%)
Low birth weight ( $<2500$ gm)	5748	52.1
Normal birth weight ( $\geq 2500$ gm)	4402	39.9
Not known	876	7.9

**Table 6 : Birth trauma**

Trauma	Number of infants (n = 11026)	Proportion (%)
Cephalhematoma	149	1.4
Cuts	22	0.2
Nerve palsy	26	0.2
Subgaleal bleed	37	0.3
Fracture(s)	18	0.2
Intracranial trauma	10	0.1

**Table 7 : Respiratory morbidity**

<b>Morbidity</b>	<b>Number of infants (n=11026)</b>	<b>Proportion (%)</b>
Hyaline membrane disease	709	6.4
Pneumonia	1468	13.3
Meconium aspiration syndrome	871	7.9
Transient tachypnea	617	5.6
Air-leak syndrome	181	1.6

**Table 8 : Central nervous system morbidity**

<b>Morbidity</b>	<b>Number of infants (n=11026)</b>	<b>Proportion (%)</b>
Seizures	1992	18.1
Hypoxic-Ischemic Encephalopathy	1767	16.0
Intraventricular Hemorrhage	248	2.2
Intracranial bleed other than IVH	93	0.8

**Table 9 : Congenital malformation**

<b>Malformation</b>	<b>Number of infants (n=11026)</b>	<b>Proportion (%)</b>
Cardiac	520	4.7
Gastrointestinal	323	2.9
Genito-urinary	144	1.3
Neural tube defect	37	0.3
Limb defects	103	0.9
Hydrocephalus	85	0.8
Cleft lip/palate	72	0.7
Down syndrome	47	0.4

**Table 10 : Miscellaneous morbidity**

<b>Morbidity*</b>	<b>Number of infants (n = 11026)</b>	<b>Proportion (%)</b>
Hyperbilirubinemia	2437	22.1
Hypothermia	2029	18.4
Hypoglycemia	1020	9.3
Anemia	955	8.7
Apneic spells	869	7.9
Hypocalcemia	627	5.7
HDN	362	3.3
Rh isoimmunization	229	2.1
PDA	168	1.5
Polycythemia	124	1.1
Retinopathy of prematurity	28	0.3

Table 32 *Morbidity figures are not mutually exclusive.*

**Table 11 : Superficial infections**

<b>Infection</b>	<b>Number of infants (n=11026)</b>	<b>Proportion (%)</b>
Conjunctivitis	345	3.1
Umbilical sepsis	235	2.1
Thrush	209	1.9
Pyoderma	134	1.2

**Table 12 : Systemic infections**

<b>Category</b>	<b>Number of infants (n=11026)</b>	<b>Proportion (%)</b>
<b>Overall incidence</b>	<b>4378</b>	<b>39.7</b>
<b>Culture status (n = 4378)</b>		
Culture positive	1410	32.2
Culture negative ( <i>Clinical sepsis</i> )	2968	67.8
<b>Time of onset (n=4378)</b>		
Early onset	2457	56.1
Late onset	1984	45.3
<b>Clinical category# (not mutually exclusive)</b>		
Pneumonia	1628	37.2
Meningitis	856	19.6
Infective diarrhoea	62	1.4
Bone/joint infection	47	1.1
UTI	38	0.9
Tetanus neonatorum	40	0.9
NEC	226	5.2

**Table 13 : Report on extramural data 2002-2003**

<b>Organisms</b>	<b>No. of isolates (n=1410)</b>	<b>Proportion (%)</b>
Klebsiella pneumoniae	388	27.52
S. aureus	210	14.89
E. coli	163	11.56
Pseudomonas	183	12.98
S. albus	53	3.76
Enterobacter	84	5.96
Acenetobacter	48	3.40
S. viridans	11	0.78
GBS	0	0.00
Citrobacter	28	1.99
Others	242	17.16
<b>Total</b>	<b>1410</b>	<b>100.00</b>

**Table 14: Antibiotic sensitivity pattern**

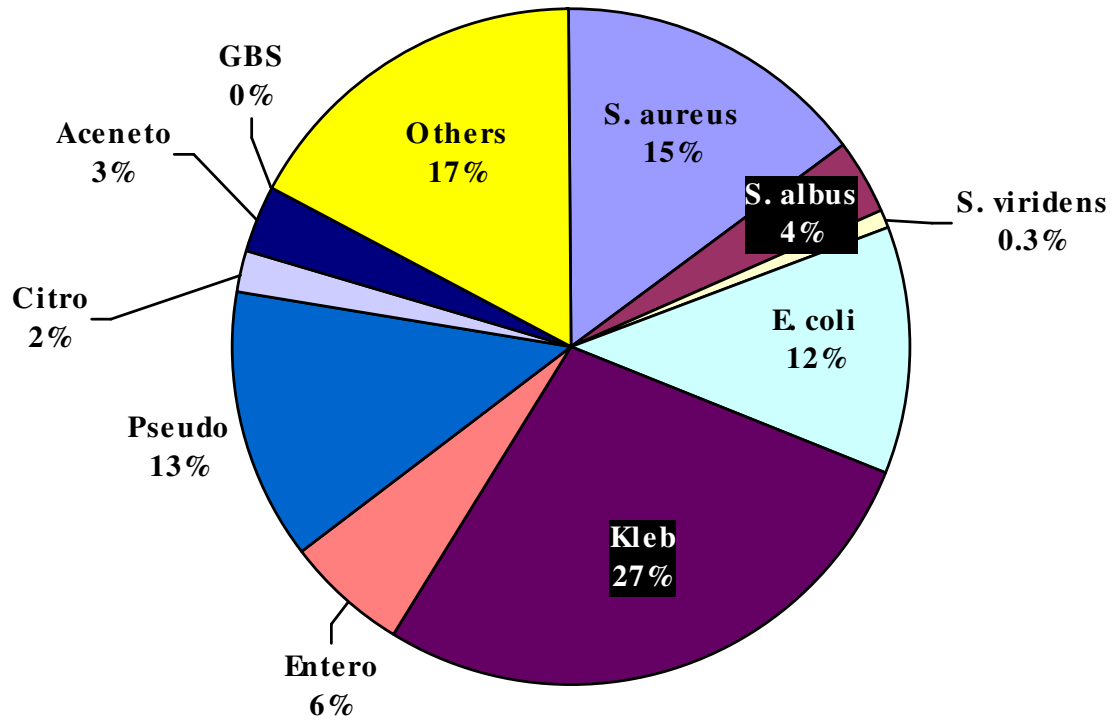
	<b>Klebsiella</b>	<b>S. aureus</b>	<b>E. coli</b>	<b>Pseudomonas</b>	<b>S. albus</b>
<i>Peni</i>	1/227 (0.44)	4/126 (3.17)	8/60 (13.33)	0/11 (0.0)	5/24 (20.83)
Ampi	5/316 (1.58)	14/130 (10.7)	2/96 (2.08)	29/155 (18.71)	15/35 (42.86)
Clox	3/229 (1.31)	15/117 (12.82)	1/39 (2.56)	1/7 (14.29)	15/29 (51.72)
Gen	23/339 (6.78)	28/149 (18.79)	28/102 (27.45)	1/134 (8.21)	19/30 (63.33)
Ami	77/339 (22.71)	82/181 (45.3)	84/134 (62.69)	107/142 (75.35)	36/40 (90.0)
Neti	11/239 (4.60)	23/117 (19.66)	16/60 (26.67)	30/108 (27.78)	20/25 (80.0)
Cefa	1/223 (0.45)	3/91 (3.30)	1/36 (2.78)	0/10 (0.0)	11/15 (73.33)
Ceph	4/278 (1.44)	13/105 (12.38)	3/46 (6.52)	2/108 (20.37)	5/10 (50.0)
Cefti	4/230 (1.74)	0/88 (0.0)	9/46 (19.57)	3/10 (30.0)	0/4 (0.0)
Cefo	38/301 (12.62)	44/160 (27.50)	28/115 (24.35)	124/141 (87.94)	7/17 (41.18)
Ceftri	13/271 (4.80)	32/134 (23.8)	25/7 (32.47)	125/136 (91.91)	1/7 (14.28)
Cefap	23/123 (18.70)	24/62 (38.71)	18/50 (36.00)	121/124 (97.58)	11/11 (100.0)
Cefta	13/259 (5.01)	19/113 (16.81)	30/76 (39.47)	109/125 (87.20)	4/10 (40.0)
Piper	4/230 (1.74)	3/91 (3.30)	5/43 (11.63)	12/21 (57.14)	2/6 (33.3)
Vanco	2/27 (7.41)	50/68 (73.53)	1/6 (16.67)	0/1 (0.0)	11/11 (100.0)
Cipro	94/347 (27.09)	56/151 (37.09)	62/119 (52.10)	116/126 (92.06)	18/31 (58.06)



**Table 15: Antibiotic sensitivity pattern**

	Enterobacter	Acinetobacter	S.viridans	GBS	Citrobacter	Others
		0/3 (0.0)	0/0	-	0/0	11/93 (11.83)
Ampi	4/36 (11.11)	10/32 (31.25)	0/0	-	0/5 (0.0)	10/144 (6.94)
Clox	0/1 (0.0)	0/1 (0.0)	0/0	-	0/0	13/79 (16.46)
Gen	11/47 (23.40)	17/36 (47.22)	11/11 (100.0)	-	3/14 (21.43)	54/170 (31.76)
Ami	40/62 (64.52)	27/38 (71.05)	1/1 (100.0)	-	11/23 (47.83)	10/173 (57.80)
Neti	4/7 (57.14)	5/12 (41.67)	0/0	-	3/7 (42.86)	11/64 (17.19)
Cefa	0/3 (0.0)	0/1 (0.0)	2/2 (100.0)	-	0/0	5/54 (9.26)
Ceph	3/6 (50.0)	6/15 (40.0)	9/9 (100.0)	-	0/2 (0.0)	8/63 (12.7)
Cefti	0/11 (0.0)	3/4 (75.0)	0/0	-	2/2 (100.0)	0/51 (0.0)
Cefo	6/50 (12.0)	23/45 (51.11)	0/0	-	4/18 (22.22)	39/153 (25.49)
Ceftri	1/17 (5.88)	16/23 (69.57)	0/0	-	1/14 (7.14)	13/86 (15.12)
Cefap	23/25 (92.0)	17/19 (89.47)	11/11 (100.0)	-	8/15 (53.33)	16/63 (25.40)
Cefta	5/12 (41.67)	7/9 (77.78)	0/0	-	2/6 (33.33)	11/65 (16.92)
Piper	0/3 (0.0)	0/0	0/0	-	1/2 (50.0)	3/53 (5.6)
Vanco	1/2 (50.0)	0/0	0/0	-	0/0	56/92 (60.87)
Cipro	33/49 (67.35)	22/32 (68.75)	11/11 (100.0)	-	15/19 (78.95)	73/163 (44.79)

## Organism causing sepsis in extramural neonates at 18 centres (n=1410)



**Table 16 : Therapies given**

<b>Therapy given*</b>	<b>Number of infants (n = 11026)</b>	<b>Proportion (%)</b>
Antibiotics	9182	84.2
IV Fluids	9055	82.1
Oxygen	6476	58.7
Phototherapy	3623	32.9
Assisted ventilation	2602	25.6
Blood/plasma transfusion	2500	22.7
Parenteral nutrition	351	3.2
Exchange transfusion	660	6.0
Surgery	355	3.2
Cryotherapy/laser for ROP <sup>#</sup>	14	0.1

\* *Therapies provided are not mutually exclusive.*

# *ROP = Retinopathy of prematurity.*

**Table 17 : Outcomes of admitted neonates**

<b>Outcomes</b>	<b>Number of infants (n=11026)</b>	<b>Proportion (%)</b>
Discharged	7638	69.3
Expired	1860	16.9
Left against medical advice	76	0.7
Referred	1447	13.1
Not known	5	0.0

**Table 18 : Death by weight at admission**

<b>Weight at admission (gms)</b>	<b>No of infants (n=11026)</b>	<b>No of deaths (n=1860)</b>	<b>Intra group mortality</b>
<1000	548	158	28.8
1000-1499	1306	429	32.8
1500-1999	2058	365	17.7
2000-2499	2656	378	14.2
≥2500	4458	530	11.9

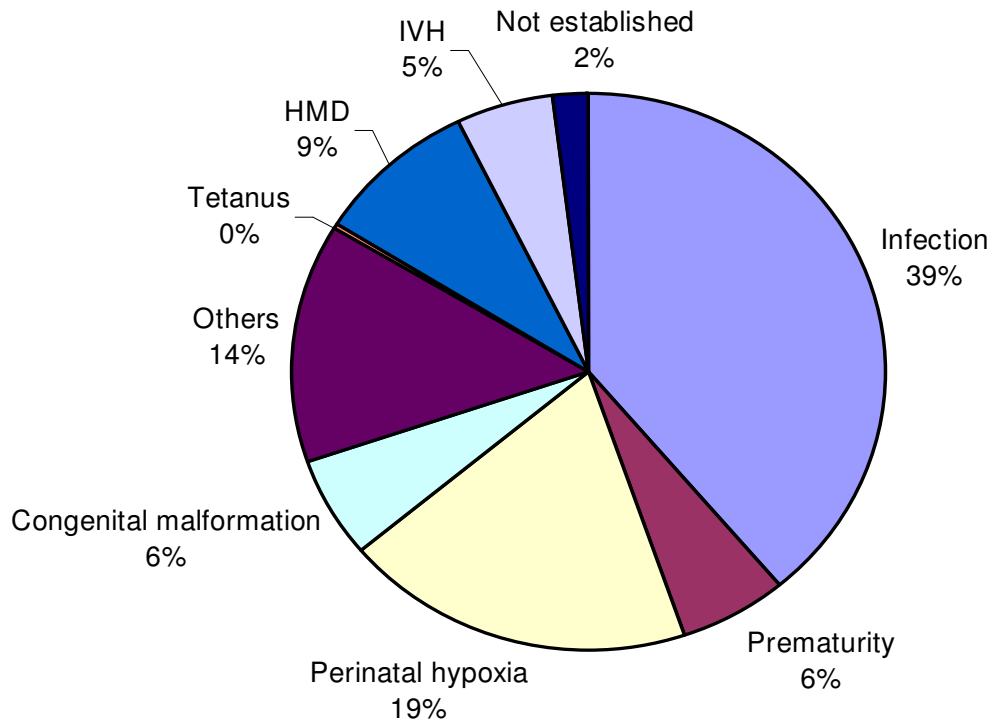
**Tables 19 : Admission to death interval**

<b>Interval (days)</b>	<b>Number of infants (n = 1860)</b>	<b>Proportion (%)</b>
< 1 day	193	10.4
1 – 2 days	503	27.0
3 – 6 days	524	28.2
≥ 7 days	595	32.0
Not known	45	2.4

**Tables 20 : Primary cause of death**

<b>Cause</b>	<b>Number of infants (n = 1860)</b>	<b>Proportion (%)</b>
Infection( <i>Septicemia/meningitis</i> )	707	38.0
Prematurity	108	5.8
Perinatal hypoxia	347	18.7
Congenital malformations	110	5.9
Others	252	13.5
Tetanus	7	0.4
HMD	159	8.5
IVH	94	5.0
Not established	76	4.1

## Causes of deaths among extramural neonates at 18 centers



# NNPD

## WORKING DEFINITIONS

### I. GENERAL

#### ***INTRAMURAL BABY***

A baby born in your center

#### ***EXTRAMURAL BABY***

Baby not born in your center

#### ***FETUS***

Fetus is a product of conception, irrespective of the duration of pregnancy, which is not completely expelled or extracted from its mother.

#### ***BIRTH***

Birth is the process of complete expulsion or extraction of a product of conception from its mother.

#### ***LIVE BIRTH***

A live birth is complete expulsion or extraction from its mother of a product of conception, irrespective of duration of pregnancy, which after separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movements of voluntary muscles. This is irrespective of whether the umbilical cord has been cut or the placenta is attached. [Include all live births >500 grams birth weight or 22 weeks of gestation or a crown heel length of 25 cm]

#### ***STILL BIRTH***

Death of a fetus having birth weight >500 g (or gestation 22 weeks or crown heel length 25 cm) or more.

#### ***BIRTH WEIGHT***

Birth weight is the first weight of a live or dead product of conception, taken after complete expulsion or extraction from its mother. This weight should be measured within

24 hours of birth, preferably within its first hour of live itself before significant postnatal weight loss has occurred.

***LOW BIRTH WEIGHT (LBW)***

Birth weight of less than 2500 g.

***VERY LOW BIRTH WEIGHT (VLBW)***

Birth weight of less than 1500 g.

***EXTREMEY LOW BIRTH WEIGHT (ELBW)***

Birth weight of less than 1000 g.

***GESTATIONAL AGE (BEST ESTIMATE)***

The duration of gestation is measured from the first day of the last normal menstrual period. Gestational age is expressed in completed days or completed weeks. PLEASE PROVIDE THE BEST ESTIMATE OF GESTATION. IT MEANS THAT, IN YOUR JUDGEMENT, BASED ON ALL THE HISTORICAL, ULTRASOUND AND BABY EXAMINATION DATA, THE ESTIMATE AS ENTERED IN THE DATABASE IS MOST ACURATE.

***PRETERM***

Gestational age of less than 37 completed weeks (i.e. less than 259 days)

***TERM***

Gestational age of 37 to less than 42 completed weeks (i.e. 259 to 293 days)

***POST TERM***

Gestational age of 42 completed weeks or more (i.e. 294 days or more).

FETAL GROWTH CATEGORIES (*Use AIIMS chart in Dr. Meharban Singh's book*)

- **SMALL FOR DATES (SFD)**  
Neonate with a birth weight less than 10<sup>th</sup> centile for the period of gestation.
- **APPROPRIATE FOR DATES (AFD)**  
Neonate with birth weight between 10<sup>th</sup> to 90<sup>th</sup> centile for the period of gestation.
- **LARGE FOR DATES**  
Neonate with birth weight over 90<sup>th</sup> centre for the period of gestation.

***PERINATAL PERIOD***

Commences from 22 weeks (154 days) of gestation (the time when the birth weight is 500 g), and ends at 7 completed days after birth.

***NEONATAL PERIOD***

It refers to the period of *less than* 28 days after birth. Early neonatal period refers to the period before 7 days of age. Late neonatal period refers to the period from completion of 7 days upto 28 days of life.

***MATERNAL DEATH***

A maternal death is the death of a woman known to be pregnant within 42 days of termination of pregnancy, irrespective of the duration or site of the pregnancy from any cause related to or aggravated by the pregnancy or its management, but not from accident or incidental causes.

***PROLONGED RUPTURE OF MEMBRANES***

Rupture of membranes or leaking for more than 24 hours.

***ANTEPARTUM HEMORRHAGE***

Bleeding per vaginum after 20 weeks of gestation.

***MATERNAL ANEMIA***

Clinical pallor should be chosen if pallor is present and hemoglobin has not been done.

***FETAL BRADYCARDIA***

Fetal heart rate of less than 120 per minute.

***FETAL TACHYCARDIA***

Fetal heart rate of more than 160 per minute.

**II. NEONATAL DETAILS**

***BIRTH ASPHYXIA***

**Definition I**

*Moderate birth asphyxia* : Slow gasping breathing at 1-minute of age.

*Severe birth asphyxia* : No breathing at 1-minute of age.

**Definition II**



*Birth asphyxia* : Apgar score of less than 7 at 1 minute of age  
*Moderate birth asphyxia* : Apgar score between 4 to 6 at 1-minute of age  
*Severe birth asphyxia* : Apgar score of 3 or less at 1-minute of age.

**For HRRC sites:**

Cry after 5 minutes of age or no cry at all

***RESPIRATORY DISTRESS***

Presence of at least 2 of the following criteria:

Respiratory rate > 60/minute

Subcostal/intercostal recessions

Expiratory grunt/groaning

**Note:** *The baby should be evaluated in between the feeds and in a quiet state. Respiratory rate should be recorded for at least 1 minute.*

***TRANSIENT TECHYPNEA/DELAYED ADAPTATION***

Respiratory distress in a term or borderline term or preterm neonate starting within 6 hours after birth, often requiring supplemental oxygen, but recovering spontaneously within 3-4 days and showing characteristic x-ray changes (linear streaking at hila and interlobar fluid).

***HYALINE MEMBRANE DISEASE***

A. Presence of all of the following three criteria

- Pre-term neonate
- Respiratory distress having onset within 6 hours of birth
- Amniotic fluid L/S ratio of <1.5, or negative gastric aspirate shake test, or skiagram of chest showing poor expansion with air bronchogram/ reticulo-granular pattern/ ground glass opacity.

B. Autopsy evidence of HMD

***MECONIUM ASPIRATION SYNDROME***

Presence of two of the following:

- Meconium staining of liquor or staining of nails or umbilical cord or skin.
- Respiratory distress soon after birth, within one hour of birth
- Radiological evidence of aspiration pneumonitis (atelectasis and or hyperinflation)

***PNEUMONIA***

In a neonate with respiratory distress, pneumonia is diagnosed in the presence of a positive blood culture or if any two one of the following are present.

- Existing or predisposing factors: maternal fever, foul smelling liquor, prolonged rupture of membranes or gastric polymorphs more than 5 per high power field
- Clinical picture of septicemia (poor feeding, lethargy, poor reflexes, hypo, hyperthermia, abdominal distension etc.)
- X-ray picture suggestive of pneumonia
- Positive septic screen (see septicemia)

*For HRRC centres, sepsis screen and x-ray may not be necessary for the diagnosis*

***SEPTICEMIA (SYSTEMIC BACTERIAL INFECTION)***

***CULTURE NEGATIVE (CLINICAL)***

In an infant having clinical picture suggestive of septicemia, the presence of any one of the following criteria is enough for assigning probable diagnosis of infection:

- Existence of predisposing factors: maternal fever or foul smelling liquor or prolonged rupture of membranes (>24 hrs) or gastric polymorphs (>5 per high power field).
- Positive septic screen (two of the four parameters (namely, TLC (<5000/mm, band to total polymorph ratio of > 0.2, absolute neutrophil count less than 1800 / cmm, C-reactive protein >1mg/dl and micro ESR>10 mm 1<sup>st</sup> hour).
- Radiological evidences of pneumonia.

*For HRRCs clinical diagnosis will suffice*

***CULTURE POSITIVE SEPSIS***

In an infant having clinical picture suggestive of septicemia, pneumonia or meningitis along with either of the following.

- Isolation of pathogens from blood or CSF or urine or abscess(es)
- Pathological evidence of sepsis on autopsy.

***EARLY/ LATE ONSET SEPSIS (Pneumonia, septicemia, Meningitis, NEC, UTI etc.)***

Early onset : Onset <72 hours

Late onset : Onset >72 hours

***MENINGITIS***

In the setting of septicemia, if CSF culture is positive; or CSF microcopy and biochemistry are suggestive of meningitis.

***NECROTISING ENTEROCOLITIS (NEC)***

In a baby at risk for NEC (pre-maturity, sepsis, umbilical venous/arterial catheterization, birth asphyxia, extreme pre-maturity, formula feeding) presence of any two of the following:

- Pre feed gastric aspirate of >50% of previous feed or abdominal distension
- Bloody stools or occult blood in the stools
- Radiological evidence of pneumatosis intestinalis/portal air/free air under the diaphragm

***HYPERBILIRUBINEMIA***

Serum bilirubin of >15 mg/dl

***HYPOTHERMIA***

Skin temperature <36 C

***HYPOGLYCEMIA***

Whole blood glucose of less than 40 mg/dl

***HYPOCALCEMIA***

Any one of the following.

- Serum total calcium <7 mg/dl. or
- Serum ionized calcium <4 mg/dl.
- Q<sub>o</sub>T<sub>c</sub> >0.2 seconds on ECG which normalizes after calcium therapy.

### **INTRAVENTRICULAR HEMORRHAGE (IVH)**

**CLINICALLY SUSPECT** if at least 3 clinical criteria in a pre-term infant in whom hypoglycemia and pyogenic meningitis have been excluded:

- Onset of symptoms within 0-72 hours of age
- Apneic attacks or seizures
- Sudden pallor or falling hematocrit
- Gross hypotonia
- Flat or bulging fontanel

*CONFIRMED if corroborated by ultrasound or CT or autopsy findings*

### **ANEMIA**

Hemoglobin <13 g/dl or PCV <40 per cent.

### **HEMORRHAGIC DISEASE OF THE NEWBORN**

Bleeding from any site especially from the gastrointestinal tract

Onset 2<sup>nd</sup> to 5<sup>th</sup> day of postnatal life

Prolonged pro-thrombin time and thrombin time, with normal platelet count.

### **APNEIC SPELL**

Period of respiratory arrest of a duration of more than 20 seconds: or of less than 20 seconds if accompanied by bradycardia (<100/minute) and/or cyanosis.

### **POLYCYTHEMIA**

Capillary hematocrit of more than 70% or venous hematocrit more than 65% after 24 hours of age

### **MAJOR CONGENITAL MALFORMATION**

A malformation that is life threatening or requires surgical correction.

### III. CAUSES OF NEONATAL DEATH

*(This entry should be verified by the PI)*

#### **Important Note:**

*You will be first asked the cause(s) of death and you would choose from the following 11 causes of death. You may assign more than one cause of death at this stage.*

*You will then be asked to identify the single most important cause of death. Here you will choose only one cause. This is the primary or underlying cause of death, which is defined as disease or injury, which initiated the train of morbid events leading directly to death. You will exercise your judgement to assign this cause keeping in mind this definition*

1. **Perinatal asphyxia:** Death of a neonate in the setting of and with features of perinatal hypoxia and / or birth asphyxia followed by manifestations of or hypoxic ischemic injury of brain (hypoxic ischemic encephalopathy) or other organs.
2. **Birth trauma :** Death due to birth trauma.
3. **Extreme prematurity:** Extreme prematurity as a cause of death is assigned to infants having birth weight of less than 750g
4. **Hyaline membrane disease:** Death in a neonate attributable to hyaline membrane disease
5. **Intraventricular hemorrhage :** Death in a neonate attributable to Intraventricular hemorrhage
6. **Pneumonia :** Death in a neonate attributable to pneumonia
7. **Septicemia :** .Death in a neonate attributable to septicemia or meningitis
8. **Tetanus neonatorum :** Death due to tetanus neonatorum
9. **Congenital malformations:** Death due to lethal congenital malformation.
10. **Others:** Mention the cause not classified by above
11. **Not established :** Cause of death not established

### IV. CAUSES OF STILLBIRTHS

*(This entry should be verified by the PI)*

**Important Note:**

*You will be first asked the cause(s) of stillbirth and you would choose from the following 11 causes of death. You may assign more than one cause of stillbirth at this stage.*

*You will then be asked to identify the single most important cause of stillbirth. Here you will choose only one cause. This is the primary or underlying cause of death which is defined as disease or injury, which initiated the train of morbid events leading directly to death. You will exercise your judgement to assign this cause keeping in mind this definition*

1. **Asphyxia:** Death of a fetus in the setting of preeclampsia, hypertension, eclampsia, fetal growth retardation, oligohydramnios, prolonged / obstructed / precipitate labor, meconium passage, cord around the neck , fetal heart slowing or instrumentation.
2. **Trauma :** Death of a fetus in the setting of cephalopelvic disproportion or obstructed labor or instrumentation with obvious evidence of traumatic lesions.
3. **Infection:** Death of a fetus in the setting of intrauterine infections (TORCH group) or chorioamnionitis (maternal fever, abdominal tenderness, foul smelling liquor)
4. **Congenital malformations:** Death of a fetus due to lethal congenital malformation.
5. **Rh Isoimmunization :** Death of a fetus attributable to erythroblastosis fetalis
6. **Others:** Mention the cause not classified by above
7. **Not established :** Cause of death not established