



# Report of the Malaysian National Neonatal Registry 2008

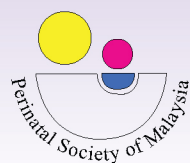
Study of critically ill babies in Neonatal Intensive Care

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- Neoh Siew Hong

**WITH CONTRIBUTIONS FROM:**

- Boo Nem Yun • Chee Seok Chiong • Jimmy Lee Kok Foo
- Noraida Ramli • Soo Thian Lian • Zuraidah Abdul Latiff



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NEONATAL INTENSIVE CARE UNITS**

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## FOREWORD

The study centres comprise 32 out of 40 NICUs in government hospitals, and one from a university hospital. Nearly fifty per cent of deliveries in Malaysia are conducted in the MNNR hospitals, out of which 73961 are admitted for neonatal care and 11219 babies in 2008 fulfilled the MNNR study criteria. Without the great amount of effort and team work by the doctor and nurse coordinators from each NICU and the registry staff to collect and coordinate the data, this study would not have been feasible and their hard work is much appreciated. It is hoped that all the NICUs in this study will look at its performance as compared to the benchmark and continue to strive to provide better care through audit and quality improvement.

The steering committee would like to thank Y.Bhg. Dato' Sri Dr. Hasan bin Abdul Rahman , Dr Hussain Imam and Dr Goh Pik Pin for their constant support.

This is the fifth annual report on the 'Outcome of Critically Ill Babies in the Neonatal Intensive Care Units (NICUs) in Malaysia. This study has enabled comparison of survival rates in our critically ill neonates and rates of screening for retinopathy of prematurity over the years; and compares outcomes such as survival rates, use of antenatal steroids, the rate of complications such as pneumothorax, chronic lung disease, retinopathy of prematurity, across centres, as well as the use of treatment such as parenteral nutrition and surfactant in the care of preterm babies, by the various centres. Variations in outcome arise out of various reasons pertaining to the data itself as well as variations of referral pattern and resources available.

Several papers on this data have been presented at regional and national conferences and for policy-making decisions. It is also hoped that further studies including auditing of NICU care will be stimulated out of the findings from this database, and will lead to continuous quality improvement in NICU care and publications.

Dr. Irene Cheah Guat Sim  
Chairman  
Malaysian National Neonatal Registry

## SUMMARY

The inclusion criteria for this study in 2008 were all preterm babies below 32 weeks gestational age, those of birth weight below or equal to 1500 g, all cases with significant congenital anomalies admitted to the NICUs, all babies who were ventilated and all neonatal deaths.

In 2008, there was a total of 258635 births in the 32 participating centres, of which 2198 were stillbirths and 256437 were livebirths. A total of 11219 babies, who were in level III NICUs, met the study criteria, 9552 were inborns whilst 1657 were outborns. There were 3348 preterm babies below 32 weeks gestational age, and 3699 babies were of birth weights of 1500 g and below.

### Results:

- Twenty-five percent (25%) of the study population were small for their gestational age. There was an increase of SGA rate in all gestational age groups below 37 weeks and all birth weight groups below 2500g. Babies born to mothers of *Orang Asli* ethnicity continued to have the highest risk, fulfilling the study criteria at 8.6 per 1000 livebirths compared to 4-5 per 1000 livebirths in the other three main ethnic groups. These babies are those who required NICU care or had congenital anomalies or neonatal deaths. The next highest risk group of mothers were those of *Bumiputra Sabah* and *Bumiputra Sarawak* ethnicity).
- In 2008, 0% of mothers who were less than 32 weeks' gestation received antenatal steroids. There were marked differences in the use of antenatal steroids across centres, varying from 22-80% of preterm babies below 32 weeks gestational age (GA) in Level IIIB hospitals and 12-84% in Level IIIA hospitals (Figures 12 and 13, Table 37 and 37a),
- There were 3672 babies with birthweight 501 to 1500g (VLBW) with 86.8% inborn and 13.2% outborn babies (figure 15a). Three-thousand three-hundred and fifty-three babies were born with gestational age 22 to 31 weeks with the proportion of inborn 86.6% and outborn 13.4%. The overall maternal steroid usage was 59.6%, higher in inborn 64.0% versus outborn 30.6 (Table 5). The Caesarean section rate for VLBW babies in the MNMR was 47%, low compared to that of other neonatal networks such as the Vermont Oxford Network which had a VLBW Caesarean section rate of 69%. There was a more aggressive use of Caesarean section for the babies (51%) between 1001-1500 g birthweight. The Caesarean section rate for the ELBW babies has increased to 39.8% in 2008 compared to 23% in 2007 (see Figure 18).
- Ninety one percent (91%) of the overall cohort required ventilatory support as in the year 2008. As in previous years, 70% of the ventilated babies were more than 32 weeks' gestation and more than 1500 g birthweight. The duration of ventilatory support for survivors was 27 days for those between 501-750 g birthweight (BW), 17 days for those 751-1000 g BW, eight days for those between 1001-1500 g BW and four days for those of more than 1500 g BW.
- Continuous positive airway pressure support as a mode of respiratory support was used alone only in 14% of the babies, with the highest rate of use (19%) in the larger preterm babies of more than 32 weeks' gestation and more than 1500 g birthweight. This relatively low number of babies on CPAP alone in the larger gestational age categories may be related to the available number of CPAP machines in each NICU, policy on respiratory support in the newborn, prophylactic surfactant and the use of antenatal steroids.
- Seventy nine percent of babies  $\leq$  1500 gm birth weight had Respiratory Distress Syndrome and required ventilatory support. Only 68% of them were treated with surfactant which is

recommended for preterm infants with RDS to improve the survival outcome and reduce morbidity. The centre variability in use of surfactant was 44-90%.

- The rates of chronic lung disease (the requirement for oxygen supplementation) for the survivors between 501-1000 g BW at Day 28 and 36 weeks post-conceptual age were 42.5% and 21.7% respectively. The rates among babies with birth weights 1001-1500g were 13% and 8% at Day 28 and 36 weeks post-conceptual age respectively.
- Postnatal steroids for chronic lung disease was given to 14.4% of those with birth weights  $\leq 1000$ g and 5.2% of those with birth weights 1001 -1500g (Table 19).
- Five hundred and ten (4.5%) of the entire cohort had developed pneumothorax with high mortality in the preterm babies. Overall mortality in this group was high - at 42%.
- The incidence rate for ventilated meconium aspiration syndrome (MAS) was 3.0 per 1000 livebirths. The overall mortality for babies ventilated for MAS was 10.6%, reducing from 16% in year 2007.
- Eight hundred and ninety-three (1.2%) babies who were admitted to the 32 participating centres were diagnosed to have hypoxic ischaemic encephalopathy (HIE). These 893 babies formed 8% of the 11219 babies recruited in the MNNR. Death occurred in 23% of the babies with HIE. Mortality was much higher in infants with severe HIE as 68% of them died when compared with 6% of infants with mild or moderate HIE.
- Among the babies <1500 g who underwent cranial ultrasound examination, 339 (13.6%) had Grade 3 or 4 IVH, a slight increase compared with the last 4 years. The combined mortality rate from Grade 3 and 4 IVH was 63%.
- Among the 1404 babies with gestational age < 32 weeks who underwent ROP screening, 58 (4.1%) had ROP stage 3, Three (1%) had ROP stage 4 and none with ROP stage 5. All 3 babies with ROP stage 4 were below 850 g. This result is comparable with previous years.
- One hundred and twenty six (3.4%) of the VLBW babies who were admitted developed necrotizing enterocolitis (NEC). This was a much lower rate than that of year 2007
- About seventeen percent (16.8% - 1881/11222) of babies in the cohort had congenital anomalies. Among babies 501-1500 g with congenital anomalies, the mortality rate was 62.5%.
- Ten percent (10%) of babies had had one or more episodes of confirmed bacterial sepsis. In this group, mortality rate was 23.6%.. The infection rate was highest (16.8%) in the < 28 weeks gestation group followed by 15.1% in the 28-30 weeks' group.
- The overall survival to discharge was 82% in year 2008, similar to year 2007. Survival of babies up to 31 weeks and up to 1500g improved progressively with increasing gestational age and birth weight. There was a marked difference in survival rate between babies below and above 700 g birth weight i.e. from 23% survival rate for the 601-700 g birthweight group to 43% survival rate for the 701-800 g birth weight group.
- The survival rate of babies between 1001-1500 g birth weight in 24 out of the 32 centres were 85% and above, the key performance index for Level III NICUs. There was a variation in survival rate across centres, varying from 79-93%
- The survival rate of babies between 501-1000 g birthweight varied from 29-73% across centres.

Study recommendations include collaboration with Obstetrics and Primary Healthcare staff to:

- closely monitor the antenatal care of mothers of *Orang Asli* and *Bumiputra Sabah* and *Sarawak* ethnicity to reduce the risk of hypoxic ischaemic encephalopathy and poor outcome with prematurity.
  - enhance the use of antenatal steroids and continue with in-utero transfer of high risk pregnancies.
  - promote Caesarean section for viable extremely preterm deliveries.
  - reduce the number of postterm deliveries and monitor for oligohydramnios to reduce the risk of thick meconium stained liquor.
- and in the NICUs:
- To increase the use of early rather than late surfactant administration in respiratory distress syndrome.
  - To promote the use of continuous positive airway pressure as early as possible after birth to reduce need for mechanical ventilation and to reduce the risk of pneumothorax.
  - To enhance infection control in the NICUs.
  - To increase availability of nitric oxide in state hospitals to reduce mortality from meconium aspiration.
  - To reduce incidence of severe ROP .

## **Report of the Malaysian National Neonatal Registry (MNNR) 2008**

### **1. Organization of the MNNR**

#### **1.1 Objectives**

The Malaysian National Neonatal Registry was set up in 2002 to study the outcome of sick babies admitted to Neonatal Intensive Care Units (NICUs) in the country. A minimum data set and a data collection system at a national level are important to monitor mortality and morbidity of babies admitted to NICUs.

#### **The Malaysian NNR aims:**

1. To determine the frequency and distribution of critically ill neonates in Malaysia. These are useful measures of the health burden of neonatal critical illnesses and its care in the country.
2. To study the mortality and some morbidity outcomes of babies admitted to NICUs in participating hospitals.
3. To calculate the perinatal, neonatal, and stillbirth mortality rates of inborn babies.
4. To compare the outcomes between various centres.
5. To develop indicators for standard of care in various areas e.g. 'Acceptable septicaemic rates in NICUs.
6. To study, in further detail, the outcome of very low birth weight babies.
7. To stimulate and facilitate research on neonatal critical illness and its management.

#### **1.2 Structure**

The MNNR consists of a Governance Board, Steering Committee and administrative staff. The Governance Board is to monitor and to direct the functions of MNNR and it meets at least once a year.

The Steering committee consists of nine members, 8 of whom were elected. The ninth member was appointed based on expertise and involvement in the development of the 'congenital anomalies' section of the registry. This committee is responsible for the general running and decision making of the Registry and for approving the use of its data.

The administrative staff at the Neonatal Registry Unit (NRU) is headed by a Clinical Nurse Manager. She is assisted by a clinical research officer and three other clinical research assistants. Statistical support is provided by the CRC.

#### **1.3 Funding**

The Ministry of Health, Malaysia provided a research grant to 'Study the outcome of critically ill babies in NICUs. Funding was also obtained from the Perinatal Society of Malaysia.



## **2. Data Set**

### **2.1 Participating Centres in 2008:**

1. Hospital Sultanah Bahiyah, Alor Setar, Kedah
2. Hospital Ampang, Selangor
3. Hospital Batu Pahat, Johor
4. Hospital Universiti Sains Malaysia, Kelantan
5. Hospital Raja Perempuan Bainun, Ipoh, Perak
6. Hospital Tuanku Fauziah, Kangar, Perlis
7. Hospital Kajang, Selangor
8. Hospital Keningau, Sabah
9. Hospital Raja Perempuan Zainab II, Kota Bharu, Kelantan
10. Hospital Kuala Lumpur, Kuala Lumpur Federal Territory
11. Hospital Sultanah Nur Zahirah, Kuala Terengganu, Terengganu
12. Hospital Likas, Kota Kinabalu, Sabah
13. Hospital Melaka, Melaka
14. Hospital Miri, Sarawak
15. Hospital Pakar Sultanah Fatimah, Muar, Johor
16. Hospital Pulau Pinang, Pulau Pinang
17. Hospital Putrajaya, Putrajaya Federal Territory
18. Hospital Seberang Jaya, Pulau Pinang
19. Hospital Selayang, Selangor
20. Hospital Serdang, Selangor
21. Hospital Tuanku Ja'afar, Seremban, Negri Sembilan
22. Hospital Seri Manjung, Perak
23. Hospital Sibu, Sarawak
24. Hospital Sg. Buloh, Selangor
25. Hospital Sultan Abdul Halim, Sg. Petani, Kedah
26. Hospital Sultanah Aminah, Johor Bharu, Johor
27. Hospital Taiping, Perak
28. Hospital Tengku Ampuan Rahimah, Klang, Selangor
29. Hospital Tengku Ampuan Afzan, Kuantan, Pahang
30. Hospital Teluk Intan, Perak
31. Hospital Sultan Haji Ahmad Shah, Temerloh, Pahang
32. Hospital Umum Sarawak, Kuching, Sarawak

Centre numbers allocated to centres were different from the numbers above.

### **2.2 Levels of Neonatal Care**

Care for the newborn is provided at three levels. (See Appendix 1)

Hospitals with a Level III NICU provide all the above levels of care and were referred to in this report as tertiary hospitals. Most Level III NICUs are in Ministry of Health hospitals and a few are in university hospitals. A total of about 40 government and three university hospital centres in the country provided neonatal intensive care to sick babies in 2008, and 32 of these NICUs are source

data producers (SDPs) of the MNNR (31 NICUs in government hospitals and one NICU attached to a university).

The majority of the state hospitals or larger NICUs in Selangor offered Level IIIB care in all aspects except for the availability of HFOV and nitric oxide and subspecialties in some hospitals. These hospitals would accept the more ill and smaller babies from the smaller NICUs (Level IIIA Hospitals) in the study, although the latter hospitals do manage the ELBW (extremely low birth weight babies) in smaller numbers. There were neonatologists in 14 out of the 32 centres.

Many hospitals in the country provide only Level I and II neonatal care and refer the more sick (or ill) babies to Level III NICUs, when the need arises.

## **2.3 Registration criteria**

The MNNR audit of critically ill babies admitted to Neonatal Units (NNUs) included

- A. All babies admitted to a Neonatal Unit who
  1. had a gestation of <32 weeks i.e. up to 31 weeks + 6 days.
  2. had a birth weight of 1500 g and below.
  3. were ventilated.
  4. had significant congenital anomalies.
- B. All neonatal deaths (i.e. newborn babies (<28days) who die in the NNU, delivery room i.e. operating theatre, labour room, and in other wards)

Both inborn and outborn babies will be included but outborn babies who die before arrival will be excluded. Babies who are admitted to the NNU at a corrected gestation of > 44/52 will not be considered a neonatal case and hence will be omitted from the study.

## **2.4 Data set variables**

The variables and their definitions are listed in Appendix 2.

The Case Report Forms (CRFs) include the name of hospitals for ex-utero transfer and place of death. Data on all inborn births according to birth weight and ethnicity was also collected to facilitate calculation on perinatal and neonatal mortality rates of each hospital. (Appendix 3 Birth Census)

In this report, babies are referred to as 'very preterm' if they are less than 32 completed weeks' gestation, 'preterm' if they are less than 37 completed weeks' gestation, and 'term' if born at 37 weeks' gestation or more. Very low birthweight (VLBW) babies are babies with birth weight (BW 501-1500g) and extremely low birthweight (ELBW) babies below birth weight of 1000g.

## **2.5 Data Collection**

The CRF consisted of four sheets (of forms). (Appendix 4 CRF)

Babies discharged or transferred out to non-paediatric wards (e.g. paediatric surgical wards) in the same hospital or to other hospitals will have only one set of CRF completed and readmission of the same babies into the NNU will require a new set of CRF.

A baby who was transferred between neonatal and paediatric wards under the same department was considered to be the same admission and the discharge CRF was completed after complete discharge from the hospital. Hardcopy CRFs were used and completed CRFs were sent to the Neonatal Registry Unit (NRU) after a defined period.

## 2.6 Data Verification

Missing or anomalous data were identified by a manual check at the NRU and then queried and corrected with the respective centre. Further data verification is made on data entry onto the main database. Quantification of errors and the implementation of practices to minimize errors are continually refined.

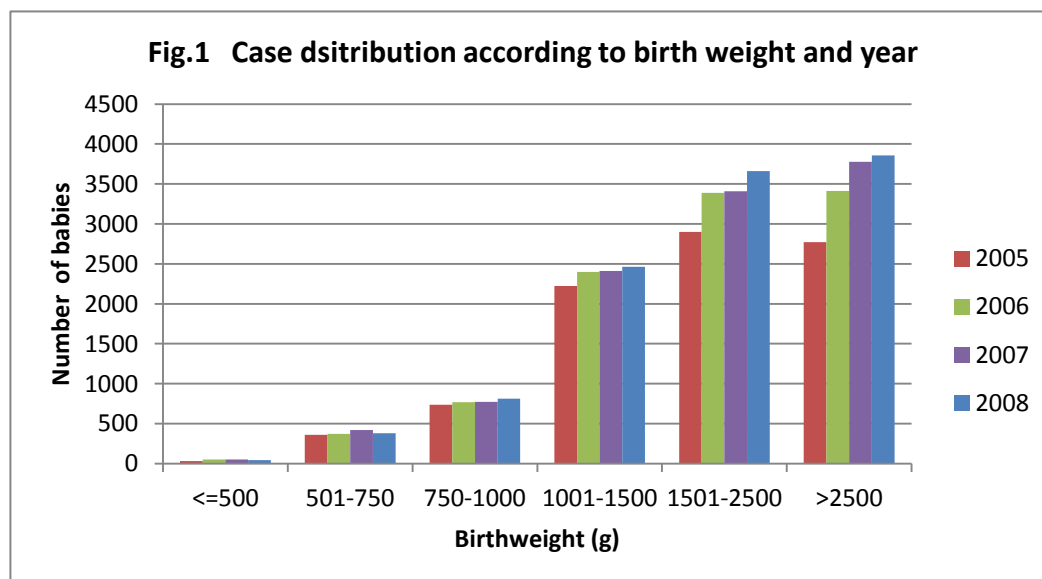
## 3. Results

### 3.1 In General

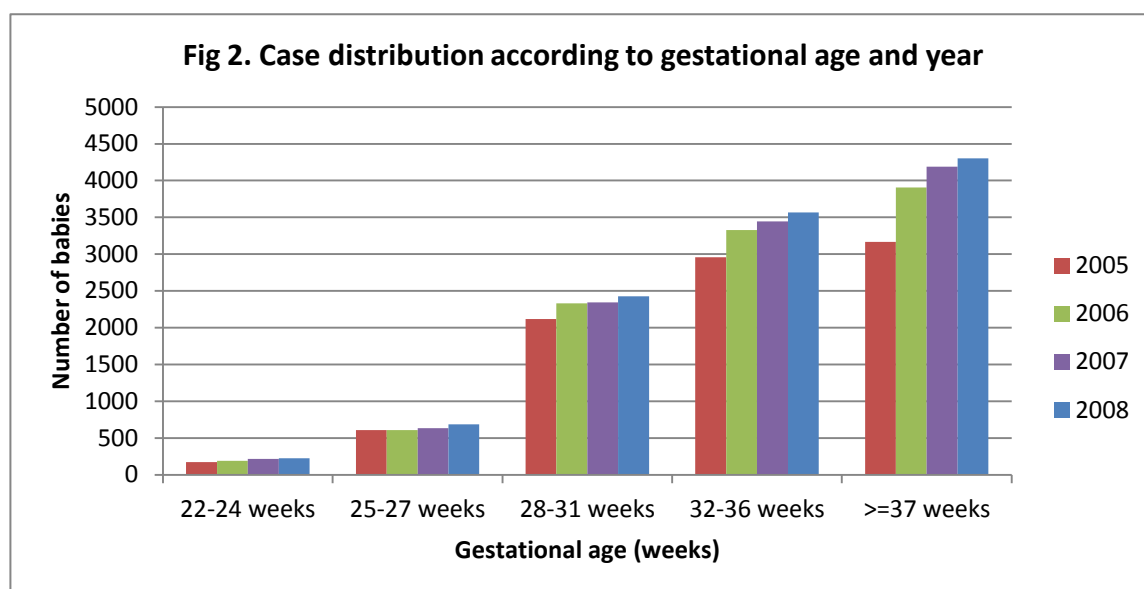
In 2008, total births in the 32 participating centres was 258635; of which 2198 were stillbirths and 256437 were livebirths. NICU admissions also included outborn babies from other hospitals which may or may not have been participating centres in the MNNR.

A total of 11219 babies who were admitted met the criteria to be included in the MNNR (Table 1). Of these 9552 were inborn babies (Table 1a). Of these 3348 babies (29.8%) were less than 32 completed weeks' gestation (Table 2) and 3699 babies (323.0%) had birth weights of 1500 g and below (Table 3). A total of 1235 babies (11.0%) were of birth weights 1000g and below (Figure 1, Table 3).

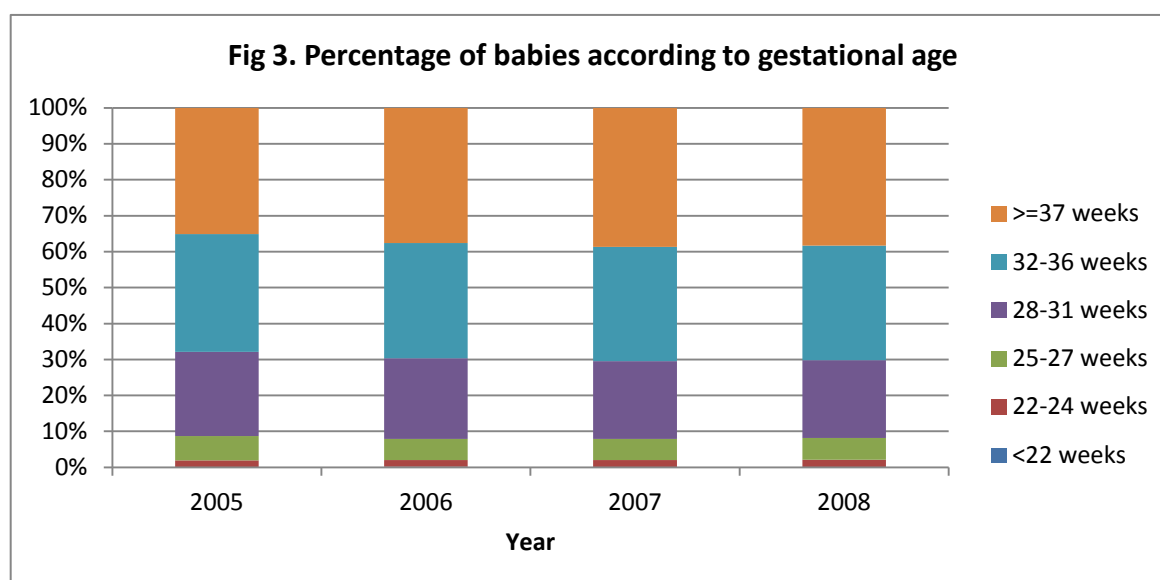
There were more babies in the 2008 cohort compared to the 2007 cohort (Figures 1 and 2). The increase was due to the recruitment of one more MNNR centre which contributed 395 babies to the cohort. The case distribution according to gestational age remained the same as in 2007 (Table 2 and Figure 3).



**Figure 1. Case distribution according to birth weight and year**



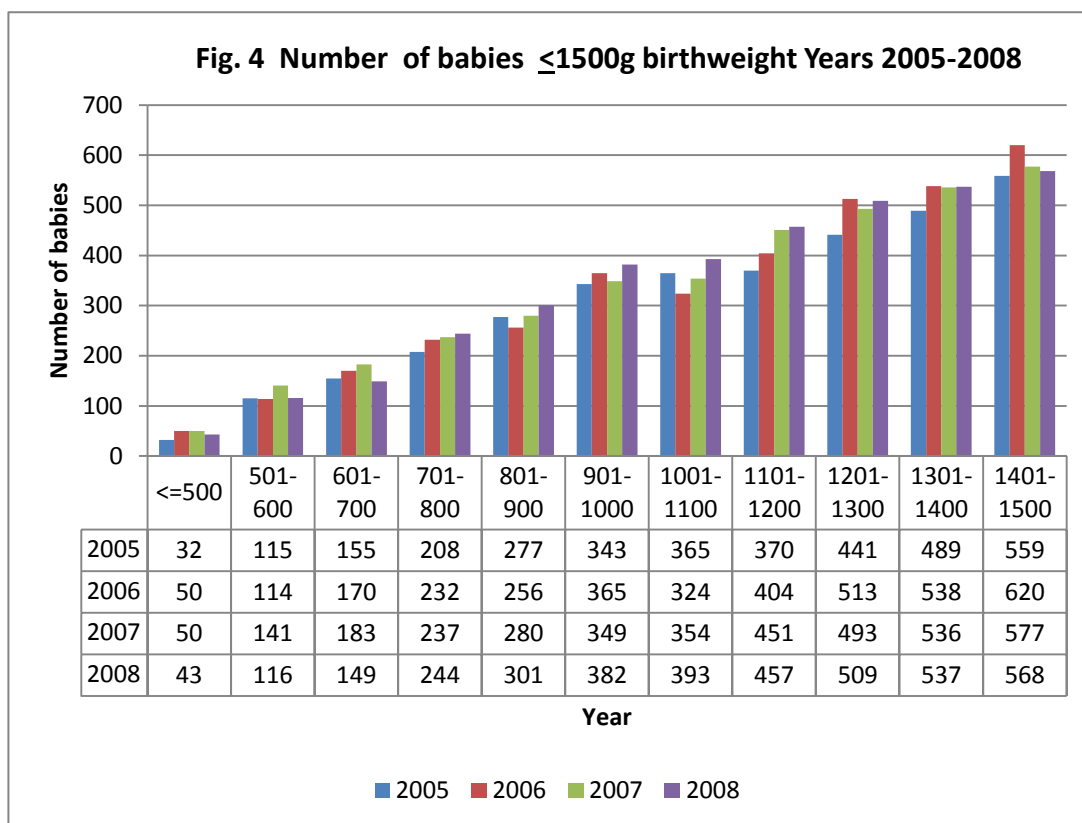
**Figure 2. Case distribution according to gestational age and year**



**Figure 3. Percentage of babies according to gestational age by year**

The babies who met the criteria for the study, totaling 11219, were generally the babies requiring the most care, and did not include many other babies admitted to the NICUs for other treatment and observation. The total number of admissions to the 32 centres totalled 73961 based on census collected concurrently by the NICUs; an increase of 4141 babies from 2007. Although there was an additional centre, this only accounted for 1308 additional cases to the MNNR.

Of the 256437 livebirths delivered in the 32 MNNR hospitals, about 1.4% were of birth weights below or equal to 1500 g (see Figure 4). Eleven percent of total livebirths between 1501-2500 g birth weight ( i.e. 3672 out of 32376) and 1.8% (of all livebirths) with birth weights above 2500 g, ( i.e. 3862 out of 220370) met the MNNR study criteria.



**Figure 4. Number of babies  $\leq 1500$ g birthweight, Years 2005-2008**

### 3.1.1 Growth status

In terms of growth status, 2816 babies (25% of the whole study population) were small for their gestational age (SGA < 10<sup>th</sup> centile for gestation according to the revised intrauterine growth curves by Kitchen W.H. et al<sup>1</sup>). There was an increase of SGA rate in all gestational age groups below 37 weeks and all birth weight groups below 2500g. The SGA rate for very preterm babies (gestation <32 weeks) was 25% compared to 18% and for VLBW babies (BW 501-1500g) was 38% compared to 35% in the 2008 and 2007 cohorts respectively (Tables 7 and 7a).

<sup>1</sup> Kitchen WH, Robinson HP, Dickinson AJ. Revised intrauterine growth curves for an Australian hospital population. Aust Paediatr J 1983; 19:157-61.

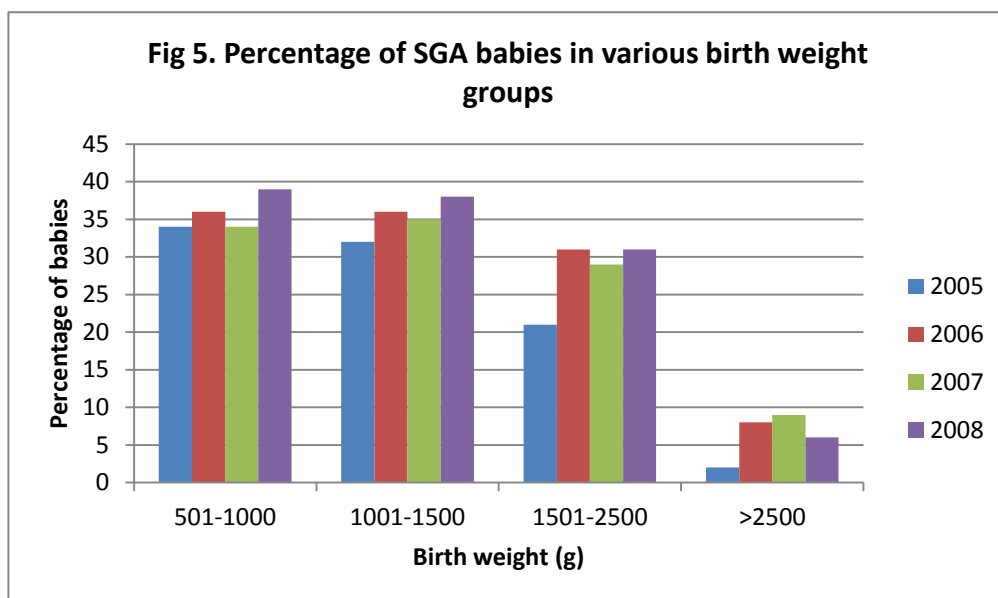


Figure 5. Percentage of SGA babies in various birthweight groups

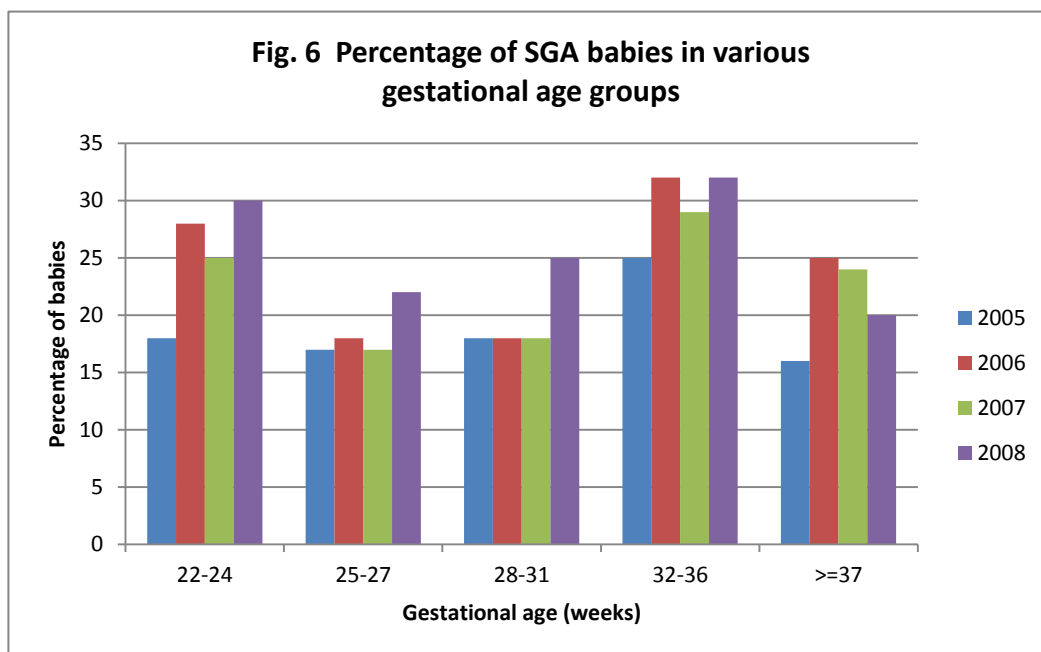
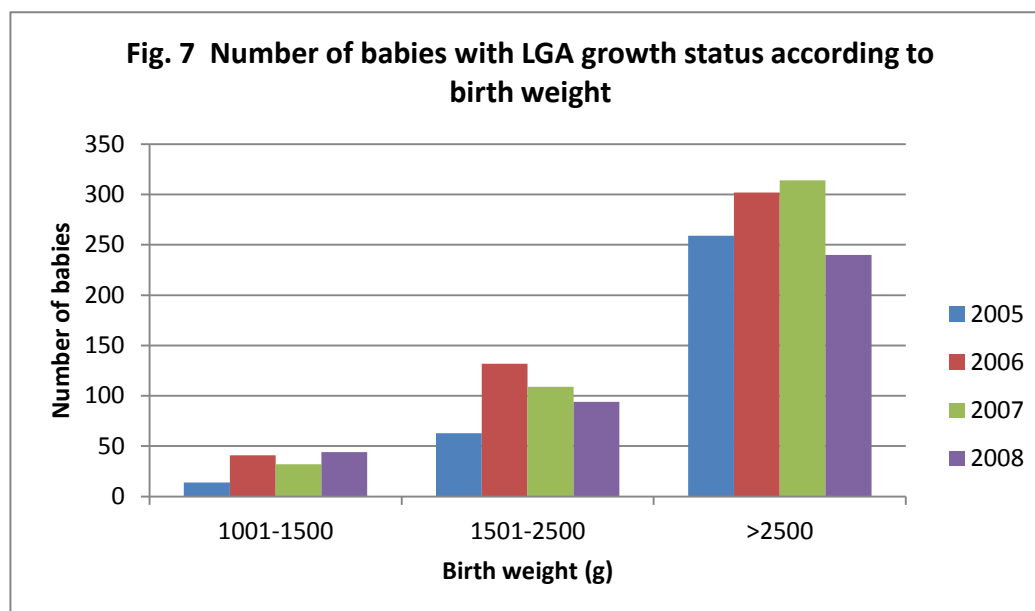


Figure 6. Percentage of SGA babies in various gestational age groups

LGA babies comprise 1.8% of the VLBW babies and 6.2% of critically ill babies of birth weight more than 2500 g and 3.8% of term babies in the MNNR study in 2008.

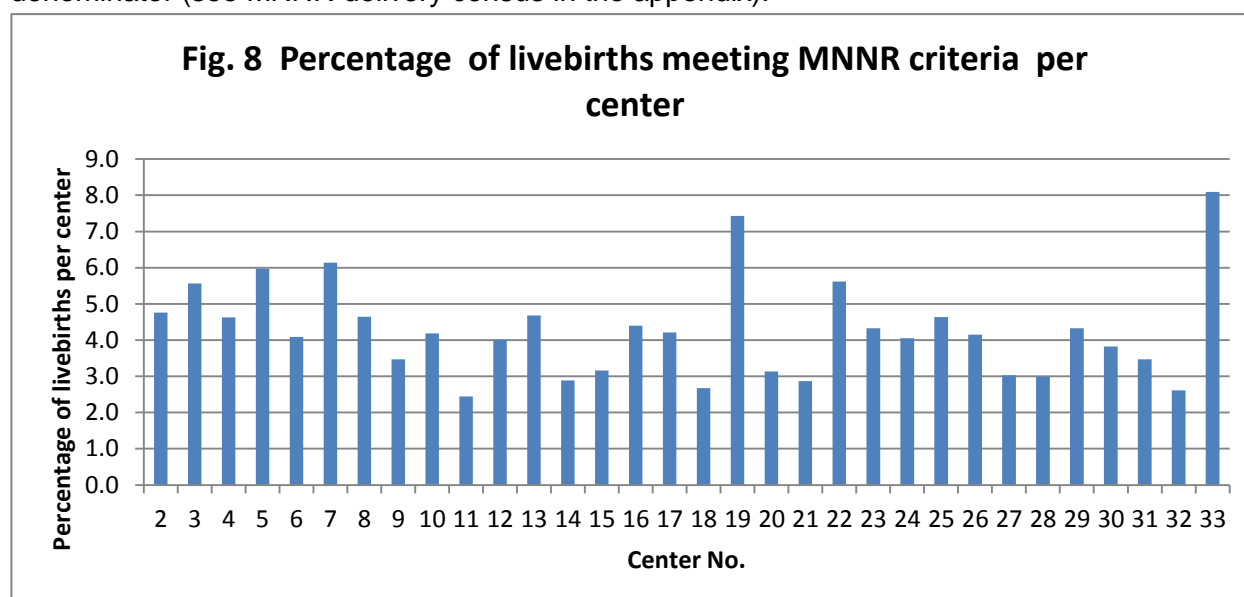


**Figure 7. Number of babies with LGA growth status according to birth weight**

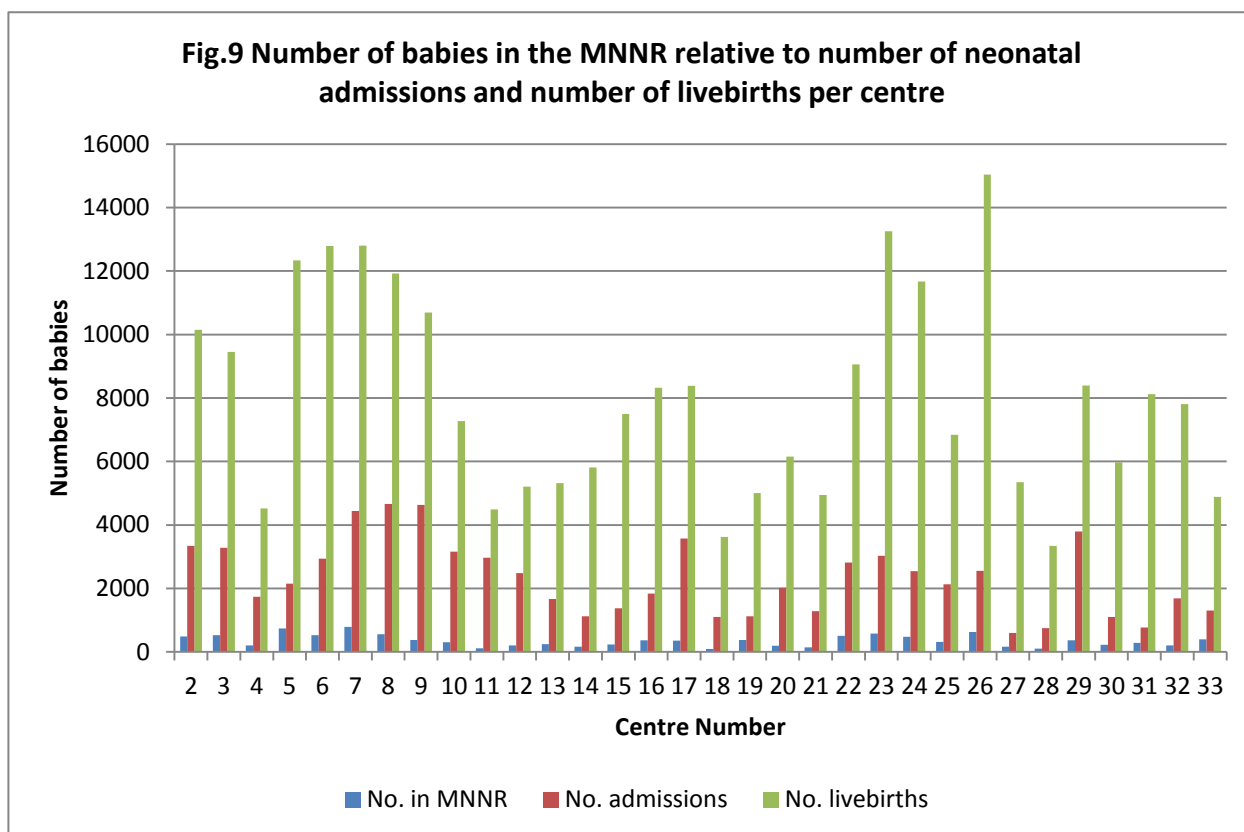
### 3.1.2 Registrants per unit

The number of admissions and number of babies included in the study from each Neonatal Unit are as shown in Table 1. The number of babies in the centres who met the criteria and was included in the study ranged from 97 to 786. These numbers reflected the size of the centre, the case mix of their patients and the geography and population distribution of each area.

The number and percentage of babies in the study group relative to the number of babies admitted to NICUs and the total livebirths per centre is shown in Figures 8 and 9. The percentage of MNNR babies (i.e. the more critically ill babies) varied between 2.4% and 8.1% between centres, with a mean of 4.3%. The centres with their percentage of critically ill babies according to MNNR definition are shown in Figure 8. It should be noted that the determined percentage could be affected not only by the absolute number of critically ill babies but may be spuriously increased by a small livebirth denominator (see MNNR delivery census in the appendix).

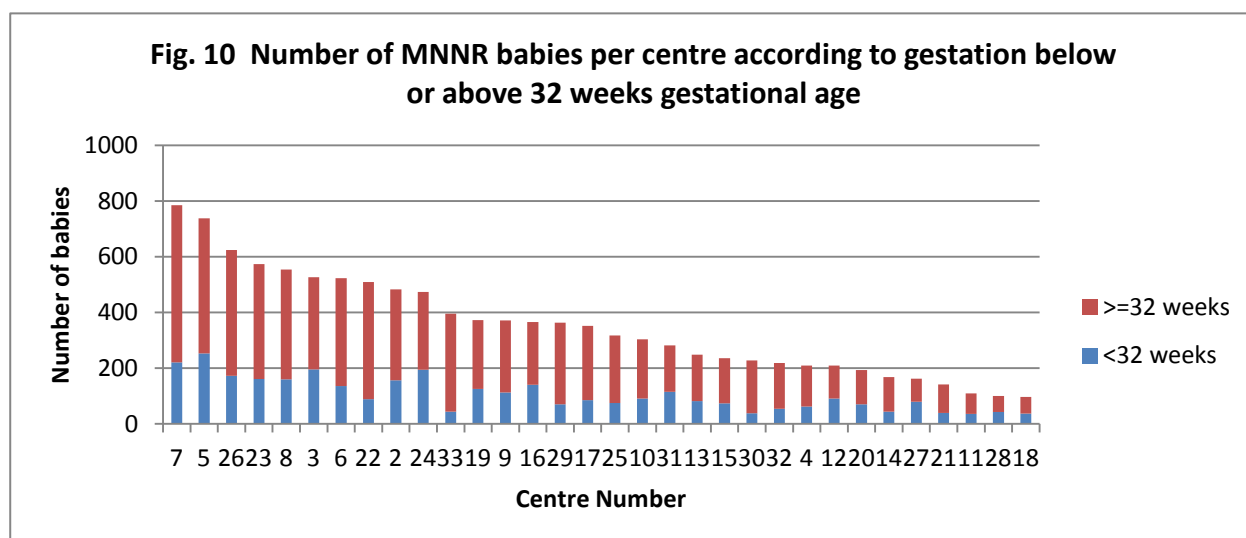


**Figure 8 Percentage of livebirths meeting MNNR criteria per centre**



**Figure 9. Number of babies in the MNMR relative to number of NICU admissions and number of centre livebirths per centre**

The relative proportion of babies below 32 weeks' gestation at birth against the number of babies from each centre is shown in Figure 10, showing the centres with descending order of the number of babies who met the study criteria.



**Figure 10. Number of babies in MNMR, per centre according to gestation below or above 32 weeks gestational age**



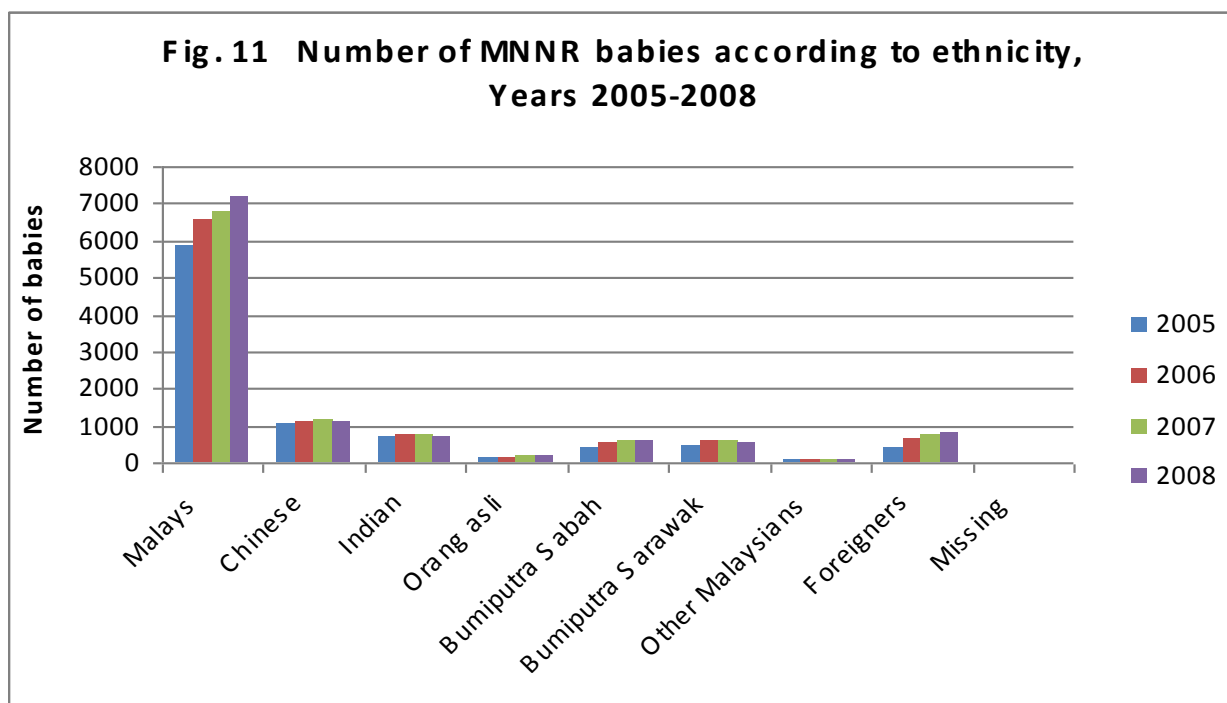
### 3.2 The Mother

Ethnic distribution (according to mother's ethnicity) was 64.3% Malays, 9.8% Chinese, 6.3% Indians, 1.5% Orang Asli, 5.3% Bumiputra Sabah, 4.8% Bumiputra Sarawak, 0.7% Other Malaysians and 7.2% Foreigners (Table 4). This was similar to previous years.

Table 4c shows a much higher percentage of Orang Asli babies born in the SDP hospitals that met the MNNR criteria (8.6%), i.e. they were more ill or of very low birth weight, preterm or having significant congenital abnormalities; followed by Bumiputra Sabah (5.2%), Bumiputra Sarawak (5.1%) and Foreigners (5.0%). Although Malay mothers have the largest number of their babies in the study, it is not an over-representation of the mothers delivering ill babies in the SDP hospitals (Table 4b, Figure 11).

**Table 4b. Ethnic distribution of livebirths (LB) in SDP hospitals vs. Distribution in study, 2008**

<b>Ethnicity</b>	<b>No. of livebirths in SDP hospitals</b>	<b>No. of babies in MNNR</b>	<b>Percentage of each ethnic group in MNNR</b>
Malays	174171	7211	4.1
Chinese	23501	1104	4.7
Indian	14799	702	2.7
Orang asli	1967	169	8.6
Bumiputra Sabah	11530	595	5.2
Bumiputra Sarawak	10612	541	5.1
Other Malaysians	3541	81	2.3
Foreigners	16311	811	5.0
Missing	5	5	



**Figure11. Number of MNNR babies according to ethnicity, Years 2005-2008**

### 3.3 Use of Antenatal steroids

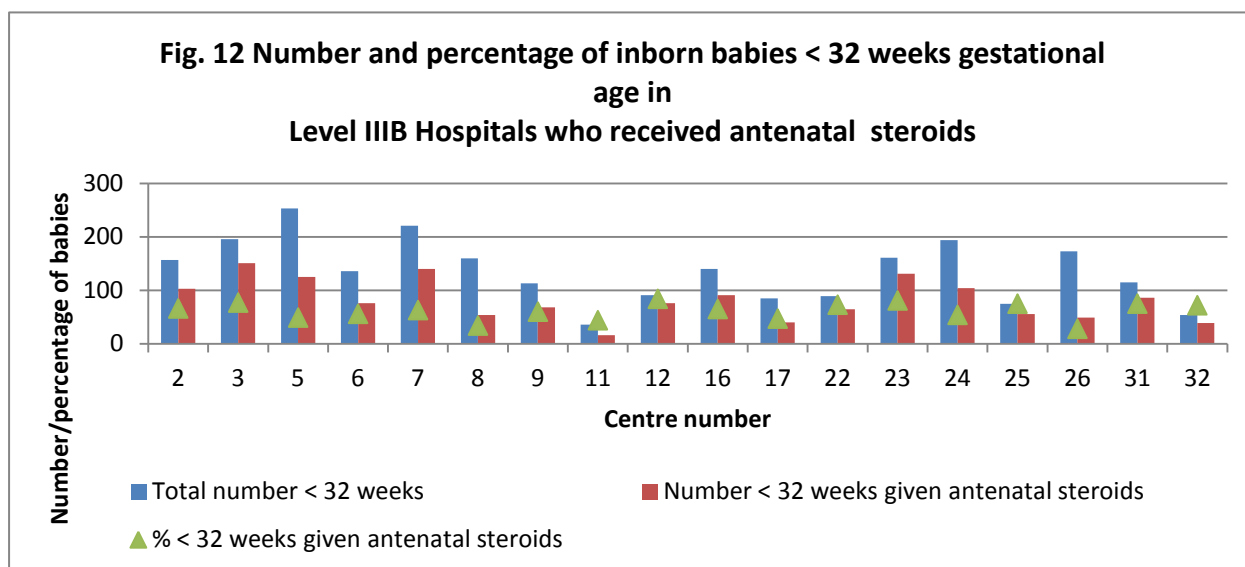
Corticosteroids are administered to the mother to enhance the maturation of the preterm baby's lungs. A systematic review reported antenatal steroids to be efficacious in helping to promote maturation of the lungs and preventing death (Crowley, 2003). This therapy also has other beneficial effects such as reduction of the incidence of necrotizing enterocolitis,

Maternal antenatal steroids were given to 60% of babies born less than 32 weeks' gestation. About eighty six (86%) percent; 1713/2003 of them had respiratory distress syndrome, of which 98% and 11% received ventilatory support and CPAP only, respectively. This is in comparison to 930/1186 (78%) of those born less than 32 weeks' gestation who did not receive antenatal steroids and had a diagnosis of RDS. The percentage of those who did not receive antenatal steroids, i.e. 96% and 10% who required ventilatory support and CPAP only, respectively (Table 57) are almost the same as those receiving antenatal steroids. This was contrary to expectations and one possible explanation was that antenatal steroids given less than two hours prior to birth and thus not expected to have an impact, was also included in the study. .

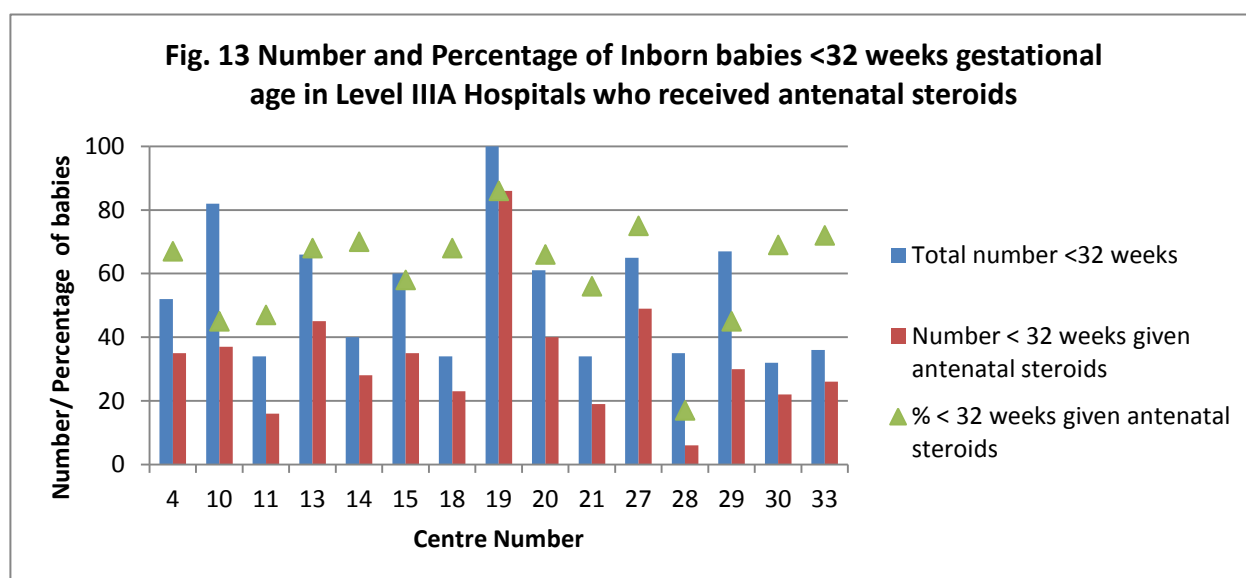
Maternal antenatal steroids was given to only 59% of babies born with birth weight less than or equal to 1500 g (Table 57a). About seventy nine (79%) percent of these babies had respiratory distress syndrome of whom 98% and 13% received ventilatory support and CPAP only, respectively. About seventy one (71%) percent of those born less than 1500 g birth weight did not receive antenatal steroids and had a diagnosis of RDS. In this group of babies, ninety six percent (96%) and 11% of them required ventilatory support and CPAP only, respectively.

Antenatal steroids given to mothers of babies 32-33 weeks' gestation who did not meet other study criteria were not included in the study. There were considerable variations in the use of antenatal

steroids across the SDP centres (Figures 12 and 13, Table 37 and 37a), ranging from 22-80% in Level IIIB hospitals and 12-84% in Level IIIA hospitals.



**Figure12. Number and percentage of inborn babies <32 weeks gestational age in Level IIIB hospitals who received antenatal steroids**



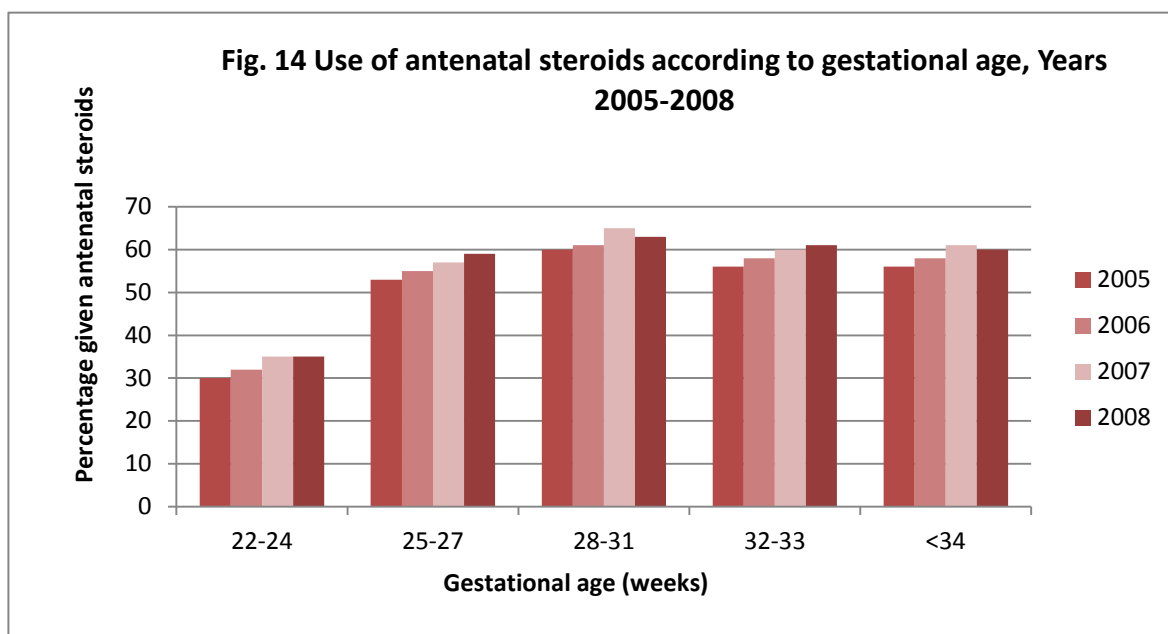
**Figure13. Number and Percentage of Inborn babies <32 weeks gestational age in Level IIIA Hospitals who received antenatal steroids**

About 60% of babies between 25-33 weeks GA received antenatal steroids (Figure 14). The usage of antenatal steroids remains almost the same as the year 2007.

In the UK National Neonatal Audit Programme May 2009<sup>2</sup>, which involved 178 neonatal units, the national average for antenatal steroids usage was 60% of babies between 24 and 34 weeks gestational age.

<sup>2</sup> Annual report for National Neonatal Audit Programme, Royal College of Paediatrics and Child Health, UK 2009

Under the California Perinatal Quality Care Collaborative quality improvement programme<sup>3</sup>, antenatal steroid administration rate increased from 76% of 1524 babies from 24 to 33 weeks gestational age in 1998 to 86% of 1475 babies in 2001. This shows that improvement is feasible over time with systematic changes in implementation of policy needed in most of the SDP hospitals, and of greater impetus required in those with a rate of less than 60%.



**Figure14. Use of antenatal steroids according to gestational age, Years 2005-2008**

### 3.4 The baby

#### 3.4.1 Gender

Fifty seven percent were males and 43% were females. Gender was indeterminate in 40 babies (0.4%) (See Table 8). As there are relatively more males admitted into the study, we can deduce that babies of the male sex were at higher risk of being critically ill at birth (Tables 8 and 8a show the gender distribution according to gestational age and birthweight group).

#### 3.4.2 Multiple births

Ninety two percent (n= 10314) were singletons, 7% (n= 804) twins, and 1% (n= 101) triplets in the study (See Tables 11 and 11a).

A total of 905 ( 8.1%) babies in the study were from multiple births. Twelve percent of preterm babies were from multiple births.

### 3.5 Birth

#### 3.5.1 Inborn vs. Outborn VLBW Babies

#### Demographic Data

<sup>3</sup> Wirtschafter et al. *The Journal of Pediatrics*, 148, (5):606-612.e1

There were 3,672 babies with birthweight 501 to 1500g (VLBW) with 86.8% inborn (IB) and 13.2% outborn (OB) babies (figure 15). Three-thousand three-hundred and fifty-three babies were born with gestational age 22 to 31 weeks with the proportion of inborn 86.6% and outborn 13.4% (figure 16). The overall maternal steroid usage was 59.6%, higher in IB 64.0% versus OB 30.6% (p value <0.001).

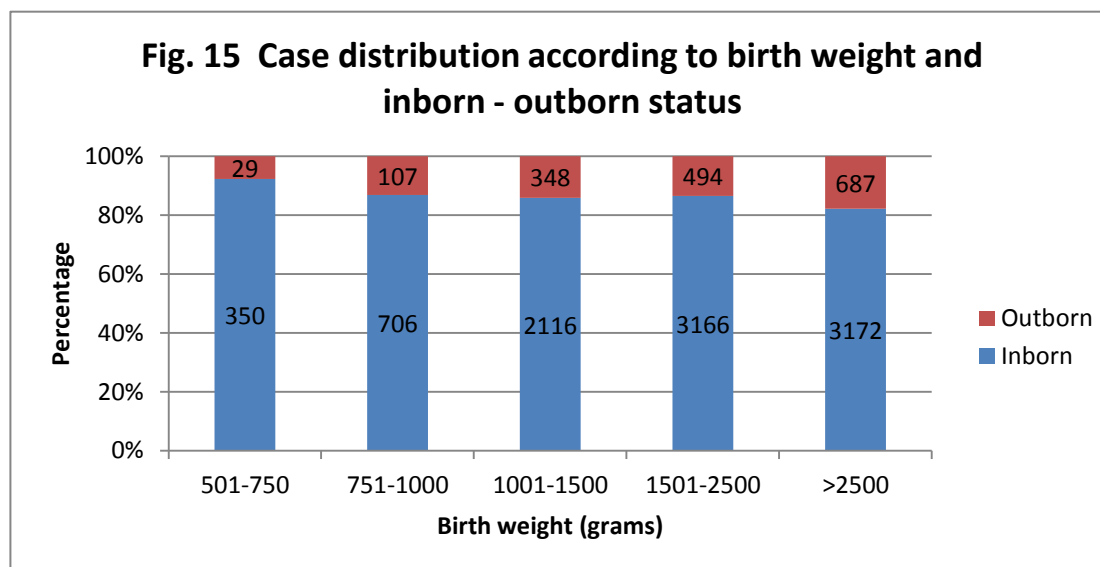
### Neonatal Events

The overall surfactant usage was 54.3%, with IB 54.4% versus OB 53.9%. The surfactant was given within 2 hours in 69.4% of babies, IB 73.6% versus OB 42.0% (p<0.001). Forty-seven percent of babies received CPAP, IB 47.9% versus OB 46.1%. Sixty-six percent of babies required conventional ventilation, IB 66.0% versus OB 68.1%. For the ventilated babies, the median duration of ventilation was 4 days (IQR 2-11), with IB 4 d (2-11) and OB 6 d (2-13) (p 0.001).

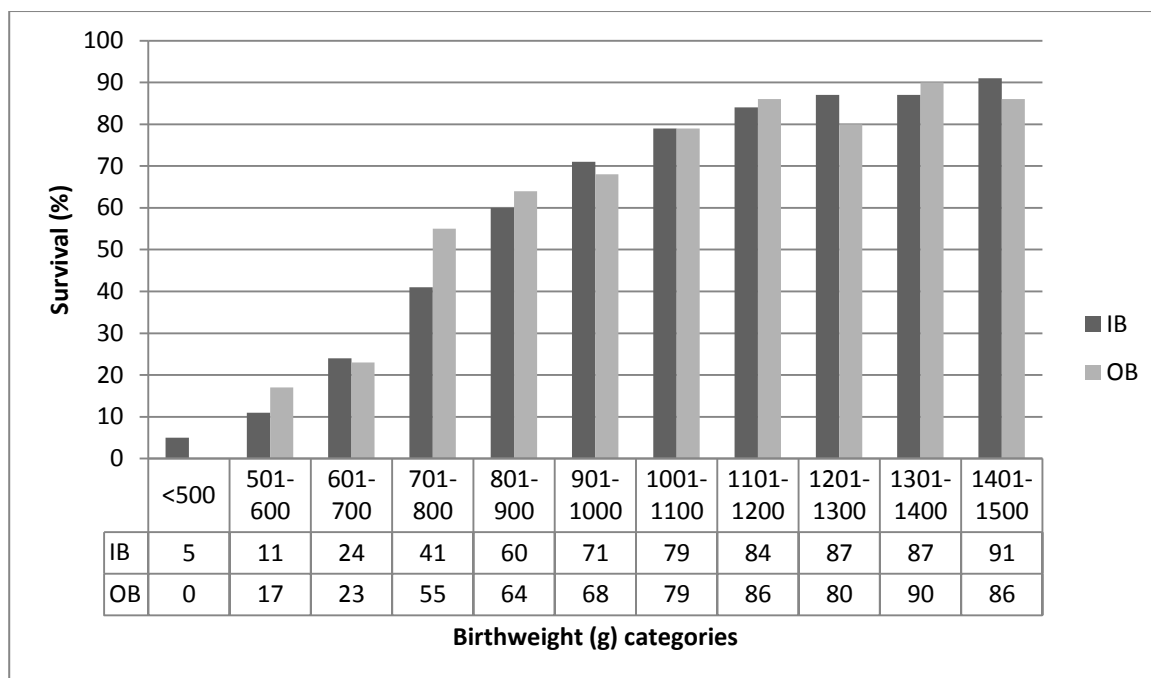
### Outcome

For the year 2008, the survival of the outborn babies seems to be better than the inborn in many birthweight (figure 15a) and gestational age categories (figure 16). The IB survived better than the OB for birthweight 1001-1500g for all the years 2004 to 2008. This was not the case for the ELBW and consequently VLBW categories. The possible reason for this data anomaly is that MNMR being a hospital based rather than a community based registry. Hence, the sicker OB babies would have died before admission giving a falsely higher survival for the MNMR data.

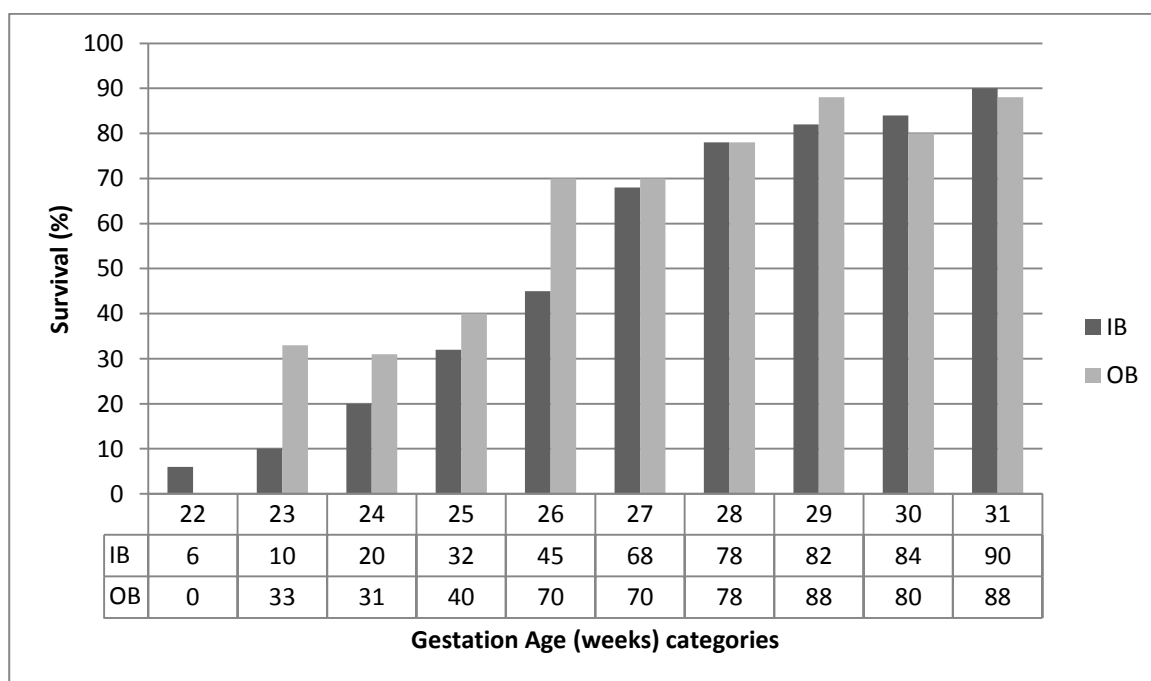
There was no difference between the IB and OB for the incidence of RDS, PDA and pneumothorax. Twenty-one percent of the OB babies required supplemental oxygen at day 28 of life compared to 16% in the IB (p 0.024), but this difference was not statistically significant for oxygen requirement at 36 weeks corrected age. The incidence of NEC stage  $\geq 2$  was 5.3% in OB versus 3.1% in IB (p 0.037). There was no difference in ROP between the IB and OB. As for IVH, the OB babies had a statistically higher incidence of grade 2 and 3 IVH. There was no difference in infection between the IB and OB babies.



**Figure 15 Case distribution according to birth weight and inborn-outborn status**



**Figure 15b Survival (%) in birthweight categories in VLBW babies– IB versus OB**



**Figure 16 – MNRR 2008: Survival (%) for gestation age ≥22 to 31weeks– IB versus OB**

### 3.5.2 Place of birth

NICUs are generally placed in general hospitals, university hospitals and some district hospitals with specialists. Some private hospitals also provided neonatal intensive care for sick babies either in a separate NICU or as part of a general ICU. There are no private hospitals participating in the MNMR. Some babies who had been delivered in private hospitals however had been transferred to NICUs in the participating hospitals. Place of birth according to gestational age and birthweight groups are as shown in Tables 9 and 9a. As most babies were inborn, the place of birth reflected the nature of NICUs participating in the study. Hence 60% were delivered in general hospitals and 24% in district hospitals with specialists, as in 2006.

### 3.5.3 Mode of delivery

The overall spontaneous vertex delivery rate was 50% and Caesarean section rate was 45%. For very preterm (<32 weeks' gestation) babies the Caesarean section rate was 41% (Table 12) and for those of 32-36 weeks' gestation, it was 54%. ***The Caesarean section rate for VLBW babies in the MNMR was 47%, and this was low compared to that of other neonatal networks such as the Vermont Oxford Network which had a VLBW Caesarean section rate of 69%.*** The Caesarean section rate is the lowest in babies below 27 weeks' gestation or below 750 g birthweight which may be a reflection of the less aggressive intrapartum management of the extremely preterm babies (Figures 17 & 18). One other possible reason is the late arrival of mothers with poor or no prior antenatal care, to the hospital for delivery. In contrast, the Caesarean section delivery rate for babies between 1001-1500g birth weight was 51% (Table 12a). This is comparable to the Caesarean section delivery rate in the United States in years 1999-2000 (see Figure 19).

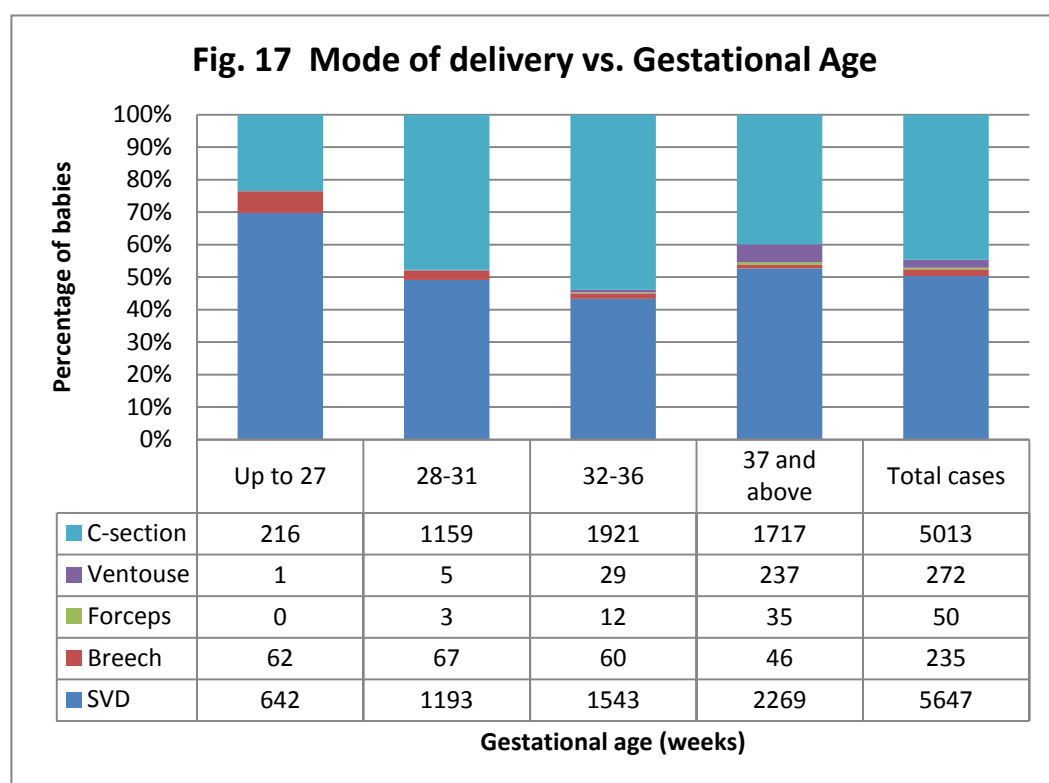


Figure17. Mode of delivery vs. Gestational Age

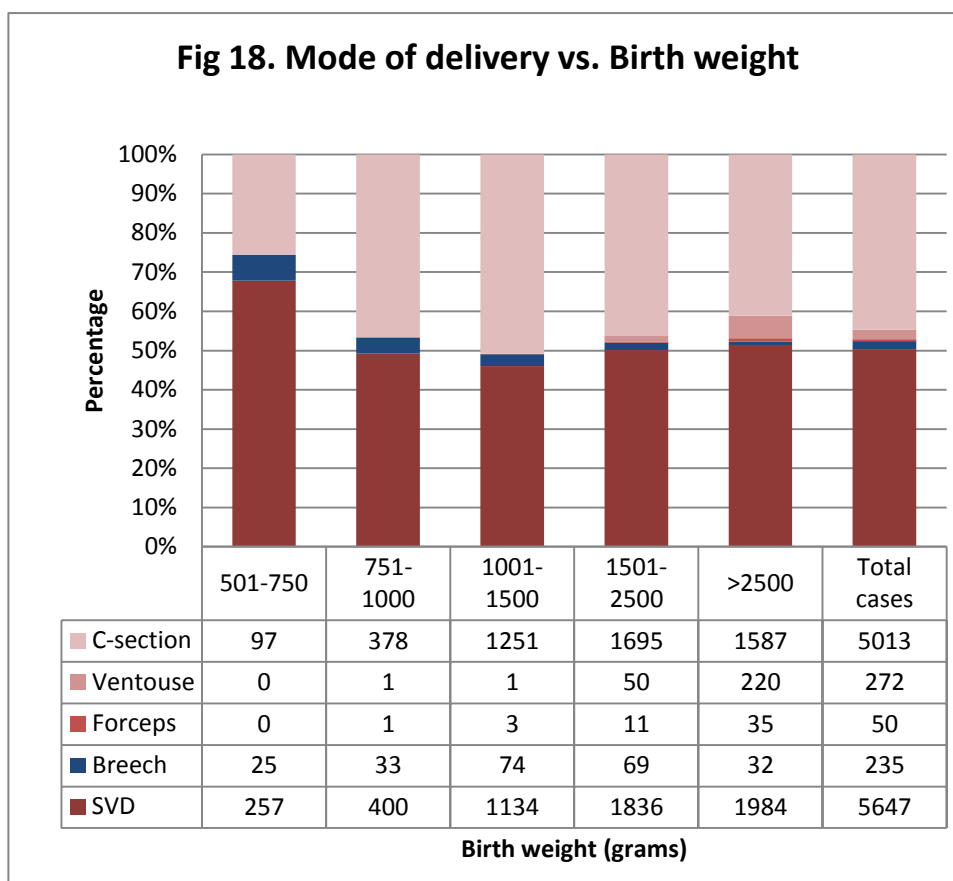


Figure18. Mode of delivery vs. Birth weight

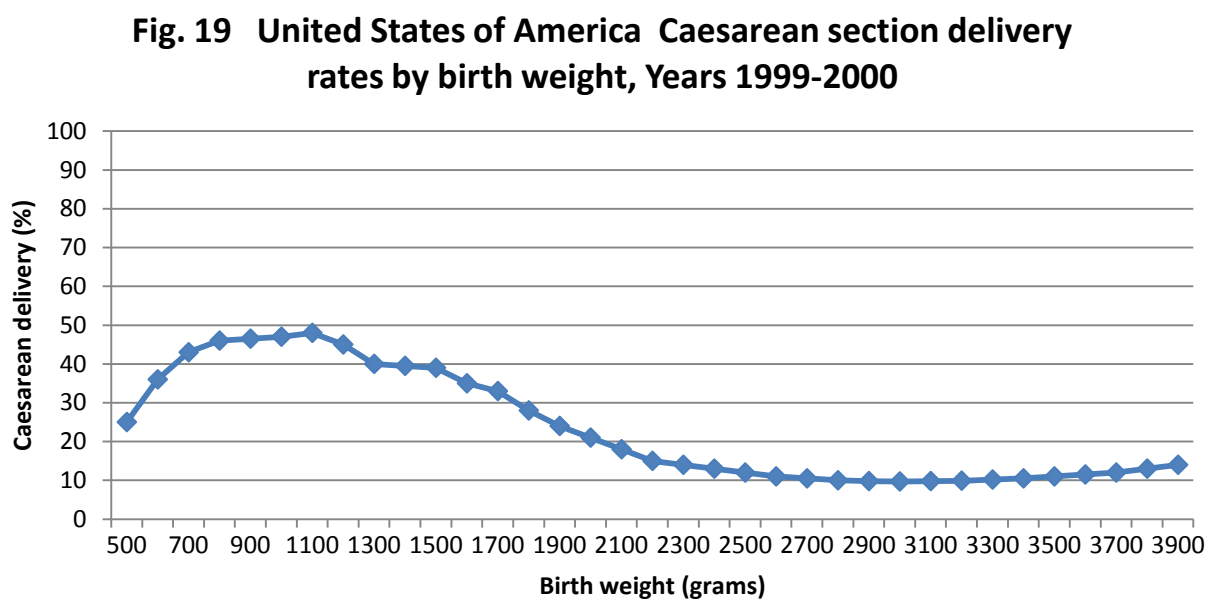
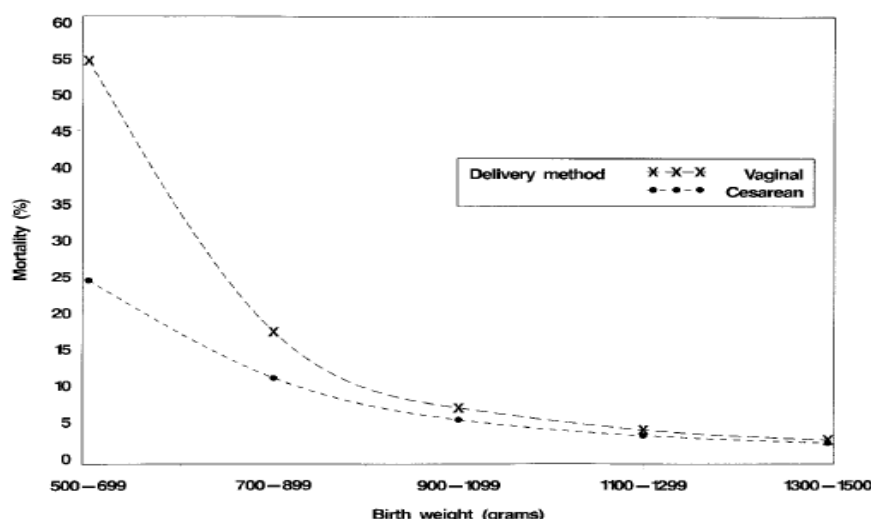


Figure19. USA Caesarean section delivery rates by birth weight, Years 1999-2000

Data source: National Center for Health Statistics. 1999, 2000 Birth Cohort Linked Birth and Infant Death Data Set<sup>5</sup>



**Figure 20. United States birth weight-specific neonatal mortality rates by mode of delivery – Years 1999-2000**



Data source: National Center for Health Statistics.1999, 2000 Birth Cohort Linked Birth and Infant Death Data Set<sup>5</sup>.

**Figure20. United States birth weight-specific neonatal mortality rates by mode of delivery – Years 1999-2000**

In an analysis of United States birth cohort of 54695 VLBW babies<sup>6</sup> born in a two-year period between 1999 and 2000, that the relative risk of mortality by vertex delivery in the lowest birthweight group was more than twice as high compared to caesarean delivery (see Figure20). **This survival advantage associated with caesarean section delivery decreased with increasing birth weight and was not statistically significant for above 1300 grams birth weight.** This advantage persisted despite adjusting for other factors associated with mortality.

### 3.6 Need for Ventilatory Support (VS)

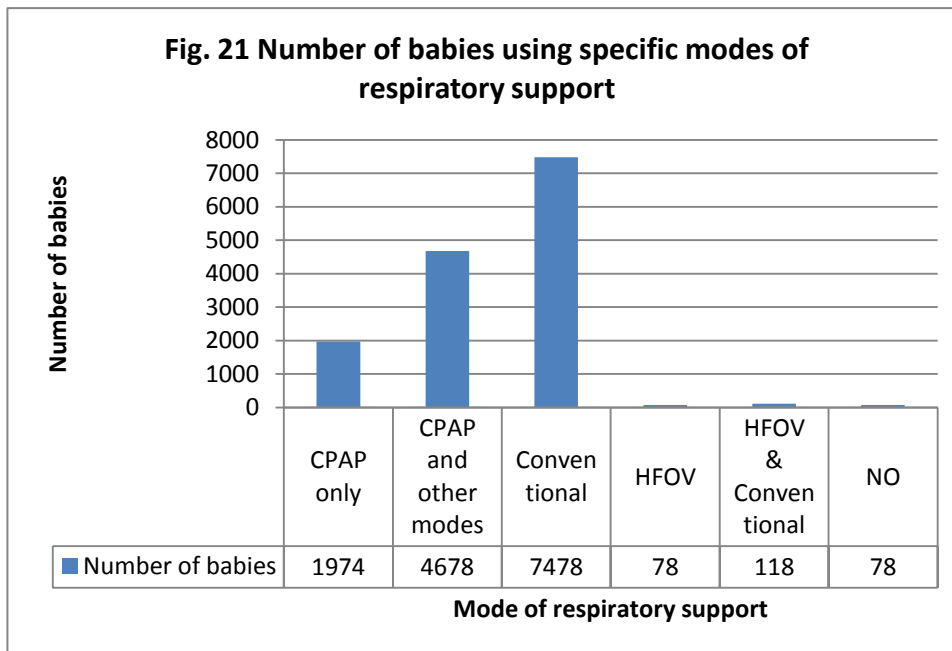
All newborn babies admitted to NICUs with a gestation of < 32 weeks at birth were included in this study. Of these, 92.4% received ventilatory support(VS) which included Continuous Positive Airway Pressure (CPAP), Conventional Mandatory Ventilation (CMV), High Frequency Positive Pressure Ventilation (HPPV)/High Frequency Oscillatory Ventilation (HFOV) and Nitric Oxide (NO), as a single modality or in combination. More mature babies were included in the study group if they needed VS or if they had died. For these babies (32 weeks' gestation and above) the VS rate was 90.1% (Table 13 and 13a).

The overall VS support rate was 91% (10186/11219).

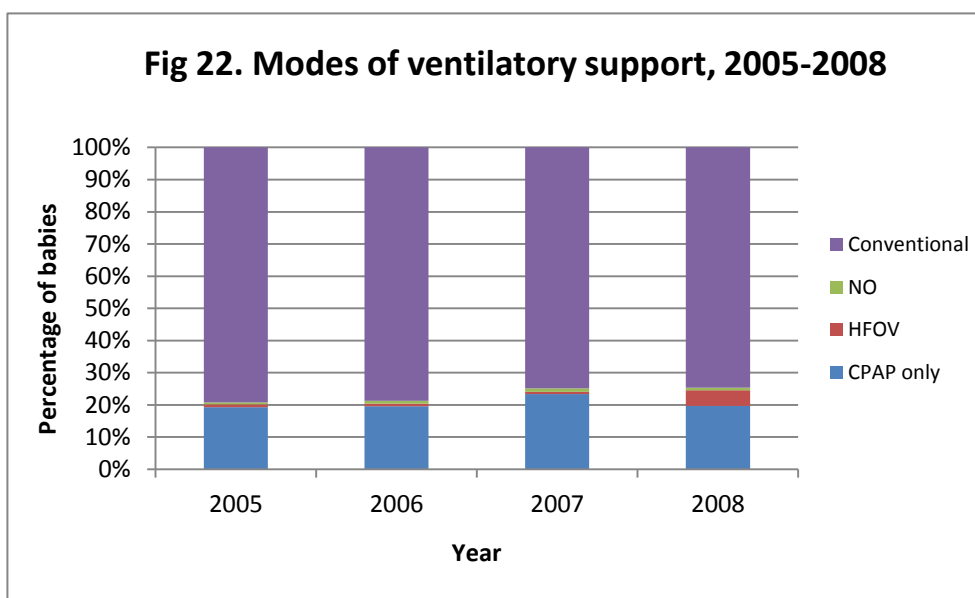
CPAP alone as a mode of ventilatory support was given to 14% of all the babies; the highest rate of CPAP use being among babies in the gestational age group of 32-36 weeks (20%) and BW group of 1501-2500 g (19%) (Tables 14 and 14a). Only 13% of babies birth weight 1001-1500 grams and 5% of babies 1000 grams and below were supported on CPAP alone. Another 33% babies were supported with CPAP in combination of other VS modes, most commonly IMV. The highest rate of

CPAP in combination with other modes of ventilatory support are among babies in gestational age group of 28-31 weeks and birth weight group of 1001-1500 grams ( Tables 14 and 14a)

Figure 21 shows the usage of CPAP, HFOV, NO and Conventional mandatory ventilation in all babies, for the year 2008. Figure 22 shows the proportions in percentage of the same over the years 2005, 2006, 2007 and 2008. Usage according to gestational age and birthweight groups are as shown in Tables 14-16a.



**Figure 21. Number of babies using specific modes of respiratory support**



**Figure 22. Percentage of cohort on specific modes of ventilatory support**

Over the four years ventilatory support including CPAP only, was given to > 80% of babies between 501-1000 g . In year 2008, 42% of babies of 500 grams and below was given ventilatory support and 89% of babies weighing 1001-1500 g required some form of ventilatory support (Figure 23). The total percentage of babies on CPAP alone reduced from 23% in year 2007 to 14% of total babies on respiratory support in year 2008.

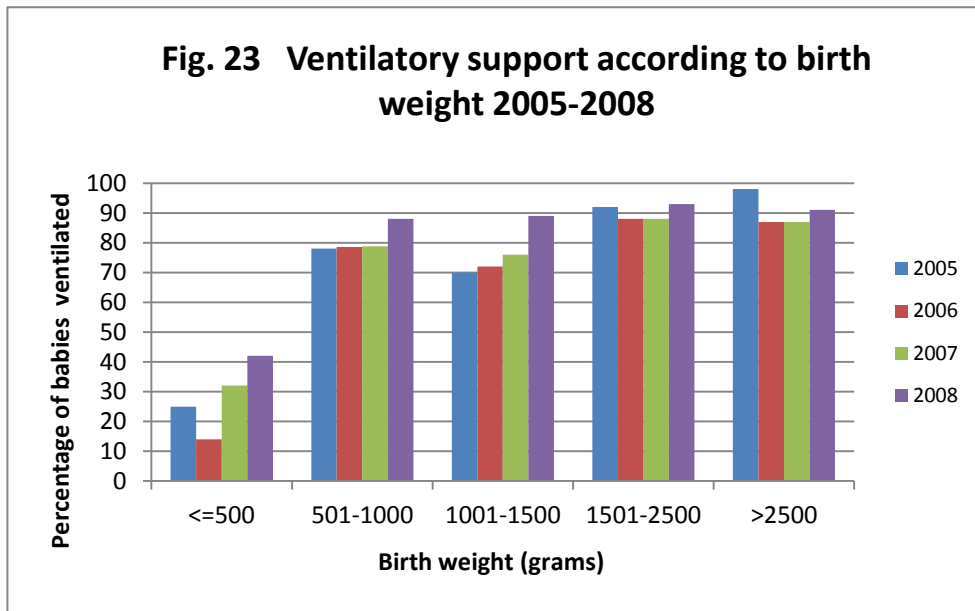


Figure 23. Ventilatory support according to birth weight, 2005-2008

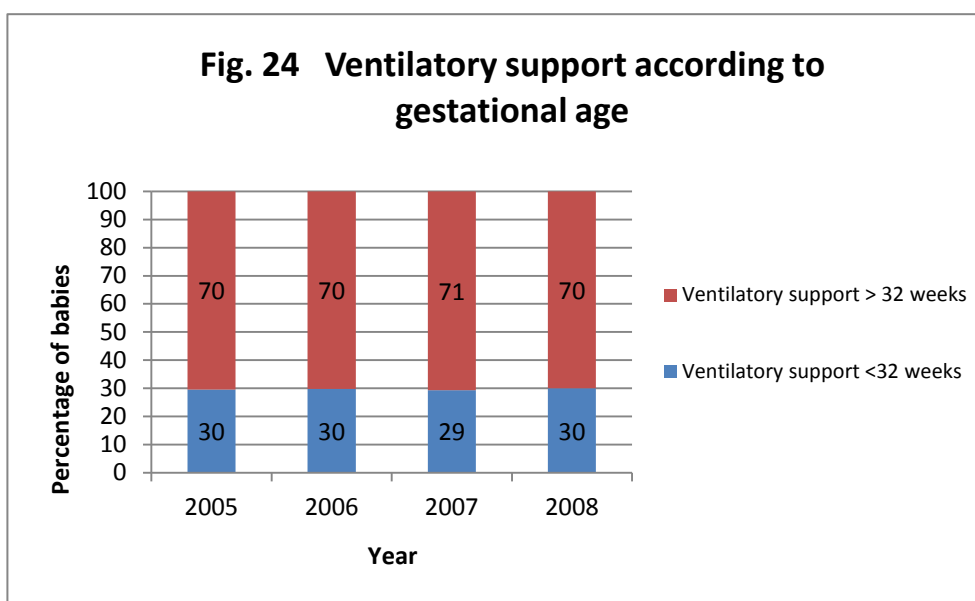


Figure 24 . Ventilatory support according to gestational age

In the four years from 2005-2008, about 70% of ventilated babies were of more than 32 weeks' gestation (Figure 24).

### 3.7 Morbidity

There is a high rate of morbidity amongst babies admitted to Level III NICUs. These are principally associated with preterm births and complications arising in term babies necessitating ventilatory support.

The criteria for entry into study was such that the babies in the study are the ones most at-risk of morbidity and mortality. The outcomes reported are those identifiable while the babies are in hospital, and many of these outcomes have also been shown to be predictors of later morbidity.

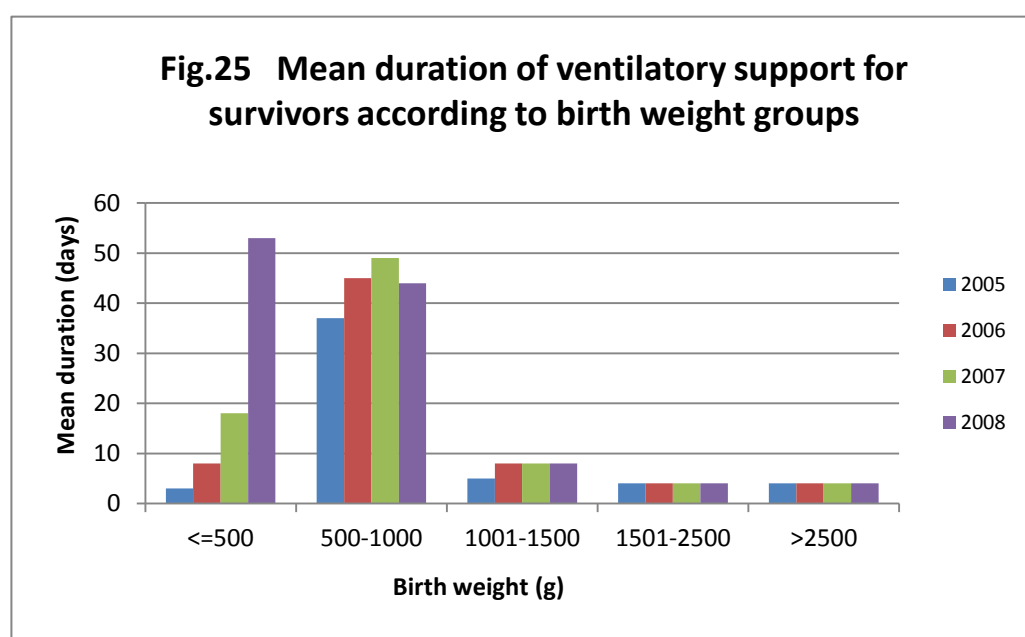
#### 3.7.1 Specific conditions in relation to respiratory morbidity

##### 3.7.1.1 Respiratory distress

The adaptation to life outside the uterus can cause problems for both preterm and term babies. Respiratory distress is a major cause of morbidity and accounts for a large proportion of the use of resources for these sick babies.

For preterm babies who survived, the duration of ventilatory support increased with decreasing gestational age. Duration of VS for term survivors (mean of 4+/- 5 days) is comparable to that of preterm babies of 32-36 weeks' gestation who survived (mean of 4+/- 6 days) (Table 17).

For very low birthweight babies who survived, the duration of ventilatory support was highest in the birth weight group of 501-1000 g . The duration was surprisingly low in the survivors below 500 g birth weight and this may have been due to their earlier demise (Figure 25).



**Figure25. Mean duration of ventilatory support for survivors according to birth weight groups**

### 3.7.1.2 Respiratory distress syndrome & Exogenous Surfactant

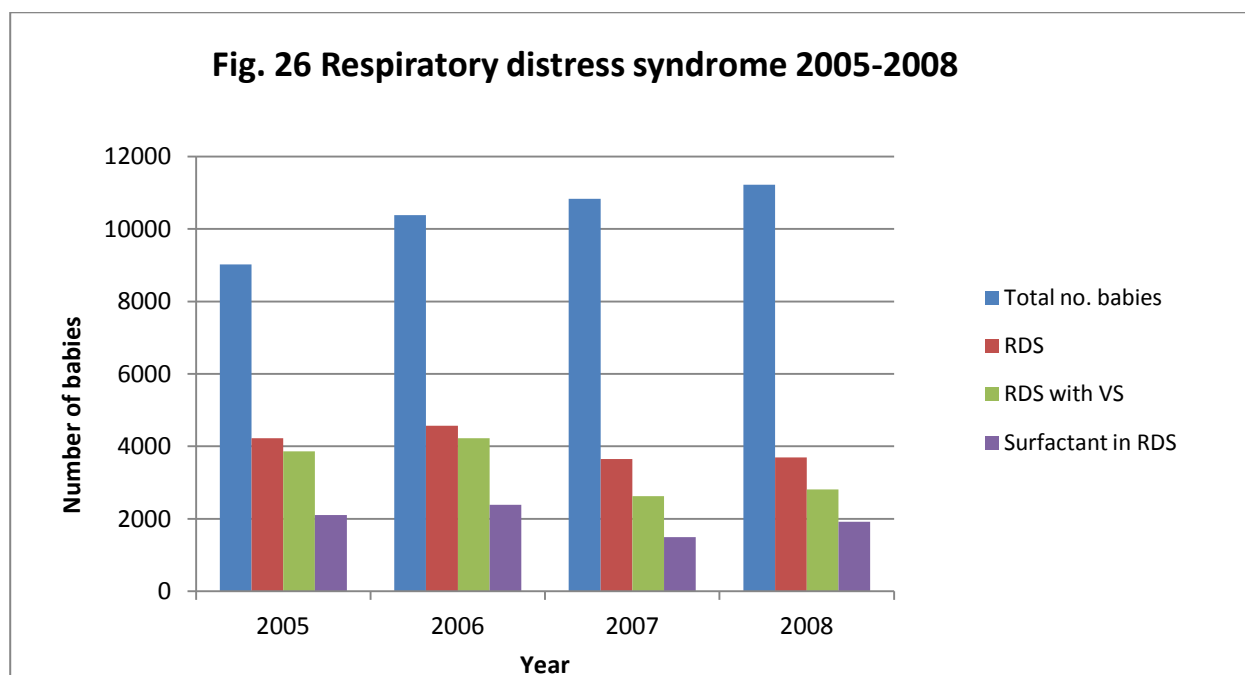
Respiratory distress syndrome (RDS) was the predominant respiratory diagnosis for babies in this study, being present in 33% of infants. From this cohort, 76% in the year 2008 needed ventilatory support (Table 38, Figures 26). Ventilatory support includes the use of continuous positive airway pressure ventilation (CPAP) only, as well as CPAP with other modes of ventilation.

About seventy nine percent (79%) of babies of birth weight  $\leq 1500$  g had RDS, out of which 97% and 9% of these babies with RDS received ventilatory support (including CPAP) and CPAP only, respectively. (Tables 57a and 58).

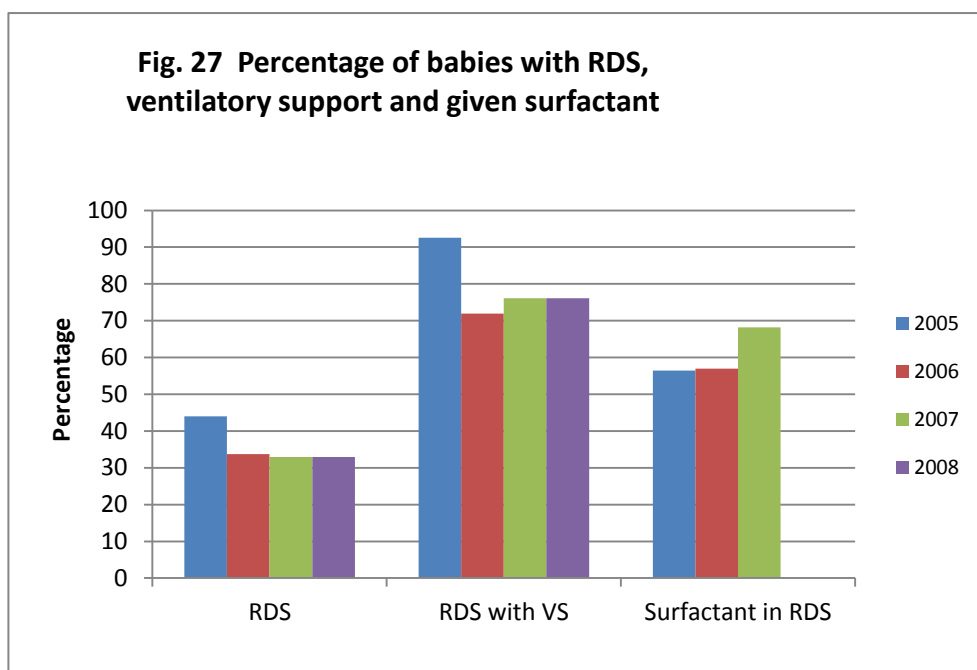
About eighty three percent (83%) of babies with gestation  $< 32$  weeks had RDS, of which 97% and 8% of these babies with RDS received ventilatory support and CPAP only, respectively. (Tables 59).

Exogenous surfactant is a treatment primarily for RDS and is given soon after birth via the endotracheal tube. Its efficacy was confirmed by a systematic review<sup>7</sup> and this treatment in the Malaysian Clinical Practice Guidelines is recommended for babies who are ventilated for RDS. Of the 2814 babies in 2008 who had RDS and required ventilatory support, 1919 (68%) were treated with surfactant. The number of babies given surfactant has increased compared to 57% in year 2007.. The number of babies with RDS requiring ventilatory support has increased from 71% in year 2007 to 76% in year 2008.(Table 38, Figure 27).

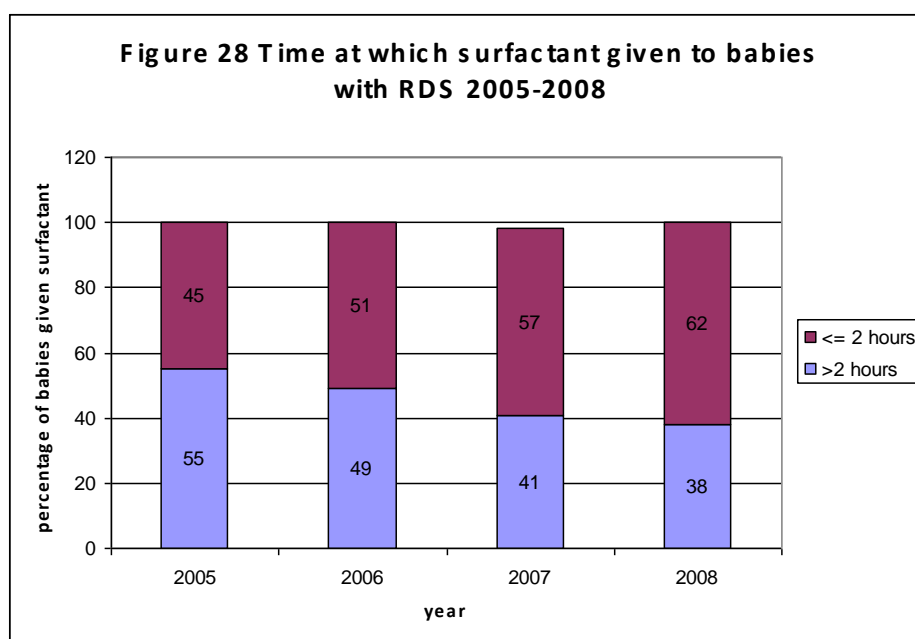
Other than in birth weight group 501-1000 grams, less than 50% of the babies with RDS received surfactant within 2 hours of life. There was, however an increasing trend in percentage of babies who received surfactant within 2 hours of life comparing the data from 2005 till 2008 (Figure 28)



**Figure 26. Number of babies with respiratory distress syndrome for years 2005-2008**

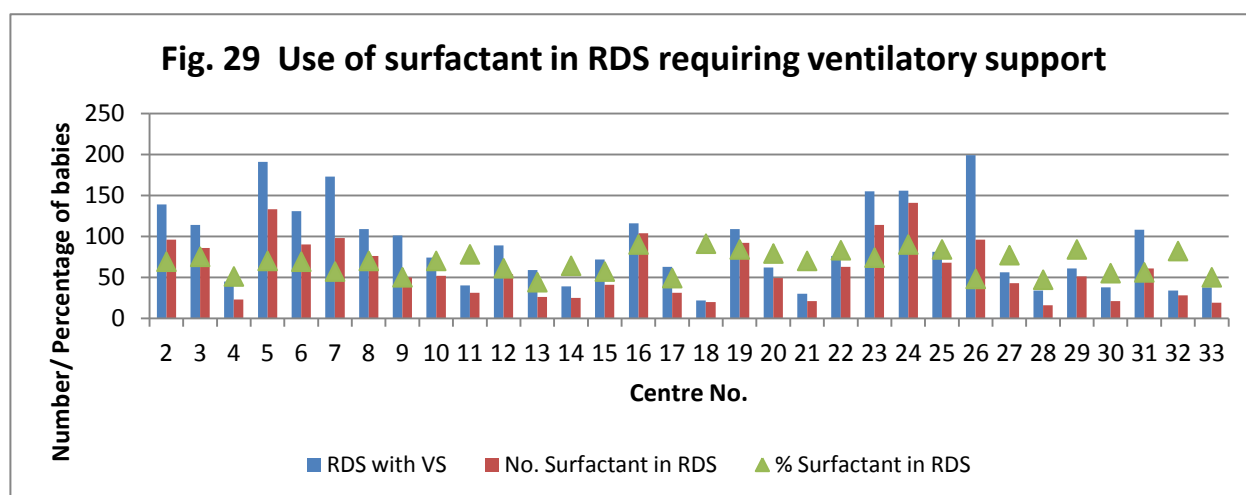


**Figure 27. Percentage of babies with RDS, ventilatory support and given surfactant**



**Figure 28. Time at which surfactant given to babies with RDS**

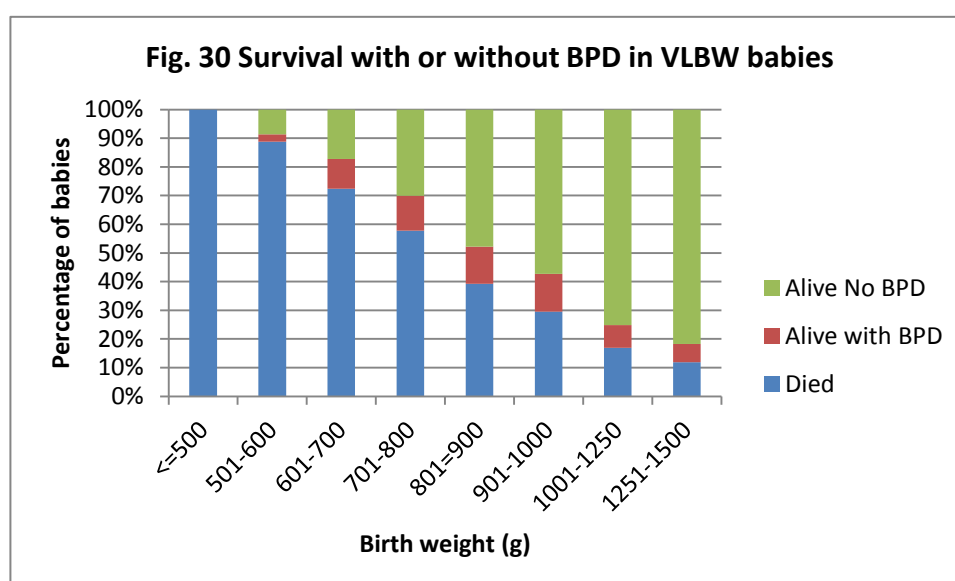
Of note, there is wide variation in the use of surfactant amongst NICUs as shown in Figure 29 below.



**Figure 29. Use of surfactant in RDS requiring ventilatory support**

### 3.7.1.3 Chronic lung disease (CLD)

Chronic lung disease in this study was captured as supplemental oxygen at Day 28 and also again at Week 36 (corrected age). Among ELBW survivors, the rates of supplemental oxygen use at Day 28 and Week 36 (corrected gestation) were 43% and 22% respectively. The rates among survivors with birth weights 1001-1500g were 13% and 8% at Day 28 and 36 weeks respectively. (Tables 41 and 41b). Survival outcome with or without bronchopulmonary dysplasia defined as supplemental oxygen at or beyond 36 weeks gestational age, is shown in Fig. 30.



**Figure 30 Survival with or without BPD in VLBW babies**

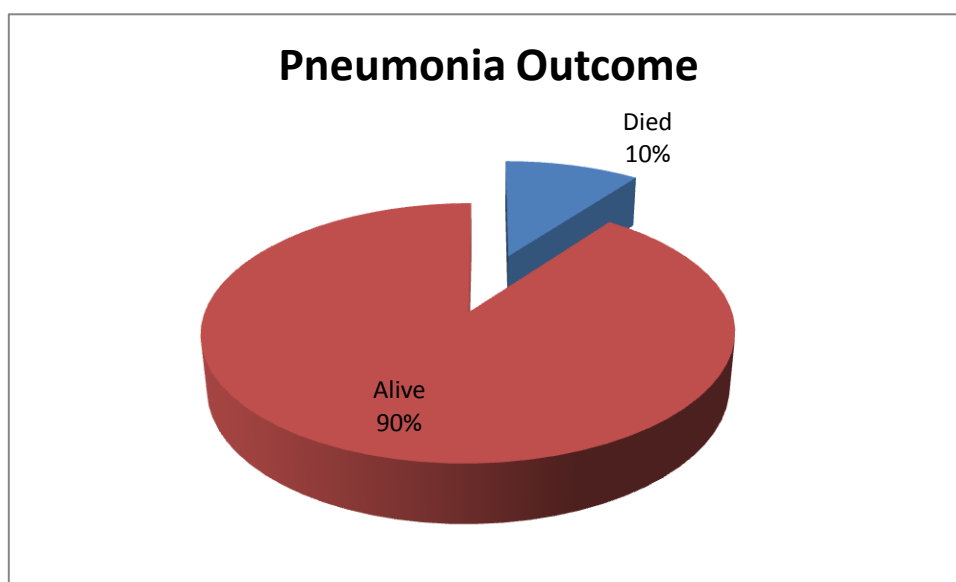
Postnatal steroids for chronic lung disease was given to 10% of those with birth weights  $\leq 1000$ g and 5% of those with birth weights 1001 -1500 g. (Table 19 and 19a).

The effect of postnatal corticosteroids on the combined outcome of death or CP varies with the level of risk for CLD. With risks for CLD below 35%, corticosteroid treatment significantly increased the chance of death or cerebral palsy, whereas with risks for CLD exceeding 65% , it reduced this chance<sup>4</sup>. On the basis of limited short term benefits, the absence of long term benefits, and the number of serious short and long term complications, The American Academy of Paediatrics and the Canadian Pediatric Society published a joint statement in 2002 which was updated in February 2008, which states that the routine use of systemic dexamethasone for the prevention or treatment of CLD in babies with VLBW is not recommended. Outside the context of a randomised controlled trial, the use of corticosteroids should be limited to exceptional clinical circumstances (e.g. an infant on maximal ventilatory and oxygen support).<sup>9</sup>

**The use of postnatal steroids at the lowest possible dose, if at all, is recommended only for ventilator dependent babies on high settings where its benefit outweighs the risk of poorer CNS outcome and other adverse effects of dexamethasone.**

#### 3.7.1.4 Congenital pneumonia (C Pneu)

There were 2170 babies with pneumonia-; 220 (10%) of which died (Figure 31). Twenty seven percent (27%) of babies more than 2500 g birth weight were ventilated for pneumonia (Table 31)



**Fig. 31 Outcome of babies with pneumonia**

#### 3.7.1.5 Meconium aspiration syndrome (MAS)

Ventilated term MAS newborn has high morbidity and mortality risk There were 256,437 neonates from 33 participating centres. There were 837 babies coded as having MAS out of the total of 11,247 data entries. The number of ventilated MAS was 766 babies, of which 83.0%, 13.9% and 3.1% (n=24) had no, mild/moderate and severe HIE. This gave the incidence rate of ventilated MAS (with/out HIE) of 2.98 per 1,000 livebirths. There were 15 deaths (62.5% mortality) in the severe HIE group with an overall mortality of 10.6% (81 deaths in 766 babies).

<sup>8</sup>Doyle LW, Halliday HL, Ehrenkranz RA et al, Impact of Postnatal Systemic Corticosteroids on Mortality and Cerebral Palsy in Preterm Babies: Effect Modification by Risk for Chronic Lung Disease, Pediatrics 2005; 115:655-661



A sub-group analysis was done (Tables 31c and 31d) for ventilated MAS with no HIE (n=636) versus mild/mod HIE (n=106). There was no significant difference between the 2 groups for morbidity and mortality. The mortality of ventilated MAS was 9% in these 2 groups with a median age of death of  $\leq 2$  days. The incidence of pneumothorax was 10.5%. The median duration of ventilation for survivors in the 'no HIE' group was 8 days (IQR 6,13) and 6 days (4,7) for mild/mod HIE group.

A logistic regression was performed (Table 31e) for risk of mortality in the 'no HIE' group. The factors associated with mortality were birthweight<2500g ( $p = 0.001$ ), pneumothorax and PPHN (both  $p < 0.001$ ).

Our incidence of ventilated MAS and mortality rate was higher than Australia & New Zealand (0.43 per 1,000 LB and 2.5% mortality – Dargaville *Ped* 2006). The absence of grades of MAS prevents further subgroup analysis

Table 31c – The Characteristics of Ventilated MAS

No.	Characteristics	No HIE, n1 = 636	Mild/Mod HIE, n2=106	p-value
1	LSCS, n (%)	315 (50)	51 (48)	0.787
2	Ventilation, n (%)			
	Conventional alone	265 (42)	49 (46)	0.378
	Conventional + HFOV	52 (8)	8 (8)	0.826
	HFOV alone	9 (1)	5 (5)	0.021
3	Given iNO	18 (3)	3 (3)	1.000
4	MAS + PPHN, n (%)	154 (24)	26 (25)	0.944
5	Confirmed sepsis, n (%)	37 (6)	4 (4)	0.394

Table 31d – The Outcomes of Ventilated MAS

No.	Characteristics	No HIE, n1 = 636	Mild/Mod HIE, n2=106	p-value
1	Pneumothorax, n (%)	68 (11)	10 (9)	0.696
2	Days on respiratory support for ALL babies (Conventional $\pm$ HFOV) – Median (IQR)	8 (4.5,12)	5 (2.5,6.5)	0.079
3	Days on respiratory support for SURVIVORS (Conventional $\pm$ HFOV) – Median (IQR)	8 (6,13)	6 (4,7)	0.086
4	Days in hospital for ALL – median (IQR)	7 (5,12)	8 (5,11)	0.511
5	Days in hospital for SURVIVORS only – median (IQR)	7 (5,12.5)	8.5 (6,12)	0.335
6	Number and % who died	56 (9)	10 (9)	0.833
7	For those who died, days of life at the time of death – median (IQR)	2 (1,6)	1.5 (1,5)	0.763

Table 31e - Risk factors (selected) for Mortality in Ventilated MAS with No HIE, N=636 (Logistic Regression)

No.	Parameter	Alive, n1=580	Died, n2=56	p-value
1	Birthweight, n (%)			
	< 2500g	62 (11)	13 (23)	0.001
	$\geq 2500$ g	518 (89)	43 (77)	
2	Pneumothorax, n (%)	49 (8)	19 (34)	<0.001

3	PPHN, n (%)	116 (20)	38 (68)	<0.001
4	Confirmed Sepsis, n (%)	33(6)	4(7)	0.102

### 3.7.1.6 Pneumothorax (PTX)

Of the 11,219 infants recruited into the MNNR in the year 2008, 510 (4.5%) developed pneumothorax. This was similar to previous years.

The median birth weight of these infants was 2300 g (IQR: 1300, 2960) and their median gestational age was 36 weeks (30, 40). Majority of them were inborn (82%). Males constituted 59%. Their ethnic distribution was : Malays 67%, Chinese 8%, Indians 6% and others 19%.

Majority of them were delivered either by SVD (50%) or LSCS (45%).

Majority (87%) of these infants received conventional ventilator support and 22% received high frequency oscillatory ventilation. Without data on the age of pneumothorax and the temporal relationship with these ventilator support modes, it is not possible to determine whether the ventilation caused the pneumothorax or that the various modes of ventilation was used to support the infants following development of pneumothorax.

The mortality rate among these infants was very high as 42% of them died.

### 3.7.2 Hypoxic ischaemic encephalopathy (HIE)

Of the 73961 infants admitted to the 32 participating NICUs of the MNNR in 2008, 893 (1.2%) were diagnosed to have hypoxic ischaemic encephalopathy (HIE). These 893 infants formed 8.0% of the 11,219 infants recruited in the MNNR.

70% of the infants with HIE were Malays. 59% were males. 82% of them were inborn. 49% of the infants were delivered by SVD, 35% by LSCS and the remainder by other methods. At birth in the labour rooms, 12% of infants with HIE required cardiac massage.

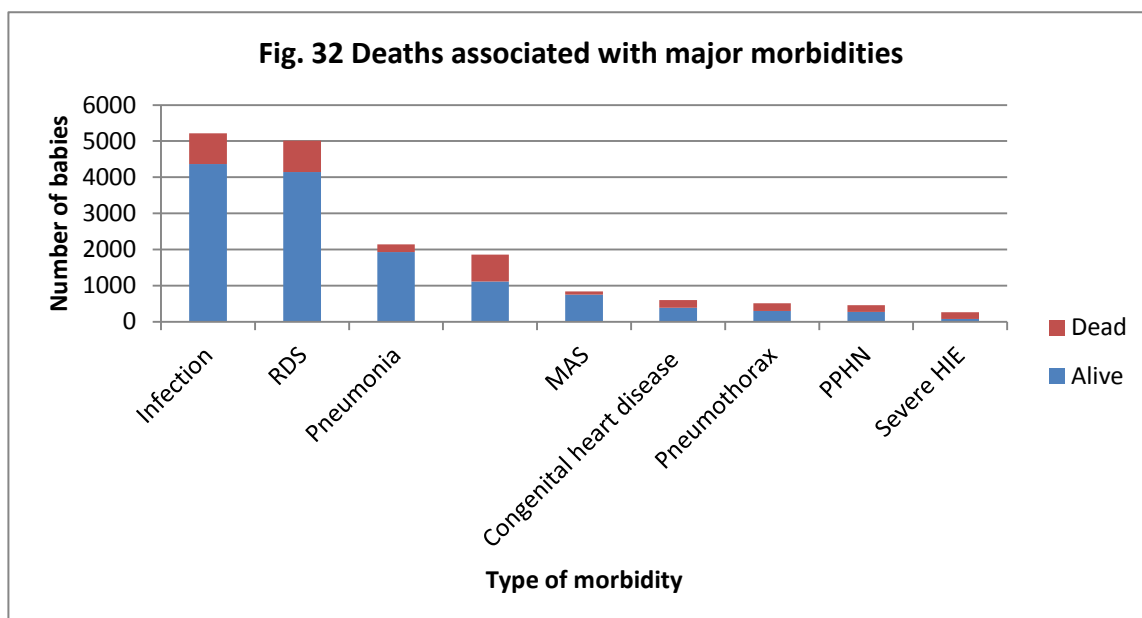
The median birth weight of these infants was 3000 g (IQR: 2695, 3300) and their median gestation was 39 weeks (IQR: 38, 40). 26.7% of the 893 infants with HIE were of severe type. The remaining infants with HIE were either of mild or moderate types.

Death occurred in 23% of the infants. Mortality was much higher in infants with severe HIE as 68% of them died when compared with 6% of infants with mild or moderate HIE.

In summary, rates of HIE and its mortality rates have not changed much when compared with 2007.

### 3.7.3 Causes of death

The frequency and mortality associated with the major morbidities were as follows:



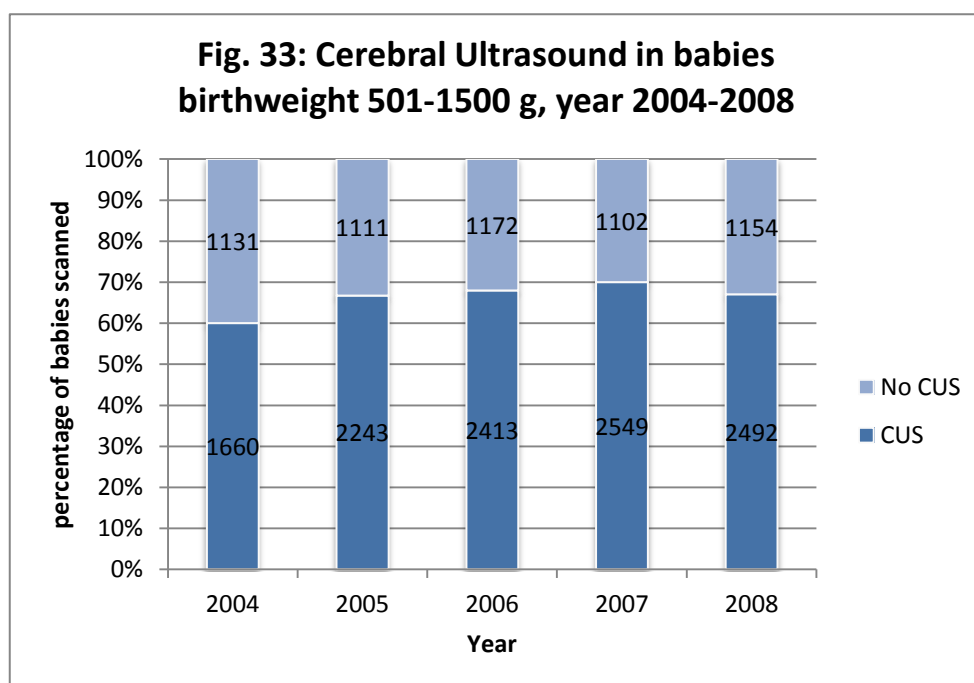
**Figure 32. Deaths associated with major morbidities**

The most common morbidities among the babies in the study was Respiratory Distress Syndrome (RDS) that was 5012 babies followed by infection (5215 babies), pneumonia (2142 babies) and major congenital anomalies (1854 babies). Mortality were high among babies with severe hypoxic ischaemic encephalopathy, pneumothorax, PPHN and major congenital anomalies which were 69%, 42%, 42% and 40% respectively. In terms of numbers, deaths were associated with infection and RDS or prematurity, and major congenital malformations.

### **3.7.4 Intraventricular haemorrhage**

#### **3.7.4.1 The rates of cranial ultrasound in 2008**

Ultrasound imaging of the head of very preterm babies is performed to detect both intraventricular haemorrhage (IVH) and the formation of cysts and ventricular dilatation (hydrocephalus). An initial cranial ultrasound (CUS) is generally performed during the first week of life to detect signs of IVH. Grade 1 and 2 are milder grades and generally do not affect the outcome adversely, while Grade 3 and 4 are not only associated with early morbidity and mortality but are also markers of possible later disabilities.



**Figure33. Cranial Ultrasound (CUS) of brain in babies with birthweight < 1500g, Years 2004-2008**

### 3.7.4.2 Severity of intraventricular haemorrhage

Among the babies in this birth weight group who underwent CUS, 339 (13.6%) had Grade 3 or 4 IVH. This showed an increment compared to the last 4 years (11.6%, 12.1 %, 11.5% in 2007, 2006, 2005 and 2004 respectively). The combined mortality rate from Grade 3 and 4 IVH was 63%; the highest from the last 3 years (51.7%, 54.6%, 60.3% and 58% in 2007, 2006, 2005 and 2004 respectively) (Table 33). This slight increment in morbidity may indicate that more centres were more aggressive in the management of smaller premature babies – and this may be a reflection of the ‘learning curve’ in managing these babies. The increment in mortality in babies with severe IVH could indicate a more conservative approach once the babies developed severe IVH. Nevertheless, centres that showed increment in the rate of severe IVH or mortality rate should probably review their own protocols in the early management of ELBW babies and infection control – as pictured in this data, once a baby developed grade 3 & 4 IVH, their mortality increased to more than 60%. (See Table 42)

If we interpret the data from a different angle, 37% (124 babies) from this cohort survived to discharged with a high likelihood of severe neuro-developmental disabilities. This in fact is a valuable data in the national planning of support for this group of babies later on.

In figure 34, the percentages of babies with grade 2 to grade 4 IVH are compared between 2008 and the previous years.

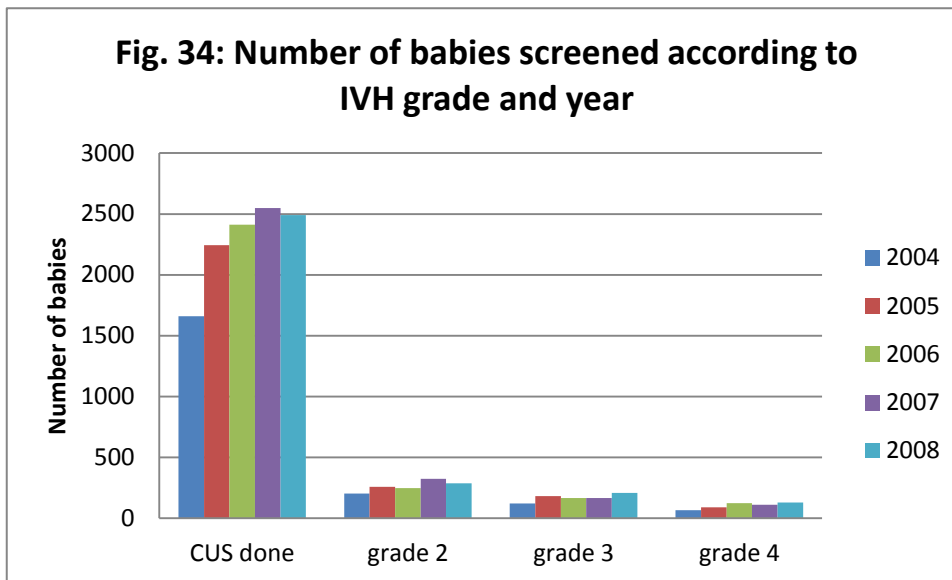


Figure 34. Percentage of babies screened according to IVH grade, and year

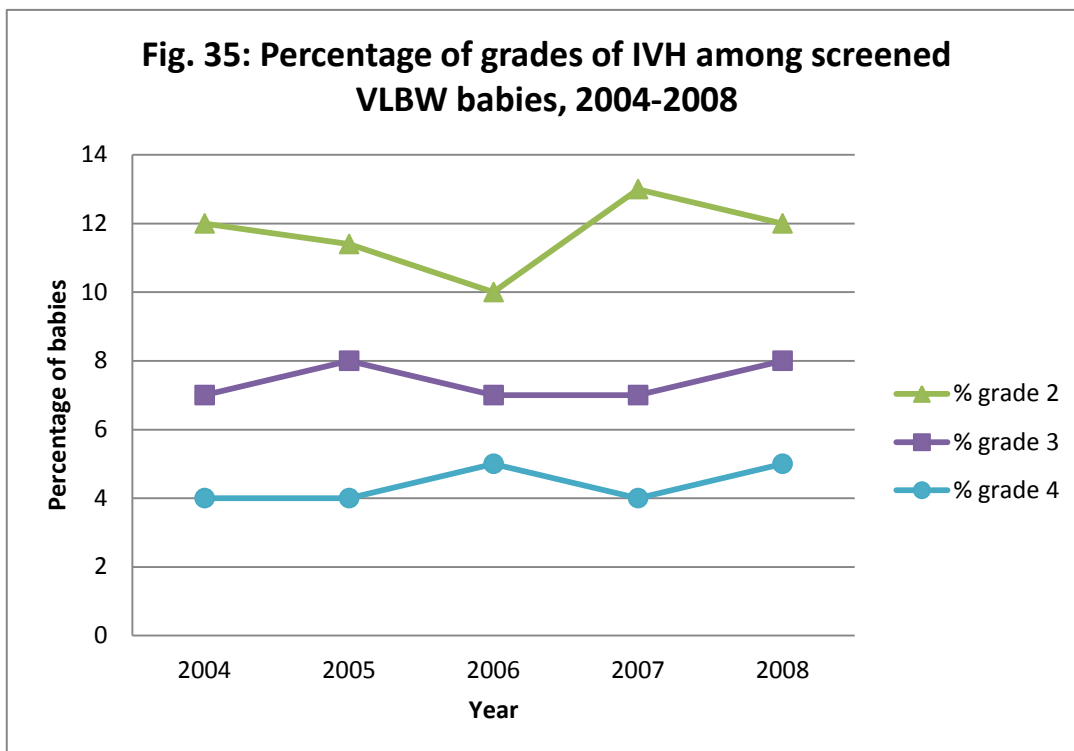
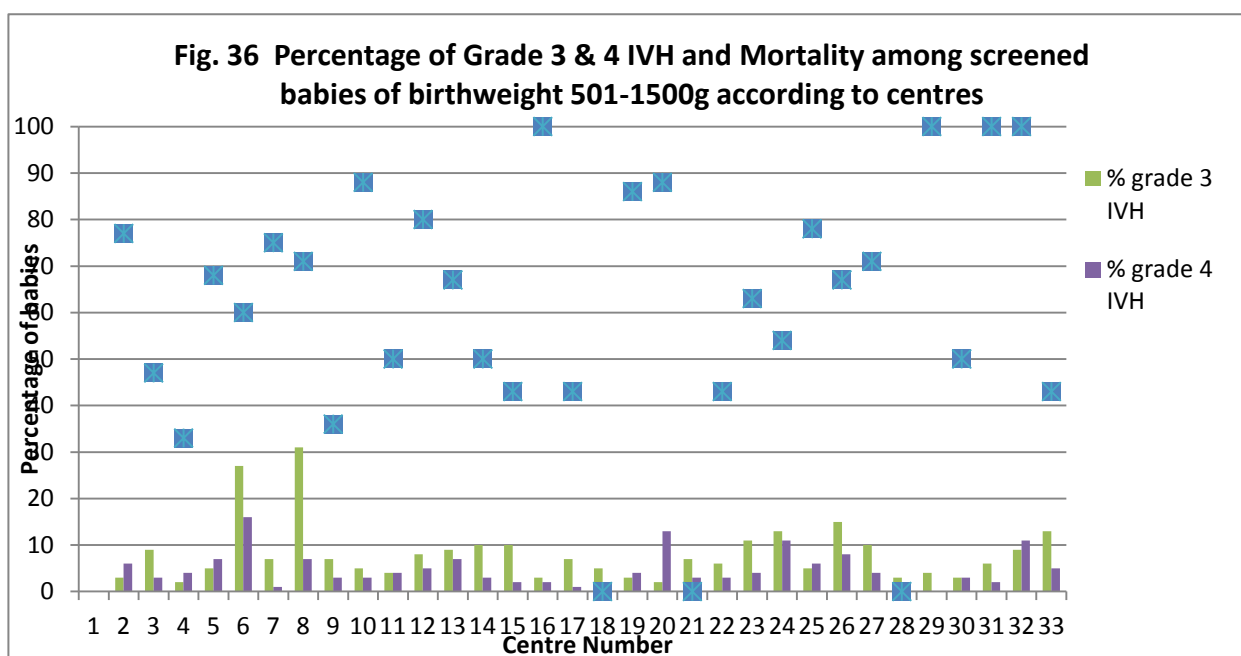


Figure 35. Percentages of grades of IVH among screened VLBW babies

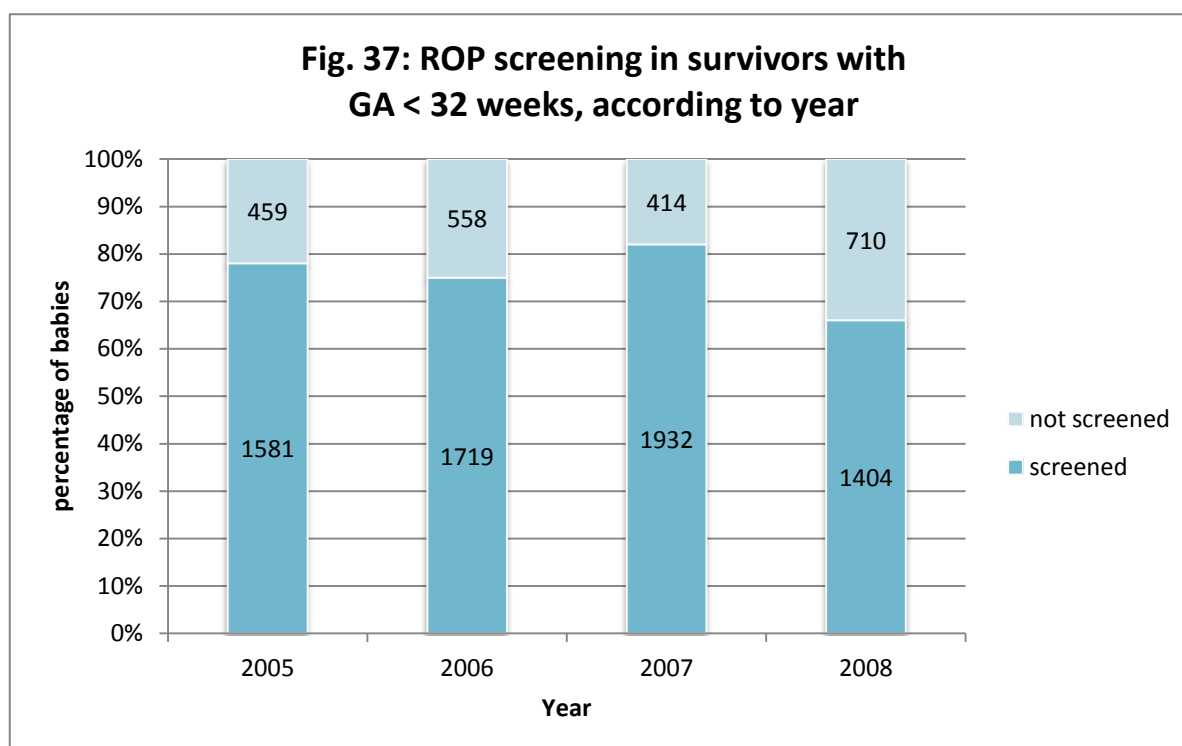


**Figure 36. Percentages of grades of IVH among screened babies**

### 3.7.5 Eye Examination for retinopathy of prematurity

Eyes of very preterm babies are examined to monitor vascularisation which, if disrupted, can result in retinopathy of prematurity (ROP). The staging criteria for ROP were set by the International Committee for the classification of ROP (1984). Threshold diseases as determined by the ophthalmologists usually necessitate laser or cryotherapy to preserve vision. Criteria that are being used for ROP screening in Malaysia are that babies with gestational age < 32 weeks or birth weights of <1500 g should be screened. Other babies, not fulfilling these birth weight and gestational age criteria, are also screened if a significant risk is perceived by the doctors taking care of these babies. The first screening is generally recommended at 4-6 weeks of life.

This audit did not study the exact time of the screening for the survivors who satisfy the criteria for screening. Some very preterm or VLBW babies had been discharged early without an ROP screening. However it is likely that screening as outpatient were done. In the 2008 data collection, the babies who were given appointment as outpatient were captured in the data collection sheet and the data that is presented here is a combination of screening as in- patient and given appointment for out-patient screening. Emphasis had been made to centre coordinators to follow-up those patients who were given out-patient ROP screening to ensure compliance and to update on the findings. In the discussion following this, the term 'ROP screening' is a combination of 'in-patient screening' and 'given appointment for out-patient screening'. Table 42a captures data of ROP screening done before discharge only.



**Figure37. ROP screening in survivors with gestational age < 32 weeks, according to year**

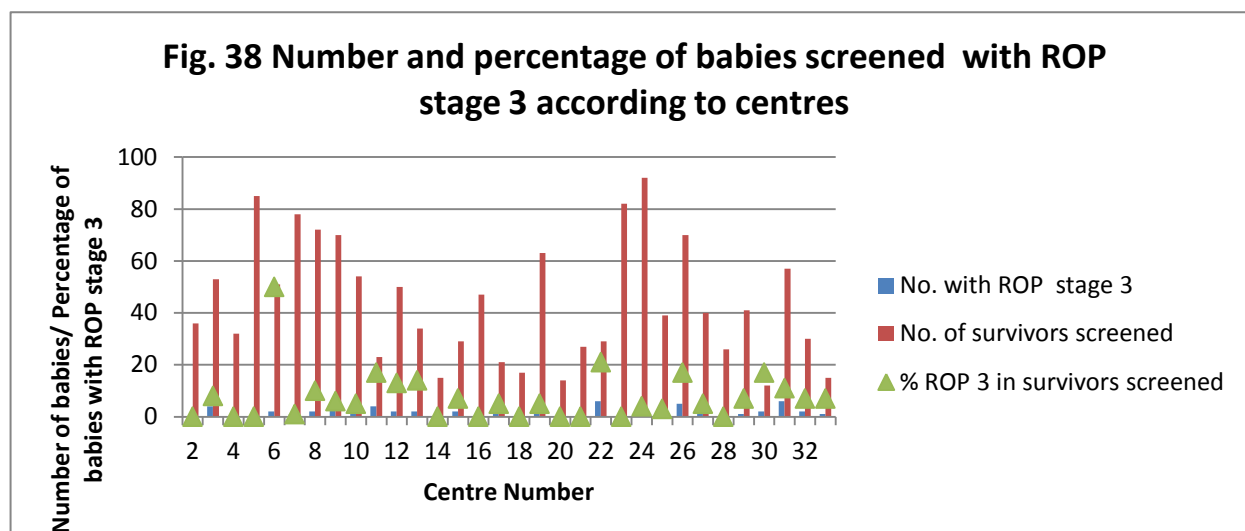
### 3.7.5.1 The rates of severe ROP

Among the 1016 inborn babies with gestational age < 32 weeks who survived and underwent ROP screening, 58 (5.7%) had ROP stage 3. There was 3 babies with ROP stage 4, all were ELBW infants of 26 weeks or below, one was inborn and another 2 were outborn. There were in addition 16 outborn babies who had ROP stage 3. This result is comparable with previous years. Since some of the screening was done as outpatient, there may be an underreporting of the number of babies who developed severe ROP. A way to improve the rate of reporting would be in the next data collection form, the data should be considered incomplete if the result of ROP screening even if it is done as outpatient, is not entered.

Due to the skewed result of ROP screening that was done in 2008, further analysis on the specific distribution of severe ROP in different gestations and birth weight groups were difficult and may be biased. Hence, this analysis is omitted in this report.

Nevertheless, there is some concern on the ROP screening that was recurrently less than 100% in ELBW babies or babies with gestational age less than 26 weeks. As this group of babies posed the highest risk in developing severe ROP, which can be treated if detected early; we should not accept the screening rate of less than 100% in these babies who survived.

The distribution of severe ROP according to centres is shown in figure 39.



**Figure 38. Number and percentage of babies screened with ROP stage 3 according to centres**

### 3.7.6 Necrotising enterocolitis

In the year 2008, there were 3699 very low birth weight (VLBW, <1501 g) infants admitted to the 32 participating NICU in the MNNR. 126 (3.4%) of them developed necrotizing enterocolitis (NEC). This was a much lower rate than that of year 2007.

60% of the infants with NEC were Malays, 13% were Chinese, 8% were Indians and the rest of other Ethnic groups. 65% of the infants were males. 79% of these infants were inborn. NEC occurred mainly among the very small infants and very preterm infants. The median birthweight of these infants was 1095 g (IQR: 870, 1300) and their median gestational age was 29 weeks (IQR: 27,30).

Mortality rate was still very high, as 37% of these infants died.

In summary, NEC occurred mainly in the very preterm and small infants. The rate of NEC in the MNNR IN 2008 was much lower than 2007 but the mortality rate of this condition remained very high.

### 3.8 Congenital anomalies

All infants with significant congenital anomalies were included in the study. For the 2008 cohort, 16.8% (1881/11222) of infants had congenital anomalies. The incidence of congenital anomaly is 168/1000 births. Of this, 28% (528/1881) was syndromic diagnosis. There was a total of 1353 patients with non-syndromic anomalies (isolated or multiple congenital anomalies). Some babies may have more than one congenital anomaly. See Table 31a.

The number of babies with syndrome diagnosis was as follows: 233 (12.4%) Down syndrome, 115 (6.1%) Edward syndrome, 54 (2.9%) Patau syndrome and 127 (6.8%) other syndromes. Based on these figures, the incidence of Down syndrome was 0.9/1000 livebirths, Edward syndrome was 0.4/1000 livebirths and Patau syndrome was 0.2/1000 livebirths.

The most common organ system affected was cardiovascular system (607 cases), followed by cleft lip and palate (269 cases), GIT anomalies (223), CNS anomalies (non-neural tube defects) (203) and neural tube defects (157). Amongst the congenital heart disease, 237 (39%) and 319 (61%)



were cyanotic and acyanotic lesions, respectively. The incidence of CVS anomaly is 2.4/1000 livebirths. Amongst the clefts, there were cleft lip (29), cleft palate (57) and cleft lip and palate (183). The incidence of cleft anomaly is 1.1/1000 livebirths. For neural tube defects, there were 40 patients with spina bifida, 90 with anencephaly and 28 with other NTDs. The incidence of NTDs is 0.6/1000 livebirths. See Table 31.

Amongst infants with congenital anomalies (501-1500g), the mortality rate was 62.5% (195/312). For infants between 501-1000g, the mortality rate was 72.6% (61/84) while infants from 1001-1500 g was 58.8% (134/228).

The total number of infants with inborn errors of metabolism was 78, giving an incidence of 0.3/1000 births. See Table 31a.

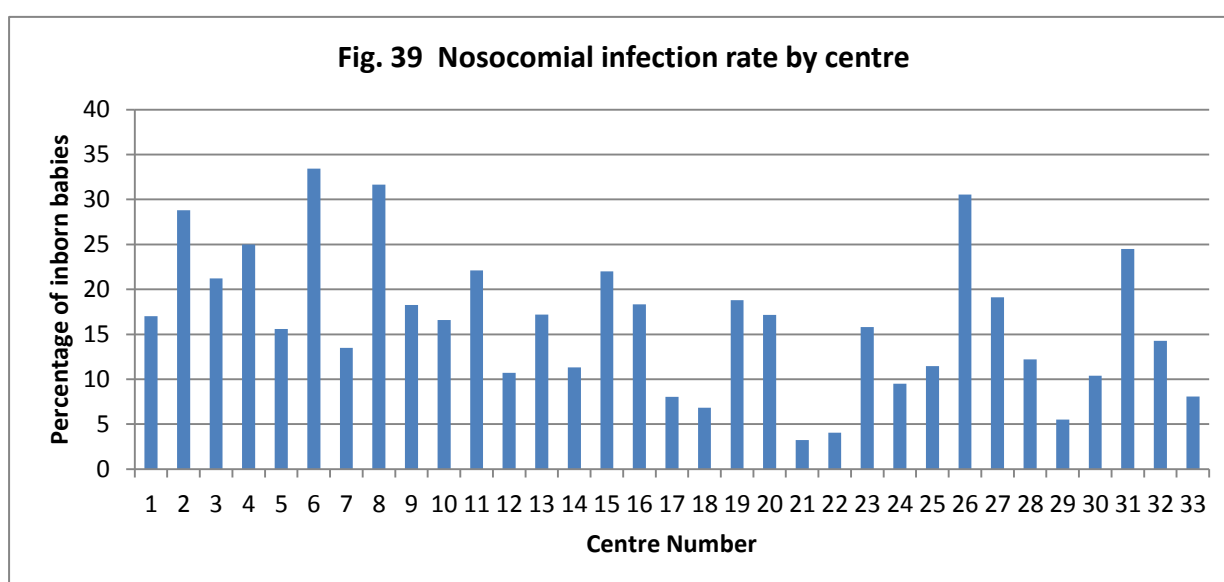
### 3.9 Neonatal infections

#### 3.9.1 Classification:

Neonatal infections are classified into the following categories:

1. Presumed sepsis - antibiotics given in the presence of obstetric risk factors but no clinical signs of infection and subsequent investigations ruled out infection.
2. Clinical sepsis – clinical signs of infection present but no organism identified.
3. Confirmed sepsis – clinical evidence of sepsis plus culture-proven infection (including positive bacterial antigen test).

The overall incidence of confirmed bacterial infection is 10% (Centre 1 represents the mean for the whole cohort) with a range of 3 to 20%.



**Figure 39 Nosocomial Infection Rate by Centre**

### 3.9.2. Infection vs. Gestational age and Birthweight

The infection rate is highest (16.8%) in infants less than 28 weeks gestation, followed by 15.1% in the 28-30 weeks gestation group. By birthweight the highest infection rate is similarly highest in the less than 1kg group (17.6%), followed by the VLBW (1001-1500gm) group (12.8%).

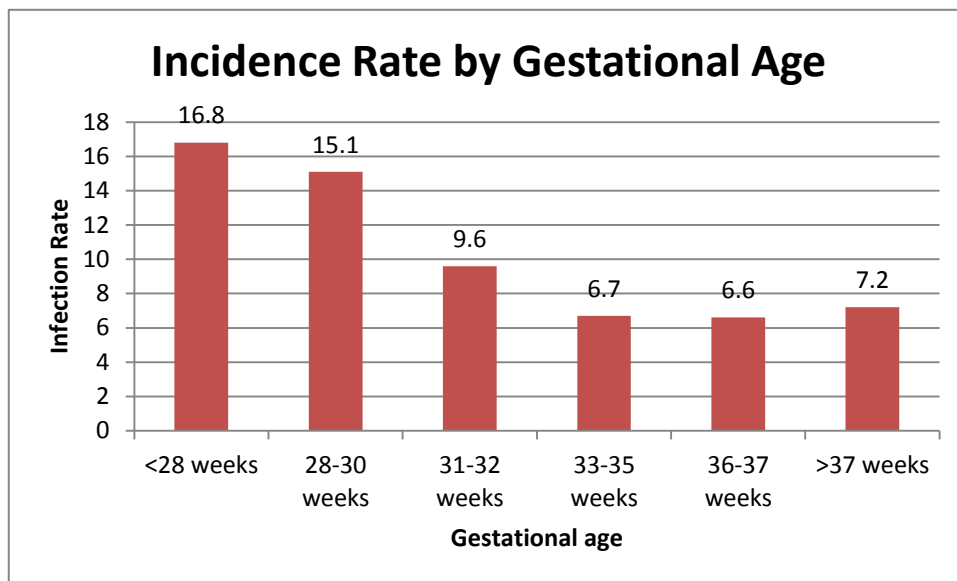


Figure 40 Percentage of babies with confirmed sepsis according to gestational age

### 3.9.3 Infection vs. Birthweight

In terms of confirmed sepsis vs. birthweight, the majority occurred in babies of more than 1500g and less than 1000g birthweight.

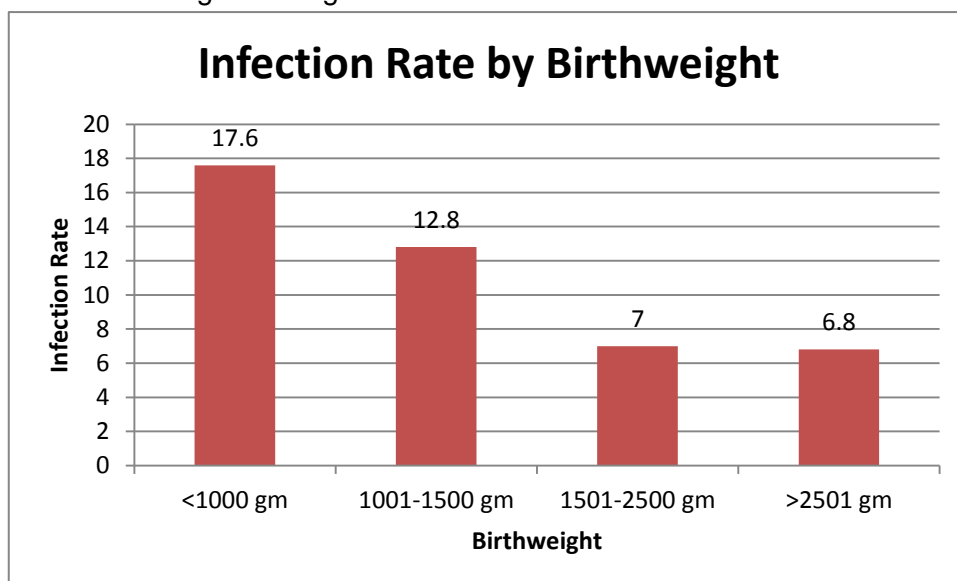


Figure 41. Percentage of babies with confirmed sepsis according to birthweight

### 3.9.4 Types of Infecting Organism

The commonest organism identified was the Coagulase Negative Staphylococcus (CONS), overall as well as in the Late Infections (after 3 days) category.

The second commonest organism was Klebsiella followed by Group B Streptococcus (GBS).

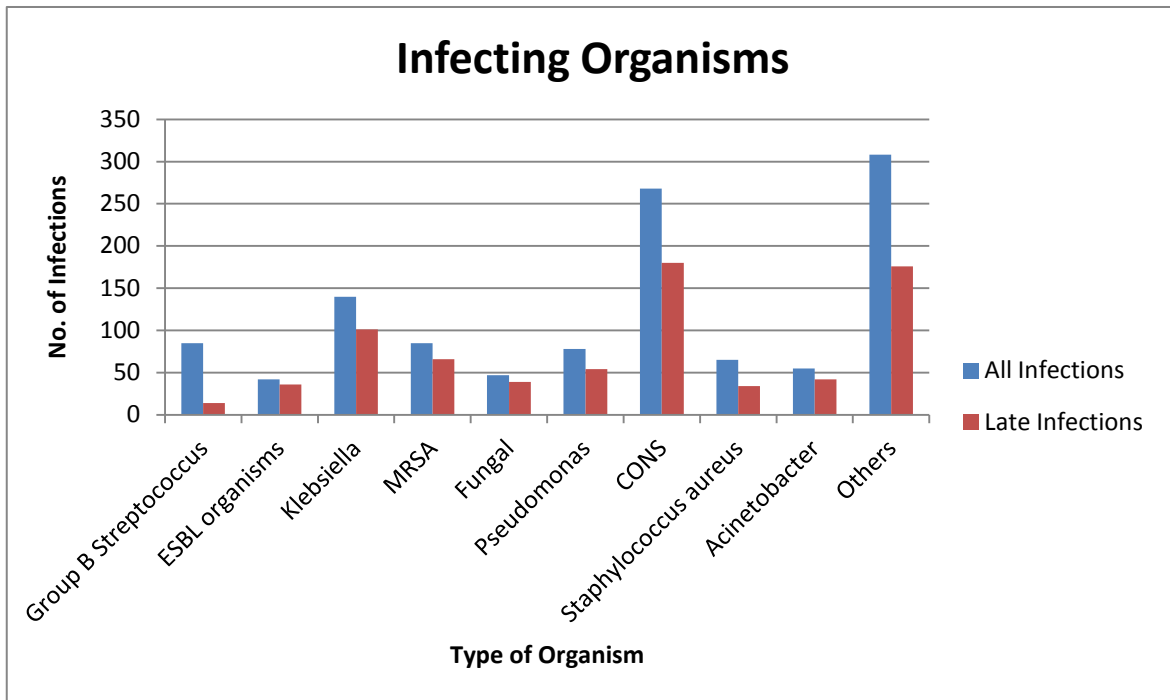


Figure 42. Percentage of babies vs. type of infecting organism

### Early and Late Infections:

The majority of infections were Late Infections (61.5%), ie occurring later than 3 days after admission. These are indicative of nosocomial (Hospital acquired) infections.

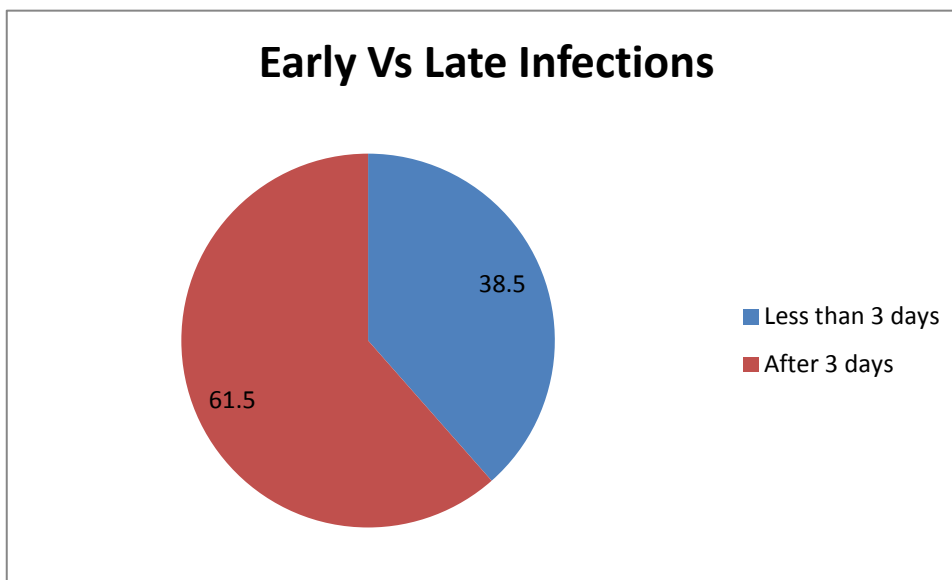


Figure 43. Early vs late infections

### Infection-Associated Mortality:

The overall mortality associated with infection was 23.6%, ranging from the highest (33.5%) in the less than 28 weeks gestation group, corresponding to the 32.1% in the less than 1000 g birthweight group.

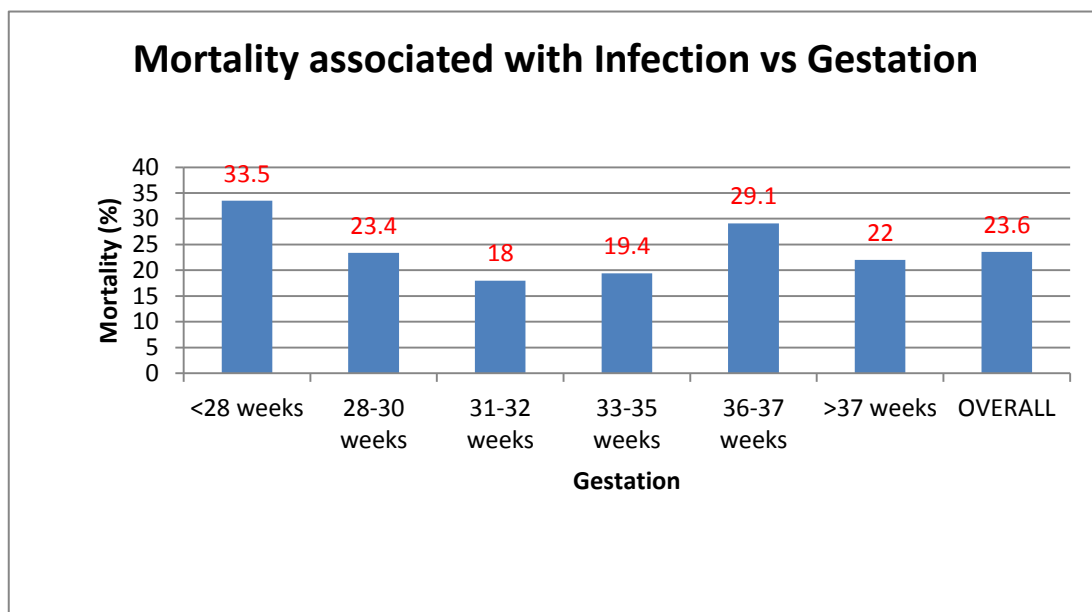


Figure 44. Mortality associated with infection according to gestational age

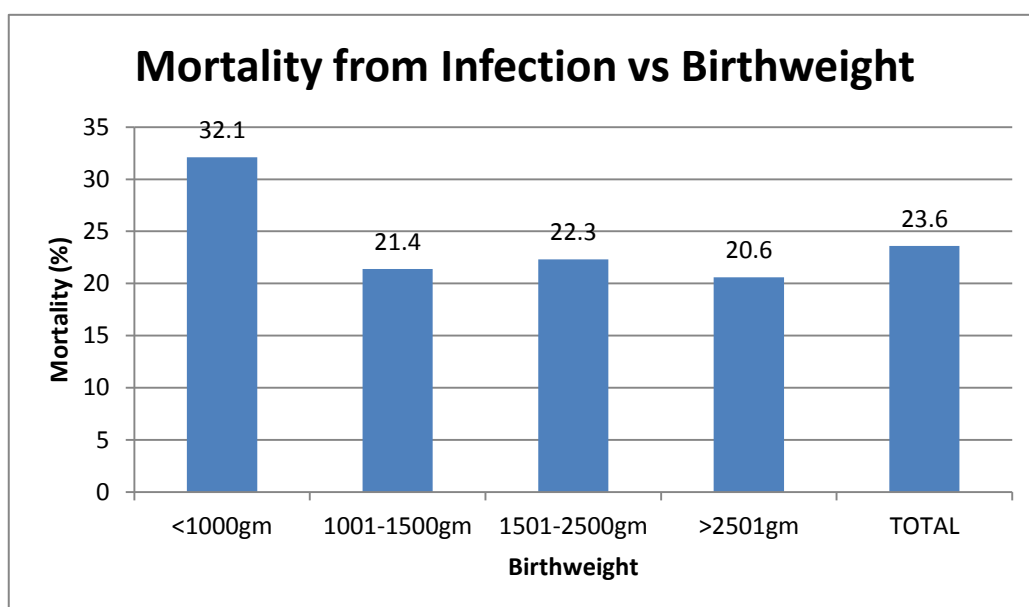
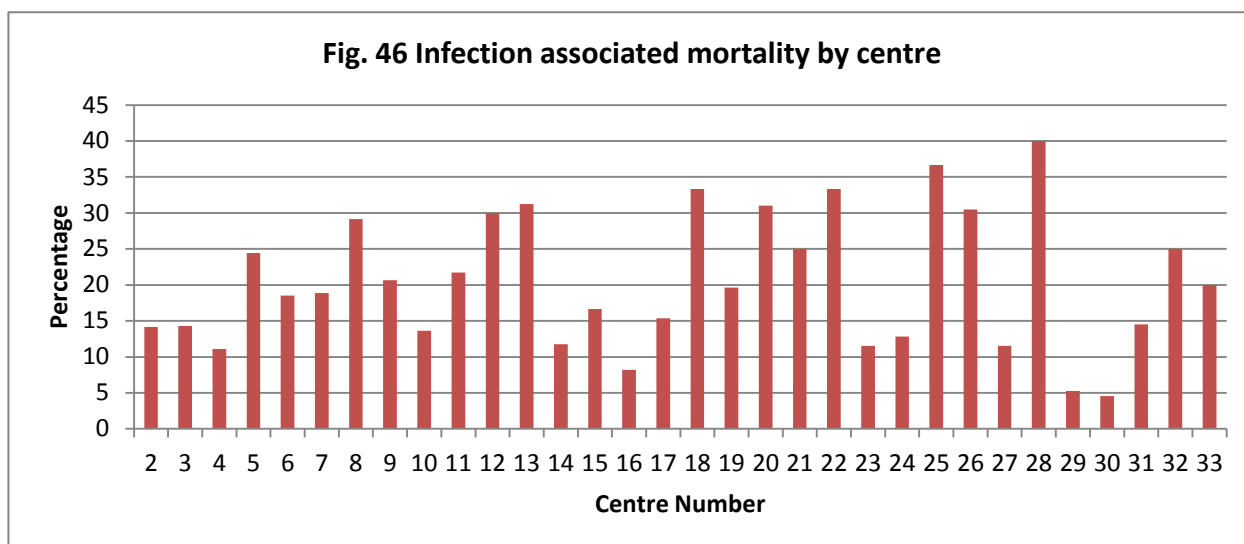


Figure 45. Mortality associated with infection according to birth weight groups

The overall infection-associated mortality was 20% for nosocomial infection amongst inborn babies, varying widely from centre to centre.



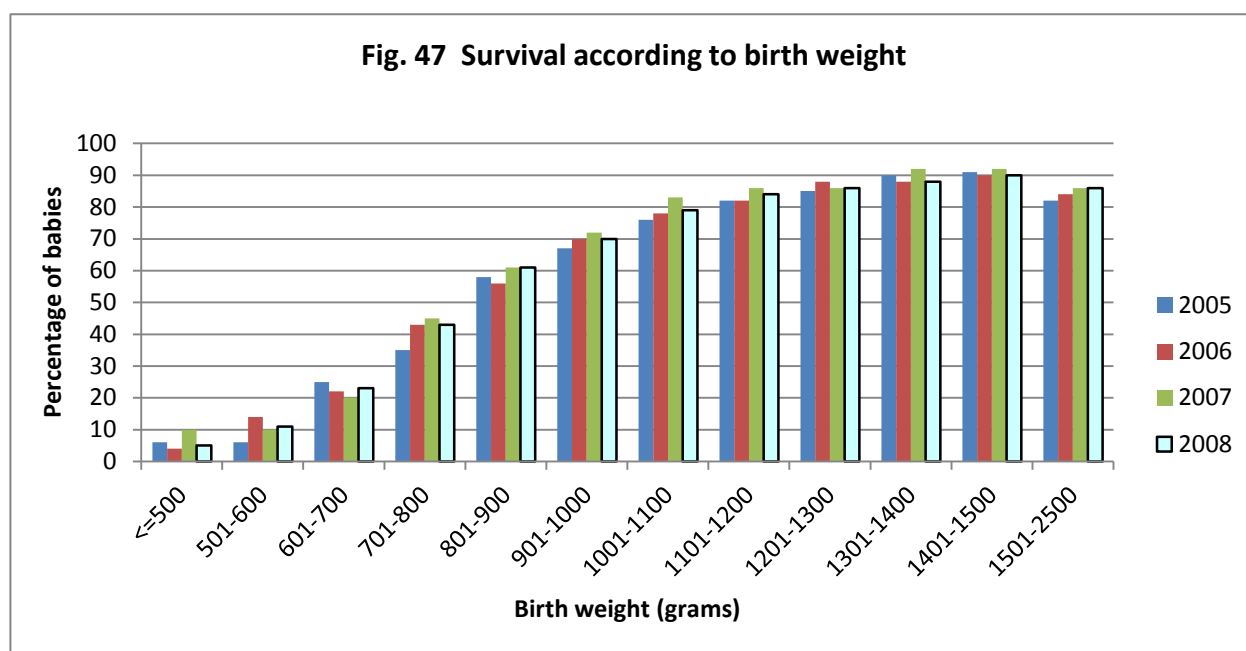
**Figure 46. Infection-associated mortality by cent**

### 3.10 Outcome

#### 3.10.1 Survival according to birthweight and gestational age

The overall survival at discharge of this high risk group of babies was 9190 survivors out of 11219 i.e. 82%, similar to the rate in 2007 (Tables 27a and 27c). Survival is dependant on many factors including gestational age and birthweight. For outborn babies, mortality was attributed to the referring unit if the baby died within the first 24 hours of life.

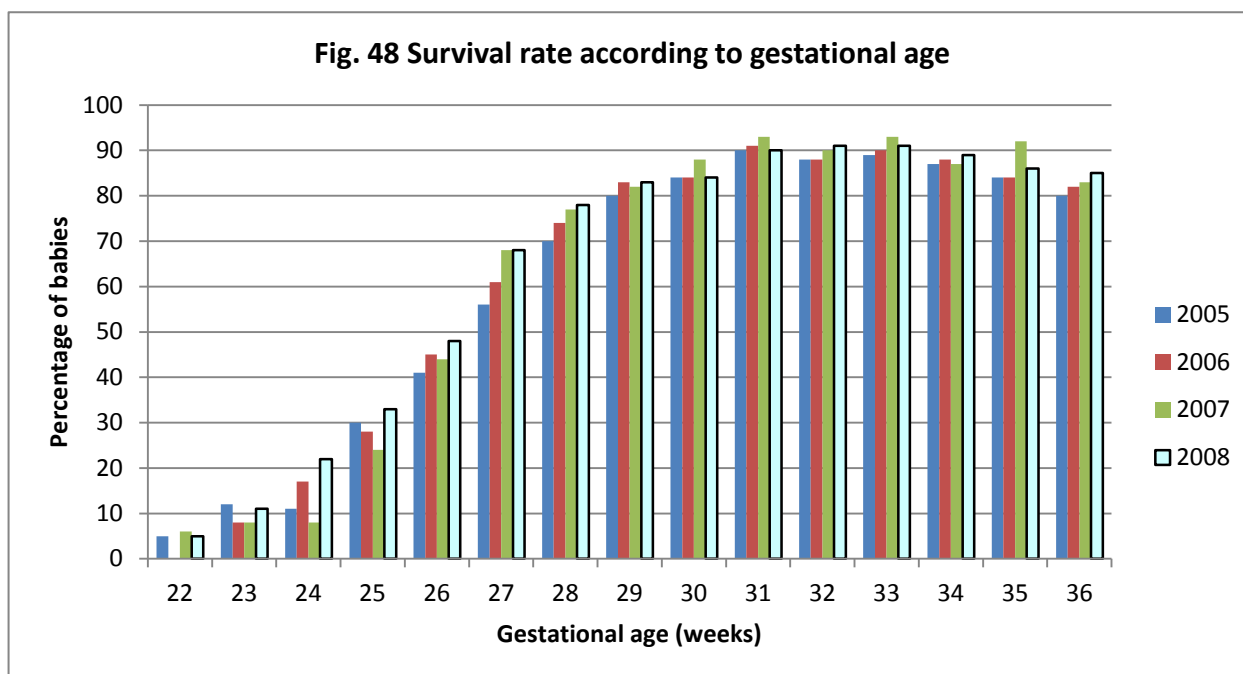
There was marked improvement in survival at above 700 g birthweight i.e. from 23% survival rate at 601-700 g birthweight group to 43% survival rate at 701-800 g birthweight (Figure 47). This may be a reflection of the NICU policies in terms of conservative management in the lower birthweight group.



**Figure 47. Survival rate according to birth weight**

Less than half (48%) of babies of 26 weeks' gestation survived while survival was better at 68% for 27 weeks' gestation (Figure 49). Survival of babies up to 31 weeks' gestation and of birthweight up to 1500 g improved progressively with increasing gestation and birth weight. The survival of babies in the Australian-New Zealand Network were about 75-85% for babies 26 weeks gestational age and over 95% for babies above 29 weeks' gestation. Thus, better survival rates are possible as neonatal care services advance.

Babies who were 32 weeks' gestation and above and babies of BW > 1500 g were entered into the study only if they had required ventilatory support or had died, hence the survival rate appeared lower in these more mature and bigger babies (Figure ).



**Figure 48. Survival rate according to gestational age**

### 3.10.2 Survival rate according to centres

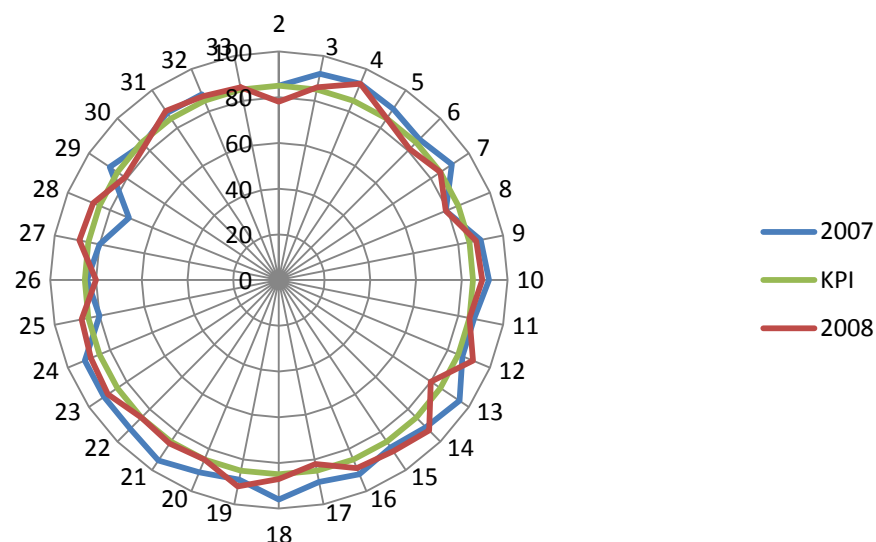
#### 3.10.2.1 Survival rate of babies of birth weight between 1001-1500 g and 28-31 weeks gestational age

The survival rate of babies between 1001-1500 g birth weight in 24 out of the 32 centres were 85% and above, the key performance index for Level III NICUs. The variation in survival rate varies across centres, varying from 79-93% (Figure 49– the spokes of the ‘wheel’ refer to the centre number, Table 52). The survival rate figure may be affected by:

- variation in antenatal factors, higher risk babies, human resources, facilities and workload.
- referral patterns as the death is attributed to the referral hospital if the baby expires after 24 hours of life.
- the case mix of the various hospitals – larger centres having more referrals for high risk deliveries and congenital abnormalities
- the total number of babies admitted to the SDP centre (Figure 50).

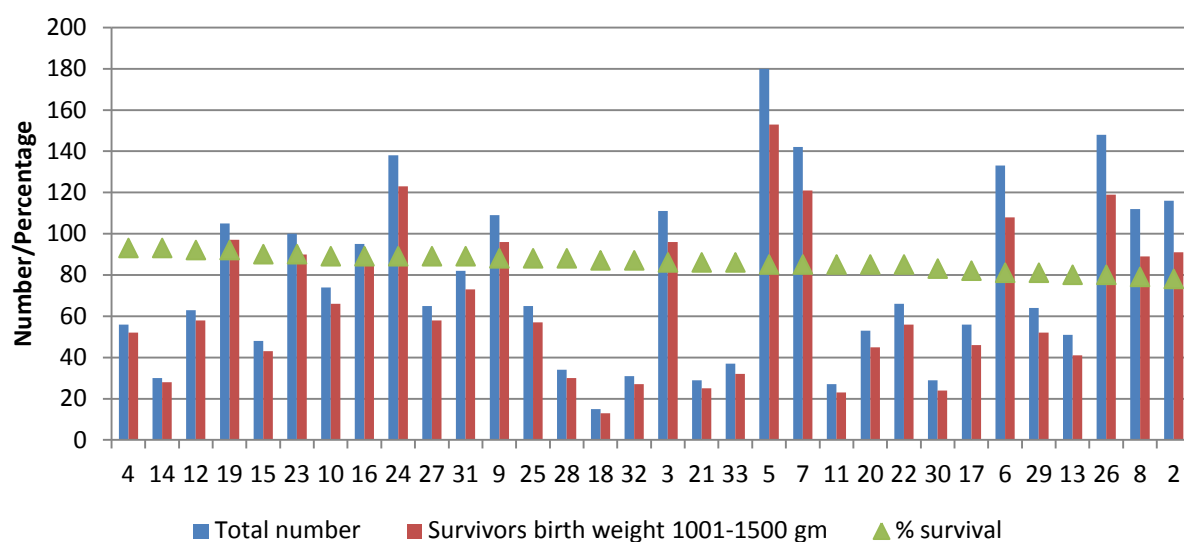
Some of these factors may explain the lack of difference in survival rate between the referral hospitals and the smaller hospitals.

**Fig. 49 Survival of babies of 1001-1500 gm birth weight & KPI for years 2007 and 2008**



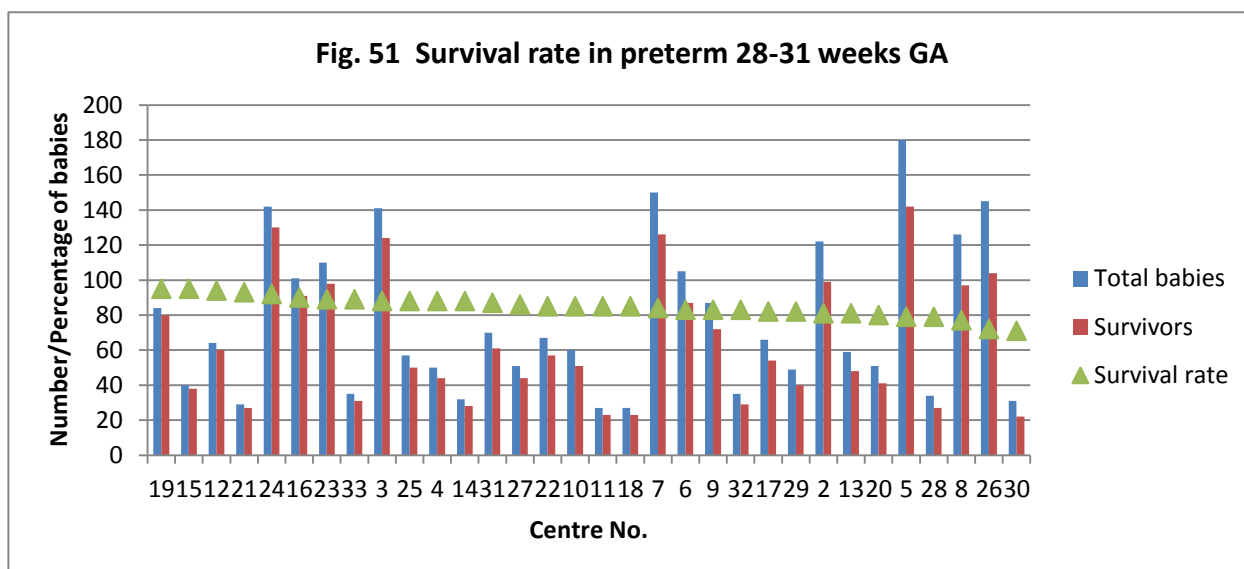
**Figure 49. Survival of babies of 1001-1500 g birth weight & KPI for year 2008**

**Fig. 50 Number of babies between 1001-1500 grams birth weight admitted to each centre compared to number of survivors**



**Figure 50. Number of babies between 1001-1500 g birth weight admitted to each centre compared to number of survivors**

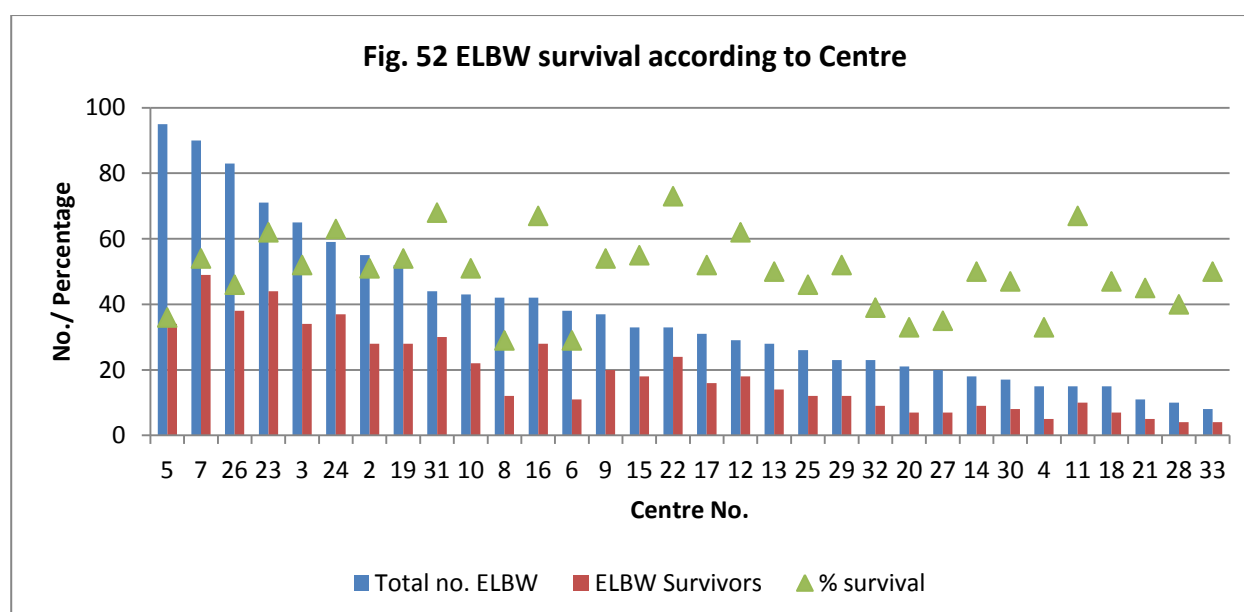




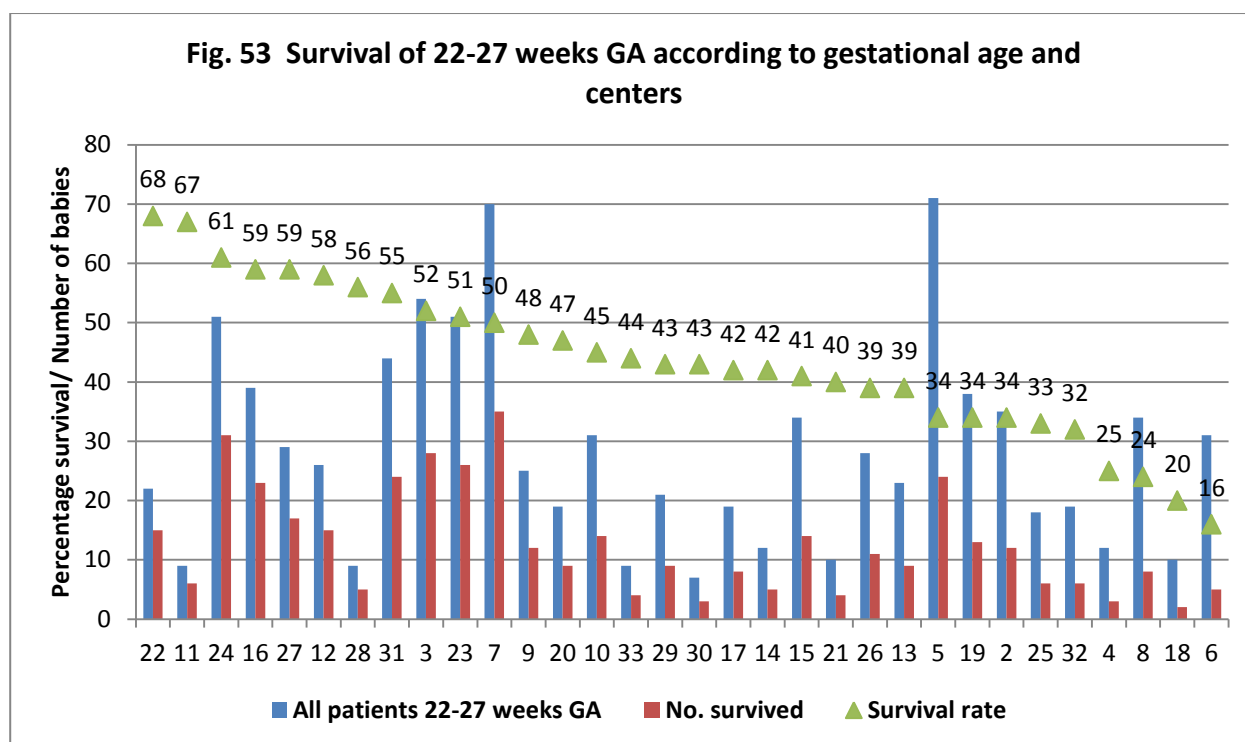
**Figure 51. Survival rate in preterm 28-31 weeks gestational age according to centres**

### 3.10.2.2 Survival rate of babies of birth weight between 501-1000 g and 22-27 weeks gestational age

The survival rate of babies between 501-1000 g birth weight showed a wider variation from 29-73% (Table 52). The study group included the group of preterm babies who died shortly after delivery and were never admitted into the NICU and this should be taken into account. Reasons given earlier for the larger VLBW babies may also apply for the variation in survival rate in this group of babies. In addition, the individual NICU policy regarding aggressive or conservative management in these babies may have affected the final outcome. Figure 52 shows the relative distribution of babies in this birth weight category and the number of survivors.



**Fig. 52 Survival of Extremely low birth weight babies by Centre**



**Figure 53. Number and survival rate of babies 22-27 weeks GA according to centres**

### 3.12 Perinatal and neonatal mortality rates

These are important indicators of both obstetric and neonatal outcomes.

The births are obtained by records of all births in the hospitals of each neonatal unit and the mortality rates are calculated pertaining to that for inborn babies only.

#### Perinatal mortality rate

No. stillbirths + neonatal deaths < 7 days (BW 500 g and above  
or gestation 22 weeks and above) \_\_\_\_\_ x 1000 TBs  
No. total births (TBs)

#### Early Neonatal mortality rate

No. neonatal deaths < 7 days (BW 500 g and above  
or gestation 22 weeks and above) \_\_\_\_\_ x 1000 LBs  
No. livebirths (LBs)

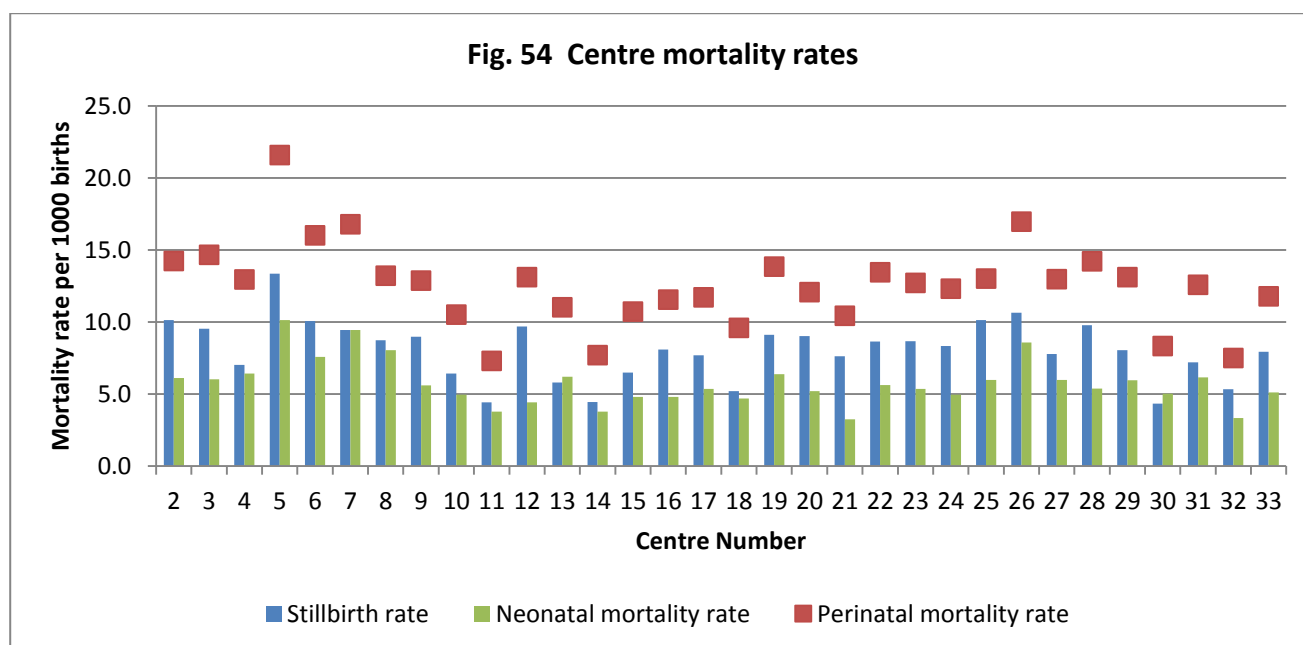
#### Neonatal mortality rate

No. neonatal deaths < 28 days (BW 500 g and above  
or gestation 22 weeks and above) \_\_\_\_\_ x 1000 LBs  
No. livebirths (LBs)

The birth census in Appendix 3 shows the form for the number of total births and stillbirths, and the number of neonatal deaths in all the centres obtained from the study. The 2008 perinatal, early neonatal and neonatal mortality rates were calculated to be 13.2 per 1000 TBs, 4.7 and 6.2 per 1000 LBs respectively, for our SDP group.

### Total births, neonatal deaths and mortality rates, 2008

Total Births	258635
No. Stillbirths	2198
No. Livebirths	256437
Inborn deaths <7 days (early neonatal deaths)	1216
Inborn deaths < 28 days (neonatal deaths)	1577
Stillbirth rate	8.6 per 1000 TBs
Perinatal mortality rate (PMR)	13.2 per 1000TBs
Early neonatal mortality rate (Early NMR)	4.7 per 1000 LBs
Neonatal mortality rate (NMR)	6.2 per 1000 LBs



**Figure 54. Centre Mortality rates**

These mortality rates are high when compared to the overall national figures which were 7.7 for PMR, 2.9 for Early NMR and 3.7 for NMR (see Figure 52). This is expected as these NICUs are tertiary centres handling high risk pregnancies and sick babies.

### 3.13 Discharge

Babies were usually discharged straight home from the participating NICUs in the hospitals. Some may have been discharged from a paediatric ward following extended care after NICU stay (e.g. babies with prolonged oxygen requirement), or rarely transferred elsewhere.

For survivors the mean duration of hospital stay according to gestation and birthweight groups are as shown in Tables 55 and 55a-e and Figure 55. The shorter stay of babies 500 g birth weight or below was related to their lower survival rate.

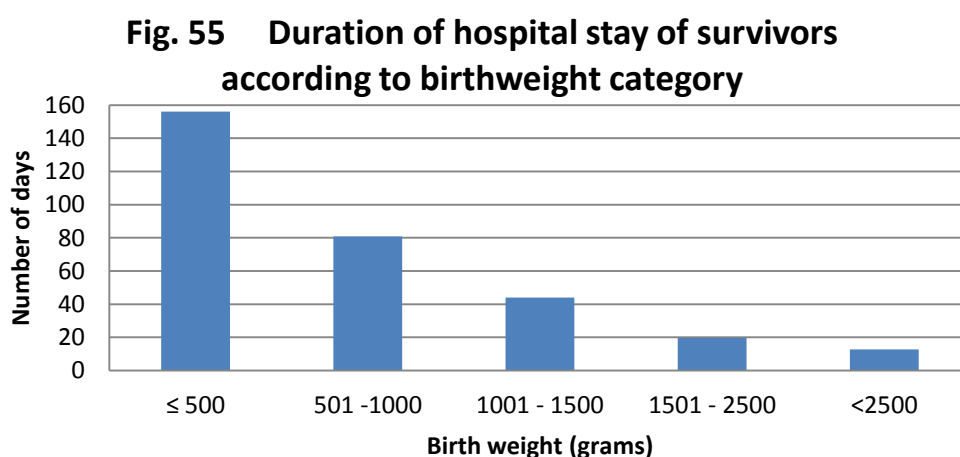


Figure 55. Duration of hospital stay of survivors according to birthweight category

The duration of hospital stay is dependent on many factors especially gestational age and birth weight and whether babies survived. About 80% of all deaths in the NICUs occur within the first week of life (Figure 56).

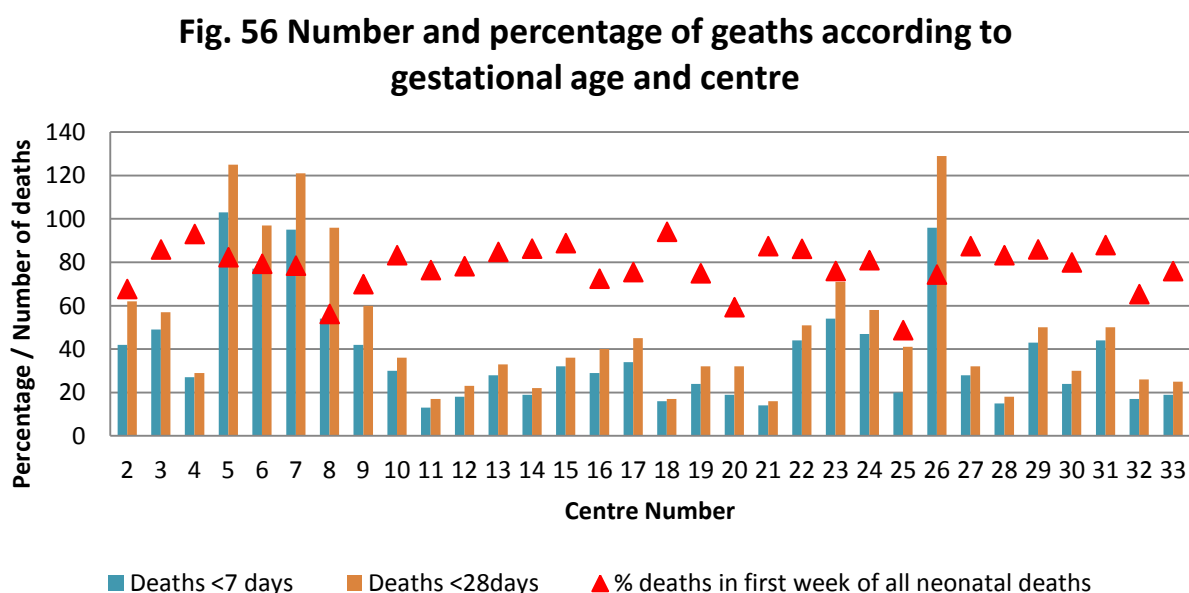


Figure 56. Number and percentage of deaths according to gestational age and centre

### 3.14 Enteral nutrition on discharge

#### 3.14.1 Enteral nutrition on discharge by gestational age

Majority of the babies (38%) were on mixed feeding on discharge. Three thousand seven hundred and twenty five babies (33%) were breastfed and 10 percent were on formula feeding on discharge. Nineteen percent of the babies were not fed enterally mainly because they were too ill to be fed and had died before enteral feeding could be commenced.

The feeding pattern was the same in the different gestational age groups whereby mixed feeding was the main type of feeding on discharge.

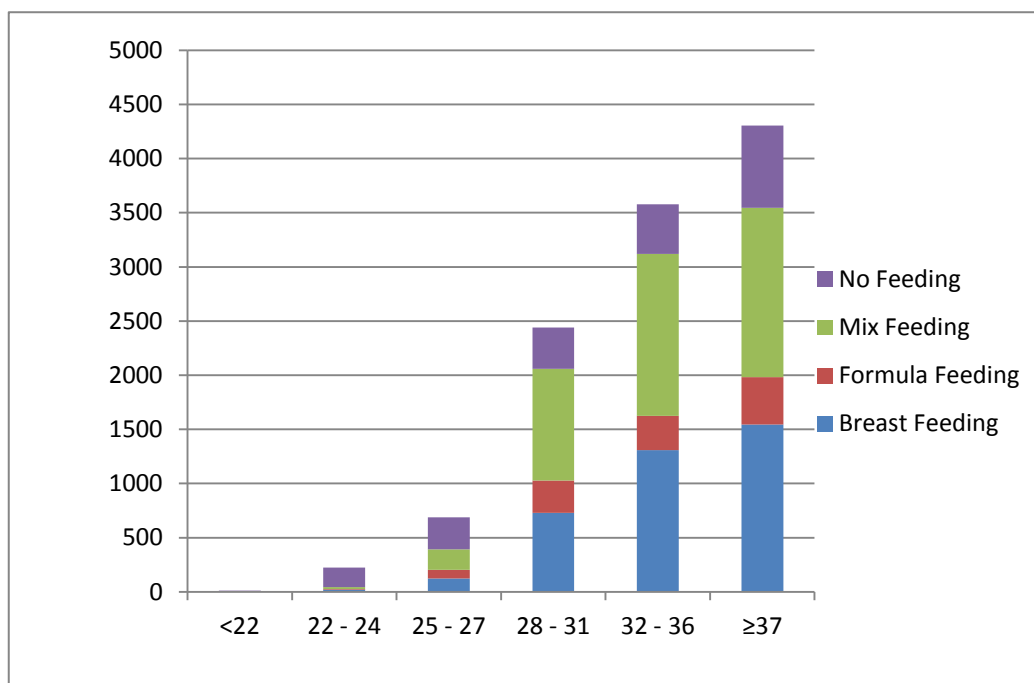
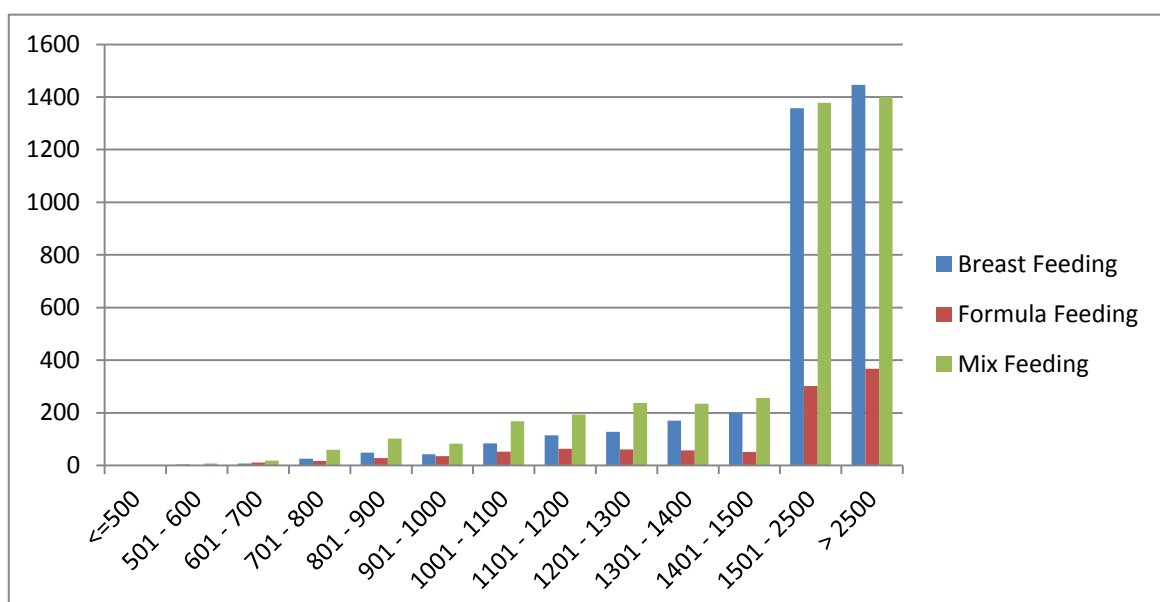


Figure 57. Enteral feeding on discharge by gestational age

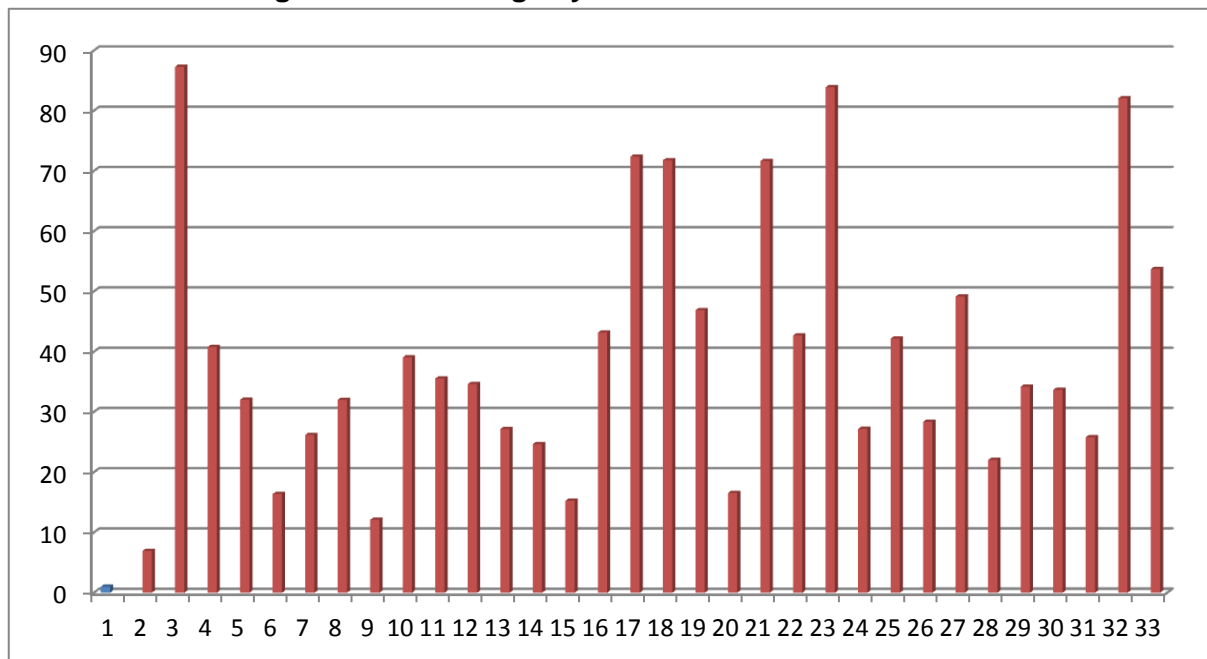
#### 3.14.2 Enteral feeding on discharge by birth weight



**Figure 58. Enteral feeding on discharge by birth weight**

Mixed feeding was the commonest type of feeding in all birth weight groups except for the >2500 g group where slightly more babies were breastfed.

### 3.14.3 Breastfeeding rate on discharge by centre



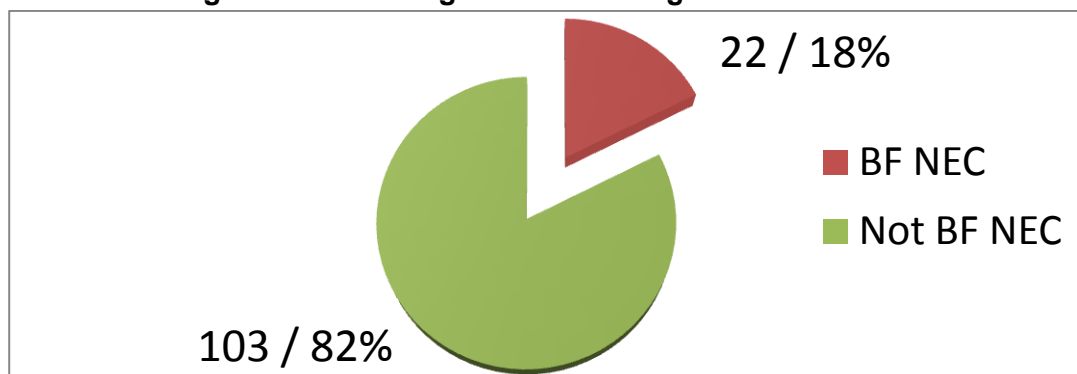
**Figure 59. Breastfeeding rate on discharge by centre**

Nine thousand four hundred and forty three babies were discharged alive in 2008. Of these 3723 (39.43%) were breastfed on discharge. Seven centres ( Centres 3,17,18, 21, 23, 32 and 33 ) had more than 50% babies who were breastfed on discharge.. Centre 3 had the highest percentage (87.31%) of exclusively breastfed babies on discharge.

### 3.14.4 Enteral feeding on discharge and NEC

The incidence of NEC among VLBW babies who were exclusively breastfed on discharge was 2.4%. The rate in the exclusively formula fed and mixed feeding on discharge groups was higher at 3.8%.

### Breast Feeding and NEC among Babies ≤ 1500 grams



**Fig. 60 Type of feeding among the ELBW's Versus NEC**

## 4.0 STUDY RECOMMENDATIONS

### 1. Antenatal care (to work with Public health and Obstetrics staff) :

- a. to closely monitor the antenatal care of mothers of *Orang Asli* and *Bumiputra Sabah* and *Sarawak* ethnicities to reduce the risk of hypoxic ischaemic encephalopathy and poor outcome with prematurity.
- b. to enhance the use of antenatal steroids and to continue with in-utero transfer of high risk pregnancies.
- c. to promote Caesarean section for viable extremely preterm deliveries.
- d. to reduce the number of post-term deliveries and monitor for oligohydramnios to reduce risk of thick meconium stained liquor.

### 2. NICU care:

- a. to increase the use of surfactant administration in respiratory distress syndrome and to administer it early rather than after 2 hours.
- b. to promote the use of continuous positive airway pressure as early as possible after birth to reduce need for mechanical ventilation and reduce risk of pneumothorax.
- c. to enhance infection control in the NICU.
- d. to increase availability of nitric oxide in state hospitals to reduce mortality from meconium aspiration.
- e. reduce incidence of severe ROP grades 4 & 5.

### 2. Postnatal care :

- a. to aim for earlier surfactant administration for preterm babies with respiratory distress syndrome.
- b. to review ventilator strategies to reduce the incidence of pneumothorax.
- c. to enhance the use of CPAP as immediate respiratory support option or earlier extubation to CPAP.
- d. to review the use of postnatal steroid use such as to limit its use to those with high ventilator settings.
- e. to monitor the ROP screening of babies in each centre who fulfil the criteria. For subsequent years, the ROP screening as outpatient to be also monitored by the MNMR.
- f. to continuously improve infection control measures.
- g. To promote feeding ELBW babies with breast milk only to reduce the incidence of necrotising enterocolitis

## 5.0 REFERENCES

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## Malaysian National Neonatal Registry

### DATA TABLES

Table 1. Admissions to each NICU unit by year

Centres	No of babies admitted to the Neonatal Unit				No of babies included in the study			
	2005	2006	2007	2008	2005	2006	2007	2008
All Centres	54671	61758	69820	73961	9023	10387	10835	11219
2	3069	3151	3576	3340	509	566	401	483
3	1620	2788	2936	3279	446	494	594	526
4	1539	1357	1367	1741	248	265	242	209
5	1463	1505	1700	2153	481	633	661	737
6	2553	2674	2850	2935	349	438	454	523
7	4657	4488	4804	4439	671	862	847	786
8	4373	4458	5850	4666	463	548	557	554
9	3862	3962	4405	4630	390	380	360	371
10	1913	2911	3213	3159	213	329	308	304
11	2327	2421	2716	2963	114	104	114	110
12	2402	2269	2502	2481	211	199	194	209
13	1572	1513	1635	1670	276	280	310	249
14	841	852	875	1120	157	106	158	168
15	1369	1232	1322	1371	183	241	264	237
16	1492	1727	1579	1839	368	413	355	366
17	1759	2199	3586	3574	433	368	433	353
18	643	553	695	1100	72	108	106	97
19	827	851	905	1122	295	364	336	372
20	1993	2370	2241	2023	218	309	264	193
21	1558	1351	1199	1282	162	119	131	142
22	3316	2705	2933	2814	428	437	472	509
23	2351	2509	2746	3026	665	627	645	573
24	2483	2240	1839	2549	386	456	436	473
25	1408	1791	2071	2129	309	293	294	317
26	2638	2930	3029	2553	784	779	625	624
27	468	571	709	599	156	179	179	162
28	175	625	612	747	36	84	96	100
29	-	3187	3014	3793	-	266	305	363
30	-	517	1123	1106	-	113	260	228
31	-	51	673	767	-	27	276	282
32	-	-	1115	1683	-	-	158	204
33	-	-	-	1308	-	-	-	395

**Table 1a. Inborn babies admissions to each NICU unit by year**

Centres	No of babies admitted to the Neonatal Unit				No of inborn babies included in the study			
	2005	2006	2007	2008	2005	2006	2007	2008
All Centres	54671	61758	69820	73961	7306	8583	9145	9552
2	3069	3151	3576	3340	358	425	325	368
3	1620	2788	2936	3279	338	390	468	429
4	1539	1357	1367	1741	230	243	209	179
5	1463	1505	1700	2153	349	455	482	552
6	2553	2674	2850	2935	267	346	343	404
7	4657	4488	4804	4439	583	779	770	675
8	4373	4458	5850	4666	369	449	476	477
9	3862	3962	4405	4630	359	332	331	345
10	1913	2911	3213	3159	171	270	255	265
11	2327	2421	2716	2963	110	100	108	104
12	2402	2269	2502	2481	169	167	177	187
13	1572	1513	1635	1670	226	225	258	186
14	841	852	875	1120	145	95	147	150
15	1369	1232	1322	1371	153	208	247	192
16	1492	1727	1579	1839	311	370	311	333
17	1759	2199	3586	3574	382	315	397	324
18	643	553	695	1100	66	99	88	88
19	827	851	905	1122	209	265	221	258
20	1993	2370	2241	2023	188	271	227	169
21	1558	1351	1199	1282	142	104	120	124
22	3316	2705	2933	2814	353	383	413	446
23	2351	2509	2746	3026	526	526	512	493
24	2483	2240	1839	2549	318	355	358	410
25	1408	1791	2071	2129	205	224	220	262
26	2638	2930	3029	2553	641	610	507	537
27	468	571	709	599	114	145	164	136
28	175	625	612	747	24	66	80	82
29	-	3187	3014	3793	-	249	291	344
30	-	517	1123	1106	-	101	233	212
31	-	51	673	767	-	16	251	253
32	-	-	1115	1683	-	-	156	197
33	-	-	-	1308	-	-	-	371

**Table 2. Case distribution according to gestational age group by year**

Gestational age group (weeks)	All Babies in study	2005		2006		2007		2008	
		No Cases	%	No Cases	%	No Cases	%	No Cases	%
<22	38	5	0	16	0	6	0	11	0
22-24	804	173	2	190	2	217	2	224	2
25-27	2537	607	7	610	6	634	6	686	6
28-31	9223	2116	23	2334	22	2346	22	2427	22
32-36	13297	2956	33	3329	32	3445	32	3567	32
>=37	15565	3166	35	3908	38	4187	39	4304	38
Total	41464	9023	100	10387	100	10835	100	11219	100

**Table 3. Case distribution according to birthweight group by year**

Birth weight group (Grams)	All Babies in study	2005		2006		2007		2008	
		No Cases	%	No Cases	%	No Cases	%	No Cases	%
<=500	174	32	0	49	0	50	0	43	0
501-750	1527	360	4	370	4	418	4	379	3
751-1000	3090	738	8	767	7	772	7	813	7
1001-1500	9498	2224	25	2399	23	2411	22	2464	22
1501-2500	13358	2899	32	3390	33	3408	31	3661	33
>2500	13817	2770	31	3412	33	3776	35	3859	34
Total	41464	9023	100	10387	100	10835	100	11219	100

Table 4. Ethnicity according to gestational age group, (weeks) by year

Ethnic group	All Babies in study				<22								22-24							
	2005	2006	2007	2008	2005		2006		2007		2008		2005		2006		2007		2008	
	No	No	No	No	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Malay	5850	6579	6811	7211	2	0	11	0	4	0	4	0	103	2	104	2	119	2	142	2
Chinese	1057	1108	1162	1104	0	0	0	0	0	0	4	0	28	3	31	3	34	3	24	2
Indian	683	761	759	702	1	0	1	0	1	0	0	0	16	2	13	2	14	2	13	2
Orang Asli	130	143	158	169	0	0	0	0	0	0	0	0	2	2	2	1	3	2	1	1
Bumiputra Sabah	385	527	556	595	1	0	2	0	0	0	1	0	6	2	12	2	9	2	14	2
Bumiputra Sarawak	463	577	560	541	0	0	0	0	0	0	1	0	9	2	11	2	12	2	9	2
Other	47	83	81	81	0	0	0	0	0	0	0	0	2	4	2	2	0	0	3	4
Foreigner	407	605	745	811	1	0	2	0	1	0	1	0	7	2	15	2	25	3	18	2
Missing	1	4	3	5	0	0	0	0	0	0	0	0	0	0	0	0	1	33	0	0
Total	9023	10387	10835	11219	5	0	16	0	6	0	11	0	173	2	190	2	217	2	224	2

Ethnic group	25-27								28-31							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Malay	377	6	349	5	398	6	395	5	1320	23	1464	22	1445	21	1483	21
Chinese	92	9	86	8	70	6	91	8	265	25	253	23	267	23	275	25
Indian	44	6	51	7	40	5	51	7	147	22	145	19	143	19	144	21
Orang Asli	11	8	8	6	9	6	10	6	29	22	33	23	30	19	29	17
Bumiputra Sabah	27	7	38	7	34	6	34	6	92	24	128	24	133	24	161	27
Bumiputra Sarawak	37	8	39	7	50	9	50	9	152	33	169	29	163	29	136	25
Other	2	4	6	7	6	7	8	10	11	23	15	18	22	27	19	23
Foreigner	17	4	33	5	27	4	45	6	100	25	126	21	143	19	177	22
Missing	0	0	0	0	0	0	2	40	0	0	1	25	0	0	3	60
Total	607	7	610	6	634	6	686	6	2116	23	2334	22	2346	22	2427	22

Ethnic group	32-26								37 and above							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Malay	1914	33	2102	32	2197	32	2326	32	2134	36	2549	39	2648	39	2861	40
Chinese	334	32	353	32	382	33	350	32	338	32	385	35	409	35	360	33
Indian	246	36	270	35	250	33	238	34	229	34	281	37	311	41	256	36
Orang Asli	49	38	53	37	64	41	63	37	39	30	47	33	52	33	66	39
Bumiputra Sabah	114	30	163	31	159	29	179	30	145	38	184	35	221	40	206	35
Bumiputra Sarawak	155	33	182	32	168	30	186	34	110	24	176	31	167	30	159	29
Other	13	28	27	33	25	31	20	25	19	40	33	40	28	35	31	38
Foreigner	130	32	177	29	199	27	205	25	152	37	252	42	350	47	365	45
Missing	1	100	2	50	1	33	0	0	0	0	1	25	1	33	0	0
Total	2956	33	3329	32	3445	32	3567	32	3166	35	3908	38	4187	39	4304	38

**Table 4a. Ethnicity according to birthweight group, by year**

Ethnic group	All Babies in study				BW < 501gm								BW 501-750gm							
	2005	2006	2007	2008	2005		2006		2007		2008		2005		2006		2007		2008	
	No	No	No	No	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Malay	5850	6579	6811	7211	24	0	27	0	25	0	27	0	220	4	227	3	246	4	224	3
Chinese	1057	1108	1162	1104	2	0	10	1	9	1	5	0	46	4	42	4	50	4	44	4
Indian	683	761	759	702	4	1	6	1	6	1	5	1	36	5	31	4	28	4	27	4
Orang Asli	130	143	158	169	0	0	0	0	1	1	0	0	5	4	3	2	6	4	2	1
Bumiputra Sabah	385	527	556	595	1	0	5	1	2	0	2	0	15	4	21	4	22	4	23	4
Bumiputra Sarawak	463	577	560	541	1	0	0	0	2	0	1	0	19	4	19	3	31	6	25	5
Other	47	83	81	81	0	0	1	1	0	0	0	0	6	13	1	1	4	5	4	5
Foreigner	407	605	745	811	0	0	0	0	5	1	3	0	13	3	26	4	30	4	28	3
Missing	1	4	3	5	0	0	0	0	0	0	0	0	0	0	0	0	1	33	2	40
Total	9023	10387	10835	11219	32	0	49	0	50	0	43	0	360	4	370	4	418	4	379	3

Ethnic group	BW 751-1000gm								BW 1001-1500gm							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Malay	457	8	461	7	475	7	470	7	1373	23	1467	22	1502	22	1524	21
Chinese	109	10	105	9	80	7	101	9	265	25	253	23	263	23	264	24
Indian	65	10	58	8	64	8	74	11	168	25	176	23	146	19	147	21
Orang Asli	8	6	14	10	9	6	15	9	42	32	41	29	30	19	34	20
Bumiputra Sabah	27	7	42	8	56	10	49	8	107	28	140	27	133	24	143	24
Bumiputra Sarawak	43	9	40	7	41	7	38	7	153	33	171	30	179	32	164	30
Other	1	2	5	6	6	7	6	7	13	28	21	25	20	25	17	21
Foreigner	28	7	41	7	41	6	59	7	102	25	129	21	137	18	169	21
Missing	0	0	1	25	0	0	1	20	1	100	1	25	1	33	2	40
Total	738	8	767	7	772	7	813	7	2224	25	2399	23	2411	22	2464	22

Ethnic group	BW 1501-2500gm								BW > 2500gm							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Malay	1877	32	2153	33	2129	31	2365	33	1899	32	2244	34	2434	36	2601	36
Chinese	340	32	336	30	372	32	359	33	295	28	362	33	388	33	331	30
Indian	219	32	255	34	242	32	223	32	191	28	235	31	273	36	226	32
Orang Asli	50	38	51	36	79	50	75	44	25	19	34	24	33	21	43	25
Bumiputra Sabah	117	30	160	30	174	31	196	33	118	31	159	30	169	30	182	31
Bumiputra Sarawak	161	35	210	36	163	29	190	35	86	19	137	24	144	26	123	23
Other	11	23	28	34	24	30	26	32	16	34	27	33	27	33	28	35
Foreigner	124	30	195	32	225	30	227	28	140	34	214	35	307	41	325	40
Missing	0	0	2	50	0	0	0	0	0	0	0	0	1	33	0	0
Total	2899	32	3390	33	3408	31	3661	33	2770	31	3412	33	3776	35	3859	34

**Table 5. Use of antenatal steroid according to gestational age group , by year**

Gestational age group (weeks)	All Babies in study				Antenatal steroid given							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<22	5	16	6	11	0	0	0	0	1	17	1	9
22-24	173	190	217	224	52	30	61	32	76	35	79	35
25-27	607	610	634	686	320	53	337	55	360	57	403	59
28-31	2116	2334	2346	2427	1273	60	1434	61	1518	65	1520	63
<32	2901	3150	3203	3348	1645	57	1832	58	1955	61	2003	60
32-33	1376	1528	1567	1657	765	56	889	58	946	60	1006	61
<34	4277	4678	4770	5005	2410	56	2721	58	2901	61	3009	60
>=34	4746	5709	6065	6214	599	13	648	11	731	12	804	13
Total	9023	10387	10835	11219	3009	33	3369	32	3632	34	3813	34

**Table 6. Mean maternal age according to gestational age group, by year**

Gestational age group (weeks)	2005			2006			2007			2008		
	No Cases	Mean Maternal Age	SD	No Cases	Mean Maternal Age	SD	No Cases	Mean Maternal Age	SD	No Cases	Mean Maternal Age	SD
<22	5	27	8	16	30	5	6	25	8	11	26	10
22-24	173	29	6	190	29	6	217	28	7	224	27	6
25-27	606	29	7	610	29	7	634	28	7	685	29	6
28-31	2113	30	7	2333	29	7	2346	29	7	2426	29	7
32-36	2946	30	7	3328	29	6	3445	30	7	3567	30	7
>=37	3155	31	6	3907	30	6	4187	30	6	4304	30	6
Total	8998	30	7	10384	29	7	10835	29	6	11217	29	6

**Table 6a. Mean maternal age according to birthweight group, by year**

Birthweight group (Grams)	2005			2006			2007			2008		
	No Cases	Mean Maternal Age	SD	No Cases	Mean Maternal Age	SD	No Cases	Mean Maternal Age	SD	No Cases	Mean Maternal Age	SD
<=500	32	29	6	49	30	6	50	28	6	43	28	7
501-750	360	30	6	370	29	7	418	29	7	378	28	6
751-1000	738	30	7	767	29	7	772	29	7	812	30	7
1001-1500	2214	30	7	2399	29	7	2411	29	7	2464	29	7
1501-2500	2893	30	7	3388	29	7	3408	29	7	3661	29	7
>2500	2761	31	6	3411	30	6	3776	30	6	3859	30	6
Total	8998	30	7	10384	29	7	10835	29	6	11217	29	6

**Table 7. Growth status according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				SGA							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<22	5	16	6	11	1	20	4	25	3	50	3	27
22-24	173	190	217	224	31	18	53	28	54	25	68	30
25-27	607	610	634	686	104	17	107	18	107	17	152	22
28-31	2116	2334	2346	2427	373	18	412	18	412	18	604	25
32-36	2956	3329	3445	3567	744	25	1062	32	1016	29	1124	32
>=37	3166	3908	4187	4304	494	16	962	25	1023	24	865	20
Total	9023	10387	10835	11219	1747	19	2600	25	2615	24	2816	25

Gestational age group (weeks)	AGA								LGA							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	3	60	10	63	3	50	7	64	1	20	2	13	0	0	1	9
22-24	141	82	130	68	155	71	142	63	1	1	7	4	8	4	12	5
25-27	493	81	470	77	501	79	499	73	10	2	33	5	26	4	35	5
28-31	1681	79	1804	77	1835	78	1758	72	61	3	118	5	98	4	65	3
32-36	2153	73	2141	64	2299	67	2317	65	59	2	126	4	129	4	124	3
>=37	2461	78	2748	70	2955	71	3270	76	210	7	198	5	209	5	164	4
Total	6932	77	7303	70	7748	72	7993	71	342	4	484	5	470	4	401	4



**Table 7a. Growth status according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				SGA							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	32	49	50	43	19	59	34	69	27	54	27	63
501-750	360	370	418	379	122	34	131	35	140	33	137	36
751-1000	738	767	772	813	248	34	274	36	265	34	322	40
1001-1500	2224	2399	2411	2464	709	32	866	36	851	35	944	38
1501-2500	2899	3390	3408	3661	597	21	1037	31	986	29	1147	31
>2500	2770	3412	3776	3859	52	2	258	8	346	9	239	6
Total	9023	10387	10835	11219	1747	19	2600	25	2615	24	2816	25

Birthweight group (Grams)	AGA								LGA							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	12	38	15	31	21	42	14	33	1	3	0	0	2	4	0	0
501-750	234	65	235	64	275	66	236	62	4	1	4	1	3	1	6	2
751-1000	489	66	488	64	497	64	474	58	1	0	5	1	10	1	17	2
1001-1500	1500	67	1492	62	1527	63	1475	60	14	1	41	2	32	1	44	2
1501-2500	2239	77	2221	66	2312	68	2419	66	63	2	132	4	109	3	94	3
>2500	2458	89	2852	84	3116	83	3375	87	259	9	302	9	314	8	240	6
Total	6932	77	7303	70	7748	72	7993	71	342	4	484	5	470	4	401	4

**Table 8. Gender according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				Male							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<22	5	16	6	11	4	80	9	56	4	67	6	55
22-24	173	190	217	224	109	63	113	59	117	54	138	62
25-27	607	610	634	686	331	55	345	57	343	54	392	57
28-31	2116	2334	2346	2427	1183	56	1293	55	1298	55	1343	55
32-36	2956	3329	3445	3567	1666	56	1860	56	1931	56	1985	56
>=37	3166	3908	4187	4304	1948	62	2350	60	2501	60	2540	59
Total	9023	10387	10835	11219	5241	58	5970	57	6194	57	6404	57

Gestational age group (weeks)	Female								Indeterminate							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	1	20	7	44	2	33	4	36	0	0	0	0	0	0	1	9
22-24	63	36	77	41	99	46	85	38	1	1	0	0	1	0	1	0
25-27	275	45	261	43	287	45	292	43	1	0	4	1	3	0	2	0
28-31	926	44	1035	44	1044	45	1078	44	6	0	6	0	4	0	6	0
32-36	1277	43	1453	44	1497	43	1561	44	13	0	16	0	17	0	20	1
>=37	1206	38	1537	39	1663	40	1754	41	12	0	21	1	23	1	10	0
Total	3748	42	4370	42	4592	42	4774	43	33	0	47	0	48	0	40	0

**Table 8a. Gender according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Male							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	32	49	50	43	14	44	22	45	20	40	18	42
501-750	360	370	418	379	183	51	190	51	206	49	201	53
751-1000	738	767	772	813	377	51	421	55	396	51	412	51
1001-1500	2224	2399	2411	2464	1144	51	1247	52	1274	53	1288	52
1501-2500	2899	3390	3408	3661	1737	60	1960	58	1953	57	2114	58
>2500	2770	3412	3776	3859	1786	64	2130	62	2345	62	2371	61
Total	9023	10387	10835	11219	5241	58	5970	57	6194	57	6404	57

Birthweight group (Grams)	Female								Indetermine							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	18	56	26	53	29	58	24	56	0	0	1	2	1	2	1	2
501-750	173	48	178	48	211	50	175	46	3	1	2	1	1	0	3	1
751-1000	360	49	343	45	374	48	398	49	1	0	3	0	1	0	3	0
1001-1500	1072	48	1144	48	1123	47	1164	47	8	0	8	0	14	1	12	0
1501-2500	1146	40	1408	42	1434	42	1531	42	16	1	22	1	21	1	15	0
>2500	979	35	1271	37	1421	38	1482	38	5	0	11	0	10	0	6	0
Total	3748	42	4370	42	4592	42	4774	43	33	0	47	0	48	0	40	0

**Table 9. Place of birth among outborn according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				University Hospital								General Hospital							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	0	1	2	1	0	0	0	0	0	0	0	0	0	0	1	100	1	50	0	0
22-24	12	20	19	20	0	0	0	0	0	0	0	0	1	8	1	5	1	5	3	15
25-27	112	93	75	100	0	0	2	2	1	1	1	1	13	12	4	4	5	7	9	9
28-31	351	320	305	329	3	1	0	0	7	2	5	2	29	8	19	6	30	10	31	9
32-36	468	493	437	435	3	1	0	0	7	2	3	1	53	11	43	9	51	12	39	9
>=37	774	877	852	781	5	1	4	0	6	1	7	1	93	12	102	12	114	13	62	8
Total	1717	1804	1690	1666	11	1	6	0	21	1	16	1	189	11	170	9	202	12	144	9

Gestational age group (weeks)	Private Hospital								District Hospital with Specialist								District Hospital without Specialist							
	2005		2006		2007		2008		2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	100
22-24	4	33	5	25	4	21	2	10	3	25	0	0	4	21	2	10	2	17	6	30	3	16	4	20
25-27	16	14	22	24	11	15	14	14	16	14	11	12	13	17	28	28	30	27	24	26	19	25	21	21
28-31	62	18	37	12	31	10	35	11	54	15	55	17	60	20	56	17	105	30	117	37	87	29	99	30
32-36	67	14	102	21	69	16	72	17	75	16	90	18	81	19	81	19	138	29	135	27	105	24	108	25
>=37	103	13	130	15	135	16	118	15	146	19	153	17	160	19	142	18	254	33	272	31	245	29	256	33
Total	252	15	296	16	250	15	241	14	294	17	309	17	318	19	309	19	529	31	554	31	459	27	489	29

Gestational age group (weeks)	Private Maternity Home								Home								Others							
	2005		2006		2007		2008		2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	0	0	0	0	0	0	0	0	0	0	0	0	1	50	0	0	0	0	0	0	0	0	0	0
22-24	1	8	1	5	0	0	0	0	0	0	3	15	5	26	7	35	1	8	4	20	1	5	2	10
25-27	2	2	3	3	3	4	5	5	21	19	19	20	10	13	12	12	14	13	8	9	13	17	10	10
28-31	15	4	9	3	14	5	15	5	49	14	41	13	44	14	51	16	34	10	41	13	32	10	35	11
32-36	49	10	34	7	33	8	41	9	37	8	46	9	58	13	49	11	45	10	42	9	33	8	41	9
>=37	110	14	115	13	103	12	102	13	36	5	54	6	54	6	60	8	27	3	47	5	35	4	33	4
Total	177	10	162	9	153	9	163	10	143	8	163	9	172	10	179	11	121	7	142	8	114	7	121	7

**Table 9a. Place of birth among outborn according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				University Hospital								General Hospital							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	0	4	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
501-750	35	30	30	29	0	0	0	0	0	0	0	0	6	17	1	3	2	7	3	10
751-1000	121	124	88	107	1	1	1	1	2	2	1	1	16	13	11	9	10	11	5	5
1001-1500	373	340	338	348	3	1	1	0	7	2	6	2	32	9	20	6	29	9	38	11
1501-2500	534	561	478	494	2	0	2	0	6	1	3	1	63	12	58	10	66	14	44	9
>2500	654	745	755	687	5	1	2	0	6	1	6	1	72	11	80	11	95	13	54	8
Total	1717	1804	1690	1666	11	1	6	0	21	1	16	1	189	11	170	9	202	12	144	9

Birthweight group (Grams)	Private Hospital								District Hospital with Specialist								District Hospital without Specialist							
	2005		2006		2007		2008		2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	0	0	0	0	0	0	0	0	0	0	1	25	0	0	0	0	0	0	1	25	0	0	1	100
501-750	6	17	11	37	5	17	5	17	6	17	5	17	4	13	5	17	4	11	7	23	5	17	5	17
751-1000	25	21	20	16	11	13	9	8	14	12	31	25	18	20	29	27	25	21	35	28	17	19	26	24
1001-1500	57	15	41	12	44	13	36	10	56	15	44	13	63	19	51	15	124	33	110	32	84	25	95	27
1501-2500	62	12	85	15	60	13	70	14	96	18	93	17	87	18	94	19	165	31	176	31	135	28	150	30
>2500	102	16	139	19	130	17	121	18	122	19	135	18	146	19	130	19	211	32	225	30	218	29	212	31
Total	252	15	296	16	250	15	241	14	294	17	309	17	318	19	309	19	529	31	554	31	459	27	489	29

Birthweight group (Grams)	Private Maternity Home								Home								Others							
	2005		2006		2007		2008		2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	0	0	0	0	0	0	0	0	0	0	1	25	1	100	0	0	0	0	1	25	0	0	0	0
501-750	2	6	1	3	1	3	1	3	9	26	4	13	10	33	6	21	2	6	1	3	2	7	4	14
751-1000	3	2	2	2	3	3	5	5	21	17	15	12	11	13	16	15	16	13	9	7	16	18	15	14
1001-1500	12	3	11	3	15	4	18	5	49	13	63	19	60	18	64	18	39	10	49	14	36	11	40	11
1501-2500	56	10	53	9	35	7	44	9	49	9	46	8	53	11	54	11	41	8	47	8	36	8	33	7
>2500	104	16	95	13	99	13	95	14	15	2	34	5	37	5	39	6	23	4	35	5	24	3	29	4
Total	177	10	162	9	153	9	163	10	143	8	163	9	172	10	179	11	121	7	142	8	114	7	121	7

**Table 10. Inborn-Outborn status according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				Inborn								Outborn							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	5	16	6	11	5	100	15	94	4	67	10	91	0	0	1	6	2	33	1	9
22-24	173	190	217	224	161	93	170	89	198	91	204	91	12	7	20	11	19	9	20	9
25-27	607	610	634	686	495	82	517	85	559	88	586	85	112	18	93	15	75	12	100	15
28-31	2116	2334	2346	2427	1765	83	2014	86	2041	87	2098	86	351	17	320	14	305	13	329	14
32-36	2956	3329	3445	3567	2488	84	2836	85	3008	87	3131	88	468	16	493	15	437	13	435	12
>=37	3166	3908	4187	4304	2392	76	3031	78	3335	80	3523	82	774	24	877	22	852	20	781	18
Total	9023	10387	10835	11219	7306	81	8583	83	9145	84	9552	85	1717	19	1804	17	1690	16	1666	15

**Table 10a. Inborn-Outborn status according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Inborn								Outborn							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	32	49	50	43	32	100	45	92	49	98	42	98	0	0	4	8	1	2	1	2
501-750	360	370	418	379	325	90	340	92	388	93	350	92	35	10	30	8	30	7	29	8
751-1000	738	767	772	813	617	84	643	84	684	89	706	87	121	16	124	16	88	11	107	13
1001-1500	2224	2399	2411	2464	1851	83	2059	86	2073	86	2116	86	373	17	340	14	338	14	348	14
1501-2500	2899	3390	3408	3661	2365	82	2829	83	2930	86	3166	86	534	18	561	17	478	14	494	13
>2500	2770	3412	3776	3859	2116	76	2667	78	3021	80	3172	82	654	24	745	22	755	20	687	18
Total	9023	10387	10835	11219	7306	81	8583	83	9145	84	9552	85	1717	19	1804	17	1690	16	1666	15

**Table 11. Multiplicity of births according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				Singletons								Twins							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	5	16	6	11	5	100	13	81	6	100	8	73	0	0	3	19	0	0	3	27
22-24	173	190	217	224	151	87	170	89	183	84	196	88	22	13	20	11	33	15	27	12
25-27	607	610	634	686	489	81	533	87	537	85	611	89	111	18	65	11	87	14	75	11
28-31	2116	2334	2346	2427	1829	86	2029	87	1992	85	2102	87	266	13	287	12	327	14	263	11
32-36	2956	3329	3445	3567	2667	90	2956	89	3066	89	3151	88	275	9	333	10	351	10	380	11
>=37	3166	3908	4187	4304	3102	98	3819	98	4111	98	4246	99	63	2	87	2	71	2	56	1
Total	9023	10387	10835	11219	8243	91	9520	92	9895	91	10314	92	737	8	795	8	869	8	804	7

Gestational age group (weeks)	Triplets								Others							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-24	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0
25-27	7	1	7	1	6	1	0	0	0	0	5	1	4	1	0	0
28-31	20	1	18	1	27	1	62	3	1	0	0	0	0	0	0	0
32-36	12	0	39	1	25	1	36	1	1	0	0	0	3	0	0	0
>=37	0	0	0	0	2	0	2	0	1	0	1	0	3	0	0	0
Total	39	0	64	1	61	1	101	1	3	0	6	0	10	0	0	0



**Table 11a Multiplicity of births according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Singletons								Twins							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	32	49	50	43	24	75	41	84	41	82	34	79	7	22	7	14	9	18	9	21
501-750	360	370	418	379	289	80	314	85	346	83	323	85	67	19	51	14	65	16	53	14
751-1000	738	767	772	813	622	84	663	86	638	83	696	86	111	15	97	13	124	16	101	12
1001-1500	2224	2399	2411	2464	1901	85	2039	85	2002	83	2101	85	299	13	328	14	375	16	308	13
1501-2500	2899	3390	3408	3661	2661	92	3087	91	3125	92	3326	91	230	8	276	8	266	8	308	8
>2500	2770	3412	3776	3859	2746	99	3376	99	3743	99	3834	99	23	1	36	1	30	1	25	1
Total	9023	10387	10835	11219	8243	91	9520	92	9895	91	10314	92	737	8	795	8	869	8	804	7

Birthweight group (Grams)	Triplets								Others							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	1	3	1	2	0	0	0	0	0	0	0	0	0	0	0	0
501-750	3	1	1	0	7	2	3	1	1	0	4	1	0	0	0	0
751-1000	5	1	6	1	6	1	16	2	0	0	1	0	4	1	0	0
1001-1500	22	1	31	1	32	1	55	2	1	0	1	0	2	0	0	0
1501-2500	8	0	25	1	16	0	27	1	0	0	0	0	1	0	0	0
>2500	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	0
Total	39	0	64	1	61	1	101	1	3	0	6	0	10	0	0	0

**Table 12. Mode of delivery according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				SVD								Breech							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	5	16	6	11	4	80	14	88	6	100	11	100	0	0	1	6	0	0	0	0
22-24	173	190	217	224	129	75	154	81	178	82	180	80	23	13	25	13	26	12	24	11
25-27	607	610	634	686	396	65	403	66	401	63	451	66	64	11	44	7	53	8	38	6
28-31	2116	2334	2346	2427	1099	52	1192	51	1156	49	1193	49	95	4	86	4	96	4	67	3
32-36	2956	3329	3445	3567	1355	46	1494	45	1468	43	1543	43	76	3	80	2	61	2	60	2
>=37	3166	3908	4187	4304	1705	54	2141	55	2174	52	2269	53	45	1	59	2	48	1	46	1
Total	9023	10387	10835	11219	4688	52	5398	52	5383	50	5647	50	303	3	295	3	284	3	235	2

Gestational age group (weeks)	Forceps								Ventouse							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
25-27	0	0	0	0	1	0	0	0	3	0	0	0	1	0	1	0
28-31	3	0	4	0	7	0	3	0	4	0	3	0	1	0	5	0
32-36	11	0	16	0	8	0	12	0	18	1	20	1	23	1	29	1
>=37	54	2	26	1	34	1	35	1	158	5	221	6	274	7	237	6
Total	68	1	46	0	50	0	50	0	183	2	244	2	299	3	272	2

Gestational age group (weeks)	Caesarean Section								Unknown							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	1	20	1	6	0	0	0	0	0	0	0	0	0	0	0	0
22-24	21	12	11	6	13	6	20	9	0	0	0	0	0	0	0	0
25-27	143	24	163	27	178	28	196	29	1	0	0	0	0	0	0	0
28-31	915	43	1048	45	1085	46	1159	48	0	0	1	0	1	0	0	0
32-36	1495	51	1718	52	1883	55	1921	54	1	0	1	0	2	0	2	0
>=37	1202	38	1459	37	1654	40	1717	40	2	0	2	0	3	0	0	0
Total	3777	42	4400	42	4813	44	5013	45	4	0	4	0	6	0	2	0

Table 12a. Mode of delivery according to birthweight group, by year

Birthweight group (Grams)	All Babies in study				SVD								Breech							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	32	49	50	43	21	66	34	69	37	74	36	84	3	9	6	12	3	6	2	5
501-750	360	370	418	379	225	63	246	66	266	64	257	68	41	11	30	8	46	11	25	7
751-1000	738	767	772	813	368	50	410	53	388	50	400	49	61	8	44	6	49	6	33	4
1001-1500	2224	2399	2411	2464	1086	49	1137	47	1077	45	1134	46	90	4	87	4	79	3	74	3
1501-2500	2899	3390	3408	3661	1518	52	1711	50	1678	49	1836	50	78	3	81	2	65	2	69	2
>2500	2770	3412	3776	3859	1470	53	1860	55	1937	51	1984	51	30	1	47	1	42	1	32	1
Total	9023	10387	10835	11219	4688	52	5398	52	5383	50	5647	50	303	3	295	3	284	3	235	2

Birthweight group (Grams)	Forceps								Ventouse							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0
501-750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
751-1000	1	0	0	0	1	0	1	0	4	1	0	0	1	0	1	0
1001-1500	2	0	4	0	4	0	3	0	2	0	1	0	2	0	1	0
1501-2500	14	0	14	0	12	0	11	0	23	1	30	1	34	1	50	1
>2500	51	2	28	1	33	1	35	1	153	6	213	6	262	7	220	6
Total	68	1	46	0	50	0	50	0	183	2	244	2	299	3	272	2

Birthweight group (Grams)	Caesarean Section								Unknown							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	7	22	9	18	10	20	5	12	0	0	0	0	0	0	0	0
501-750	94	26	94	25	106	25	97	26	0	0	0	0	0	0	0	0
751-1000	303	41	312	41	333	43	378	46	1	0	1	0	0	0	0	0
1001-1500	1043	47	1169	49	1247	52	1251	51	1	0	1	0	2	0	1	0
1501-2500	1266	44	1552	46	1618	47	1695	46	0	0	2	0	1	0	0	0
>2500	1064	38	1264	37	1499	40	1587	41	2	0	0	0	3	0	1	0
Total	3777	42	4400	42	4813	44	5013	45	4	0	4	0	6	0	2	0

**Table 13. Ventilatory support according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				Babies with Ventilatory support							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<22	5	16	6	11	0	0	3	19	1	17	4	36
22-24	173	190	217	224	72	42	81	43	97	45	141	63
25-27	607	610	634	686	506	83	504	83	530	84	640	93
28-31	2116	2334	2346	2427	1720	81	1962	84	2033	87	2309	95
32-36	2956	3329	3445	3567	2489	84	2705	81	2878	84	3255	91
>=37	3166	3908	4187	4304	2985	94	3309	85	3523	84	3837	89
Total	9023	10387	10835	11219	7772	86	8564	82	9062	84	10186	91

**Table 13a. Ventilatory support according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Babies with Ventilatory support							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	32	49	50	43	8	25	7	14	16	32	18	42
501-750	360	370	418	379	208	58	224	61	257	61	288	76
751-1000	738	767	772	813	649	88	670	87	681	88	765	94
1001-1500	2224	2399	2411	2464	1553	70	1730	72	1825	76	2187	89
1501-2500	2899	3390	3408	3661	2653	92	2973	88	3016	88	3416	93
>2500	2770	3412	3776	3859	2701	98	2960	87	3267	87	3512	91
Total	9023	10387	10835	11219	7772	86	8564	82	9062	84	10186	91

**Table 14. Use of CPAP according to gestational age group, by year**

Gestational age group (weeks)	All Babies on VS				Babies with CPAP alone								Babies with CPAP in combination with any others mode of VS							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	0	3	1	4	0		0	0	0	0	0	0	0		1	33	1	100	0	0
22-24	72	81	97	141	9	13	3	4	4	4	7	5	15	21	16	20	16	16	27	19
25-27	506	504	530	640	31	6	33	7	39	7	19	3	187	37	223	44	233	44	268	42
28-31	1720	1962	2033	2309	301	18	329	17	386	19	266	12	637	37	887	45	990	49	1107	48
32-36	2489	2705	2878	3255	693	28	782	29	952	33	647	20	576	23	776	29	827	29	1139	35
>=37	2985	3309	3523	3837	466	16	528	16	735	21	447	12	414	14	530	16	573	16	771	20
Total	7772	8564	9062	10186	1500	19	1675	20	2116	23	1386	14	1829	24	2433	28	2640	29	3312	33

**Table 14a. Use of CPAP according to birthweight group, by year**

Birthweight group (Grams)	All Babies on VS				Babies with CPAP alone								Babies with CPAP in combination with any others mode of VS							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	8	7	16	18	2	25	0	0	4	25	0	0	1	13	3	43	2	13	2	11
501-750	208	224	257	288	26	13	21	9	25	10	14	5	56	27	66	29	86	33	80	28
751-1000	649	670	681	765	62	10	53	8	65	10	42	5	261	40	340	51	334	49	343	45
1001-1500	1553	1730	1825	2187	318	20	339	20	402	22	277	13	542	35	732	42	848	46	988	45
1501-2500	2653	2973	3016	3416	653	25	767	26	923	31	632	19	600	23	815	27	835	28	1167	34
>2500	2701	2960	3267	3512	439	16	495	17	697	21	421	12	369	14	477	16	535	16	732	21
Total	7772	8564	9062	10186	1500	19	1675	20	2116	23	1386	14	1829	24	2433	28	2640	29	3312	33

**Table 15. Use of HFOV according to gestational age group, by year**

Gestational age group (weeks)	All Babies on VS				Babies with HFOV alone								Babies with HFOV in combination with any others mode of VS							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	0	3	1	4	0		0	0	0	0	0	0	0		0	0	0	0	1	25
22-24	72	81	97	141	2	3	2	2	3	3	4	3	5	7	4	5	9	9	16	11
25-27	506	504	530	640	9	2	9	2	13	2	18	3	20	4	51	10	52	10	52	8
28-31	1720	1962	2033	2309	13	1	14	1	6	0	10	0	40	2	84	4	88	4	79	3
32-36	2489	2705	2878	3255	11	0	11	0	17	1	17	1	35	1	55	2	86	3	75	2
>=37	2985	3309	3523	3837	34	1	33	1	25	1	40	1	81	3	162	5	165	5	179	5
Total	7772	8564	9062	10186	69	1	69	1	64	1	89	1	181	2	356	4	400	4	402	4

**Table 15a. Use of HFOV according to birthweight group, by year**

Birthweight group (Grams)	All Babies on VS				Babies with HFOV alone								Babies with HFOV in combination with any others mode of VS							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	8	7	16	18	1	13	0	0	0	0	0	0	1	13	0	0	1	6	0	0
501-750	208	224	257	288	5	2	2	1	5	2	5	2	10	5	19	8	24	9	28	10
751-1000	649	670	681	765	7	1	12	2	9	1	14	2	23	4	53	8	55	8	50	7
1001-1500	1553	1730	1825	2187	10	1	9	1	12	1	14	1	30	2	68	4	67	4	68	3
1501-2500	2653	2973	3016	3416	15	1	18	1	14	0	22	1	42	2	67	2	95	3	97	3
>2500	2701	2960	3267	3512	31	1	28	1	24	1	34	1	75	3	149	5	158	5	159	5
Total	7772	8564	9062	10186	69	1	69	1	64	1	89	1	181	2	356	4	400	4	402	4

**Table 16. Use of Nitric Oxide to gestational age group, by year**

Gestational age group (weeks)	All Babies on VS				Babies with Nitric Oxide							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<22	0	3	1	4	0		0	0	0	0	0	0
22-24	72	81	97	141	0	0	0	0	0	0	0	0
25-27	506	504	530	640	1	0	2	0	1	0	2	0
28-31	1720	1962	2033	2309	5	0	6	0	8	0	9	0
32-36	2489	2705	2878	3255	8	0	7	0	12	0	12	0
>=37	2985	3309	3523	3837	32	1	60	2	77	2	56	1
Total	7772	8564	9062	10186	46	1	75	1	98	1	79	1

**Table 16a. Use of Nitric Oxide according to birthweight group, by year**

Birthweight group (Grams)	All Babies on VS				Babies with Nitric Oxide							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	8	7	16	18	0	0	0	0	0	0	0	0
501-750	208	224	257	288	0	0	1	0	0	0	1	0
751-1000	649	670	681	765	1	0	0	0	1	0	3	0
1001-1500	1553	1730	1825	2187	3	0	4	0	5	0	6	0
1501-2500	2653	2973	3016	3416	10	0	19	1	28	1	20	1
>2500	2701	2960	3267	3512	32	1	51	2	64	2	49	1
Total	7772	8564	9062	10186	46	1	75	1	98	1	79	1



**Table 17. Mean total duration of ventilatory support according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				Babies who survived								For survivors, total duration of ventilatory support in days							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<22	5	16	6	11	0	0	1	6	0	0	1	9	0	0	15	0	0	0	0	0
22-24	173	190	217	224	18	10	23	12	17	8	40	18	32	26	32	26	32	32	24	24
25-27	607	610	634	686	274	45	289	47	309	49	366	53	20	20	23	20	24	21	21	23
28-31	2116	2334	2346	2427	1748	83	1964	84	2020	86	2048	84	6	10	8	11	9	12	8	12
32-36	2956	3329	3445	3567	2540	86	2895	87	3068	89	3156	88	3	6	4	6	4	6	4	6
>=37	3166	3908	4187	4304	2433	77	3099	79	3472	83	3579	83	4	8	5	9	4	5	4	5
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82	5	9	6	10	6	10	6	10

**Table 17a. Mean total duration of ventilatory support according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Babies who survived								For survivors, total duration of ventilatory support in days							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<=500	32	49	50	43	2	6	2	4	5	10	2	5	3	1	8	9	18	21	53	16
501-750	360	370	418	379	71	20	80	22	86	21	90	24	23	23	26	22	30	25	27	24
751-1000	738	767	772	813	438	59	470	61	493	64	514	63	14	16	19	19	19	18	17	21
1001-1500	2224	2399	2411	2464	1904	86	2068	86	2133	88	2117	86	5	10	8	10	8	10	8	12
1501-2500	2899	3390	3408	3661	2381	82	2864	84	2943	86	3134	86	4	7	4	8	4	5	4	6
>2500	2770	3412	3776	3859	2217	80	2787	82	3226	85	3333	86	4	7	4	6	4	6	4	5
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82	5	9	6	10	6	10	6	10

**Table 18. Use of surfactant according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Babies given surfactant							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	32	49	50	43	3	9	3	6	5	10	8	19
501-750	360	370	418	379	142	39	145	39	196	47	179	47
751-1000	738	767	772	813	434	59	485	63	514	67	574	71
1001-1500	2224	2399	2411	2464	823	37	934	39	1056	44	1237	50
1501-2500	2899	3390	3408	3661	698	24	856	25	940	28	1115	30
>2500	2770	3412	3776	3859	171	6	229	7	202	5	221	6
Total	9023	10387	10835	11219	2271	25	2652	26	2913	27	3334	30

Birthweight group (Grams)	2005				2006				2007				2008					
	<=2 hrs		>2 hrs		<=2 hrs		>2 hrs		<=2 hrs		>2 hrs		< 1 hrs		1 - 2 hrs		>2 hrs	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	2	67	1	33	0	0	3	100	2	40	3	60	6	75	2	25	0	0
501-750	87	61	54	38	93	64	52	36	127	65	67	34	66	37	75	42	38	21
751-1000	248	57	185	43	295	61	190	39	340	66	162	32	224	39	209	36	141	25
1001-1500	396	48	427	52	518	55	416	45	653	62	384	36	386	31	420	34	431	35
1501-2500	239	34	457	65	360	42	496	58	458	49	477	51	287	26	310	28	518	46
>2500	48	28	123	72	84	37	145	63	88	44	114	56	47	21	35	16	139	63
Total	1020	45	1247	55	1350	51	1302	49	1668	57	1207	41	1016	30	1051	32	1267	38

**Table 18a. Duration of surfactant according to Centre, 2008**

Centres	All Babies in study	Surfactant Duration < 1 Hours		Surfactant Duration 1-2 Hours		Surfactant Duration > 2 Hours	
		No	%	No	%	No	%
All Centres	11219	1016	9	1051	9	1267	11
2	483	8	2	36	7	104	22
3	526	81	15	42	8	38	7
4	209	17	8	8	4	17	8
5	737	29	4	95	13	93	13
6	523	0	0	22	4	137	26
7	786	37	5	69	9	76	10
8	554	25	5	71	13	63	11
9	371	6	2	11	3	65	18
10	304	22	7	27	9	46	15
11	110	10	9	22	20	6	5
12	209	23	11	44	21	14	7
13	249	5	2	13	5	24	10
14	168	14	8	11	7	14	8
15	237	14	6	28	12	42	18
16	366	89	24	89	24	24	7
17	353	11	3	14	4	21	6
18	97	7	7	28	29	11	11
19	372	100	27	4	1	69	19
20	193	29	15	21	11	22	11
21	142	17	12	6	4	5	4
22	509	136	27	29	6	23	5
23	573	82	14	73	13	38	7
24	473	62	13	126	27	30	6
25	317	95	30	6	2	26	8
26	624	1	0	34	5	82	13
27	162	10	6	30	19	10	6
28	100	3	3	8	8	12	12
29	363	3	1	19	5	91	25
30	228	15	7	12	5	9	4
31	282	24	9	34	12	17	6
32	204	35	17	11	5	5	2
33	395	6	2	8	2	33	8

**Table 19. Use of postnatal steroid for CLD according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Babies given postnatal steroid for CLD							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	32	49	50	43	0	0	0	0	2	4	1	2
501-750	360	370	418	379	24	7	28	8	32	8	32	8
751-1000	738	767	772	813	98	13	99	13	91	12	85	10
1001-1500	2224	2399	2411	2464	96	4	106	4	112	5	129	5
1501-2500	2899	3390	3408	3661	47	2	53	2	62	2	49	1
>2500	2770	3412	3776	3859	68	2	69	2	83	2	46	1
Total	9023	10387	10835	11219	333	4	355	3	382	4	342	3

**Table 19a. Use of postnatal steroid for CLD according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				Babies given postnatal steroid for CLD							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<22	5	16	6	11	0	0	0	0	0	0	0	0
22-24	173	190	217	224	11	6	12	6	6	3	7	3
25-27	607	610	634	686	76	13	78	13	81	13	89	13
28-31	2116	2334	2346	2427	113	5	131	6	144	6	133	5
32-36	2956	3329	3445	3567	61	2	61	2	65	2	65	2
>=37	3166	3908	4187	4304	72	2	73	2	86	2	48	1
Total	9023	10387	10835	11219	333	4	355	3	382	4	342	3

**Table 20. Use of parenteral nutrition according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Babies given parenteral nutrition							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	32	49	50	43	4	13	2	4	6	12	5	12
501-750	360	370	418	379	104	29	124	34	144	34	136	36
751-1000	738	767	772	813	371	50	441	57	484	63	524	64
1001-1500	2224	2399	2411	2464	654	29	715	30	917	38	1050	43
<1501	3354	3585	3651	3699	1133	34	1282	36	1551	42	1715	46
1501-2500	2899	3390	3408	3661	336	12	405	12	464	14	606	17
>2500	2770	3412	3776	3859	203	7	265	8	274	7	437	11
Total	9023	10387	10835	11219	1672	19	1952	19	2289	21	2758	25

**Table 21. Enteral nutrition feeding on discharge according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				No Enteral nutrition								Exclusive breastfeeding / breast milk feeds							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	32	49	50	43	29	91	47	96	45	90	41	95	2	6	2	4	1	2	0	0
501-750	360	370	418	379	262	73	267	72	313	75	267	70	23	6	29	8	26	6	28	7
751-1000	738	767	772	813	249	34	264	34	256	33	270	33	115	16	148	19	161	21	158	19
1001-1500	2224	2399	2411	2464	272	12	296	12	272	11	353	14	546	25	714	30	689	29	698	28
1501-2500	2899	3390	3408	3661	459	16	488	14	457	13	563	15	883	30	1167	34	1223	36	1363	37
>2500	2770	3412	3776	3859	499	18	601	18	567	15	580	15	806	29	1225	36	1410	37	1453	38
Total	9023	10387	10835	11219	1770	20	1963	19	1910	18	2074	18	2375	26	3285	32	3510	32	3700	33

Birthweight group (Grams)	Mixed feeds								Exclusive formula feeds							
	2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	1	3	0	0	4	8	1	2	0	0	0	0	0	0	1	2
501-750	50	14	48	13	64	15	59	16	24	7	26	7	15	4	25	7
751-1000	305	41	258	34	277	36	285	35	67	9	97	13	78	10	100	12
1001-1500	1186	53	1132	47	1191	49	1117	45	220	10	257	11	258	11	295	12
1501-2500	1367	47	1439	42	1446	42	1404	38	188	6	293	9	282	8	327	9
>2500	1281	46	1251	37	1484	39	1433	37	184	7	335	10	314	8	390	10
Total	4190	46	4128	40	4466	41	4299	38	683	8	1008	10	947	9	1138	10

**Table 22. Enteral nutrition feeding survival on discharge according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				All Babies who survived								No Enteral nutrition							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	32	49	50	43	2	6	2	4	5	10	2	5	0	0	0	0	0	0	0	0
501-750	360	370	418	379	71	20	80	22	86	21	90	24	0	0	5	6	1	1	0	0
751-1000	738	767	772	813	438	59	470	61	493	64	514	63	8	2	8	2	13	3	9	2
1001-1500	2224	2399	2411	2464	1904	86	2068	86	2133	88	2117	86	27	1	28	1	31	1	54	3
1501-2500	2899	3390	3408	3661	2381	82	2864	84	2943	86	3134	86	50	2	63	2	69	2	100	3
>2500	2770	3412	3776	3859	2217	80	2787	82	3226	85	3333	86	48	2	83	3	86	3	120	4
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82	133	2	187	2	200	2	283	3

Birthweight group (Grams)	Exclusive breastfeeding / breast milk feeds								Mixed feeds								Exclusive formula feeds							
	2005		2006		2007		2008		2005		2006		2007		2008		2005		2006		2007		2008	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	1	50	2	100	1	20	0	0	1	50	0	0	4	80	1	50	0	0	0	0	0	0	1	50
501-750	13	18	17	21	19	22	19	21	43	61	41	51	54	63	50	56	15	21	17	21	12	14	21	23
751-1000	98	22	138	29	150	30	142	28	268	61	239	51	258	52	270	53	63	14	85	18	72	15	93	18
1001-1500	522	27	695	34	682	32	685	32	1148	60	1105	53	1168	55	1092	52	207	11	240	12	252	12	285	13
1501-2500	866	36	1147	40	1208	41	1350	43	1305	55	1391	49	1412	48	1378	44	158	7	263	9	254	9	302	10
>2500	793	36	1208	43	1401	43	1444	43	1221	55	1198	43	1444	45	1400	42	156	7	298	11	294	9	367	11
Total	2293	33	3207	39	3461	39	3640	40	3986	57	3974	48	4340	49	4191	46	599	9	903	11	884	10	1069	12

**Table 23. ROP screening according to gestational age group by year**

Gestational age group (weeks)	All Babies in study				Babies who survived on discharge								Babies who survived and had ROP screening							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<22	5	16	6	11	0	0	1	6	0	0	1	9	0	0	1	100	0	0	0	0
22-24	173	190	217	224	18	10	23	12	17	8	40	18	17	94	21	91	15	88	31	78
25-27	607	610	634	686	274	45	289	47	309	49	366	53	257	94	270	93	293	95	273	75
28-31	2116	2334	2346	2427	1748	83	1964	84	2020	86	2048	84	1307	75	1427	73	1624	80	887	43
<32	2901	3150	3203	3348	2040	70	2277	72	2346	73	2455	73	1581	78	1719	75	1932	82	1191	49
32-36	2956	3329	3445	3567	2540	86	2895	87	3068	89	3156	88	784	31	836	29	969	32	360	11
>=37	3166	3908	4187	4304	2433	77	3099	79	3472	83	3579	83	40	2	41	1	54	2	7	0
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82	2405	34	2596	31	2955	33	1558	17

**Table 23a. ROP screening according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Babies who survived on discharge								Babies who survived and had ROP screening							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
<=500	32	49	50	43	2	6	2	4	5	10	2	5	0	0	1	50	3	60	2	100
501-750	360	370	418	379	71	20	80	22	86	21	90	24	71	100	76	95	82	95	78	87
751-1000	738	767	772	813	438	59	470	61	493	64	514	63	410	94	445	95	467	95	366	71
1001-1500	886	923	997	1046	709	80	755	82	846	85	868	83	591	83	621	82	750	89	444	51
<1251	2016	2109	2237	2281	1220	61	1307	62	1430	64	1474	65	1072	88	1143	87	1302	91	890	60
1251-1500	1338	1476	1414	1418	1195	89	1313	89	1287	91	1249	88	706	59	820	62	920	71	407	33
1501-2500	2899	3390	3408	3661	2381	82	2864	84	2943	86	3134	86	599	25	596	21	692	24	254	8
>2500	2770	3412	3776	3859	2217	80	2787	82	3226	85	3333	86	28	1	37	1	41	1	7	0
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82	2405	34	2596	31	2955	33	1558	17

**Table 24. Cerebral ultrasound scanning according to birth weight group, by year**

Birthweight group (Grams)	All Babies in study				Babies with ultrasound brain							
					2005		2006		2007		2008*	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	32	49	50	43	4	13	3	6	8	16	5	12
501-750	360	370	418	379	150	42	179	48	197	47	185	49
751-1000	738	767	772	813	564	76	602	78	623	81	650	80
1001-1500	2224	2399	2411	2464	1525	69	1629	68	1721	71	1657	67
<1501	3354	3585	3651	3699	2243	67	2413	67	2549	70	2497	68
1501-2500	2899	3390	3408	3661	1060	37	1235	36	1264	37	1250	34
>2500	2770	3412	3776	3859	642	23	729	21	816	22	825	21
Total	9023	10387	10835	11219	3945	44	4377	42	4629	43	4572	41

\* Ultrasound of Brain done at  $\leq 28$  days of life

**Table 25. Mean Discharge weight according to gestational age group, by year**

Birthweight group (Grams)	All Babies in study				Babies who survived								For survivors, total discharge weight in grams							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<22	5	16	6	11	0	0	1	6	0	0	1	9	0	0	1700	0	0	0	2850	0
22-24	173	190	217	224	18	10	23	12	17	8	40	18	2012	465	2142	835	2128	630	1964	726
25-27	607	610	634	686	274	45	289	47	309	49	366	53	2019	641	1922	456	1932	478	2012	639
28-31	2116	2334	2346	2427	1748	83	1964	84	2020	86	2048	84	1879	500	1839	320	1848	373	1869	429
32-36	2956	3329	3445	3567	2540	86	2895	87	3068	89	3156	88	2024	473	2031	452	2038	468	2058	452
$\geq 37$	3166	3908	4187	4304	2433	77	3099	79	3472	83	3579	83	3013	623	3001	605	3014	594	3032	583
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82	2331	738	2345	710	2373	723	2393	726



**Table 25a. Mean Discharge weight according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Babies who survived								For survivors, total discharge weight in grams							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<=500	32	49	50	43	2	6	2	4	5	10	2	5	2715	403	2065	191	2554	1176	2435	799
501-750	360	370	418	379	71	20	80	22	86	21	90	24	1953	456	1818	540	1930	416	2087	804
751-1000	738	767	772	813	438	59	470	61	493	64	514	63	1915	643	1871	414	1864	468	1950	633
1001-1500	2224	2399	2411	2464	1904	86	2068	86	2133	88	2117	86	1820	429	1804	302	1812	362	1820	359
1501-2500	2899	3390	3408	3661	2381	82	2864	84	2943	86	3134	86	2053	407	2045	351	2038	346	2062	379
>2500	2770	3412	3776	3859	2217	80	2787	82	3226	85	3333	86	3162	513	3151	511	3137	515	3144	500
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82	2331	738	2345	710	2373	723	2393	726

**Table 26. Mean total duration of hospital stay according to gestational age group, by year**

Gestational age group (weeks)	All Babies in study				Babies who survived								For survivors, total duration of hospital stay in days							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<22	5	16	6	11	0	0	1	6	0	0	1	9	0	0	42	0	0	0	6	0
22-24	173	190	217	224	18	10	23	12	17	8	40	18	91	40	102	69	95	50	81	58
25-27	607	610	634	686	274	45	289	47	309	49	366	53	75	42	73	30	73	33	76	47
28-31	2116	2334	2346	2427	1748	83	1964	84	2020	86	2048	84	43	27	42	24	42	24	44	32
32-36	2956	3329	3445	3567	2540	86	2895	87	3068	89	3156	88	23	22	23	23	20	18	21	19
>=37	3166	3908	4187	4304	2433	77	3099	79	3472	83	3579	83	14	19	14	22	12	16	13	19
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82	27	28	26	27	24	24	25	29

**Table 26a. Mean total duration of hospital stay according to birthweight, by year**

Gestational age group (weeks)	All Babies in study				Babies who survived								For survivors, total duration of hospital stay in days							
					2005		2006		2007		2008		2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<=500	32	49	50	43	2	6	2	4	5	10	2	5	8	1	33	29	64	68	132	34
501-750	360	370	418	379	71	20	80	22	86	21	90	24	95	33	91	43	94	30	102	57
751-1000	738	767	772	813	438	59	470	61	493	64	514	63	71	33	72	26	68	30	74	42
1001-1500	2224	2399	2411	2464	1904	86	2068	86	2133	88	2117	86	40	24	41	21	40	21	42	25
1501-2500	2899	3390	3408	3661	2381	82	2864	84	2943	86	3134	86	19	19	19	21	16	13	18	20
>2500	2770	3412	3776	3859	2217	80	2787	82	3226	85	3333	86	13	20	13	21	11	15	12	18
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82	27	28	26	27	24	24	25	29

Table 27a.Survival according to gestation (gestational age group), by year

Gestational age group (weeks)	All Babies in study				Babies who survived							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<22	5	16	6	11	0	0	1	6	0	0	1	9
22	22	29	17	19	1	5	0	0	1	6	1	5
23	51	51	71	53	6	12	4	8	6	8	6	11
24	100	110	129	152	11	11	19	17	10	8	33	22
25	120	143	156	160	36	30	40	28	38	24	53	33
26	231	223	226	231	95	41	101	45	99	44	111	48
27	256	244	252	295	143	56	148	61	172	68	202	68
28	393	429	454	495	277	70	317	74	351	77	385	78
29	414	472	462	473	332	80	391	83	377	82	394	83
30	670	704	683	718	562	84	594	84	598	88	601	84
31	639	729	747	741	577	90	662	91	694	93	668	90
32	812	836	891	928	714	88	737	88	803	90	841	91
33	564	692	676	729	504	89	626	90	628	93	660	91
34	639	727	757	813	554	87	643	88	662	87	720	89
35	426	501	543	526	357	84	422	84	497	92	452	86
36	515	573	578	571	411	80	467	82	478	83	483	85
>=37	3166	3908	4187	4304	2433	77	3099	79	3472	83	3579	83
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82
22-24	173	190	217	224	18	10	23	12	17	8	40	18
25-27	607	610	634	686	274	45	289	47	309	49	366	53
28-31	2116	2334	2346	2427	1748	83	1964	84	2020	86	2048	84
22-31	2896	3134	3197	3337	2040	70	2276	73	2346	73	2454	74
32-36	2956	3329	3445	3567	2540	86	2895	87	3068	89	3156	88
>=37	3166	3908	4187	4304	2433	77	3099	79	3472	83	3579	83

**Table 27b. Survival among inborn babies according to gestation (gestational age group), by year**

Gestational age group (weeks)	Inborn babies in study				Inborn babies who survived							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<22	5	15	4	10	0	0	1	7	0	0	1	10
22	21	26	16	18	1	5	0	0	1	6	1	6
23	48	46	68	50	5	10	2	4	6	9	5	10
24	92	98	114	136	9	10	16	16	9	8	28	21
25	95	125	141	130	23	24	33	26	36	26	41	32
26	191	193	196	201	76	40	85	44	88	45	90	45
27	209	199	222	255	118	56	124	62	155	70	174	68
28	313	343	388	419	216	69	252	73	301	78	326	78
29	338	419	408	404	266	79	350	84	333	82	333	82
30	552	594	588	611	466	84	509	86	518	88	515	84
31	562	658	657	664	512	91	595	90	611	93	600	90
32	682	718	793	812	606	89	630	88	719	91	732	90
33	490	610	609	662	447	91	551	90	567	93	600	91
34	539	617	662	727	468	87	547	89	577	87	644	89
35	366	421	477	458	312	85	355	84	436	91	398	87
36	411	470	467	472	333	81	385	82	384	82	398	84
>=37	2392	3031	3335	3523	1848	77	2442	81	2790	84	2938	83
Total	7306	8583	9145	9552	5706	78	6877	80	7531	82	7824	82
22-24	161	170	198	204	15	9	18	11	16	8	34	17
25-27	495	517	559	586	217	44	242	47	279	50	305	52
28-31	1765	2014	2041	2098	1460	83	1706	85	1763	86	1774	85
22-31	2421	2701	2798	2888	1692	70	1966	73	2058	74	2113	73
32-36	2488	2836	3008	3131	2166	87	2468	87	2683	89	2772	89
>=37	2392	3031	3335	3523	1848	77	2442	81	2790	84	2938	83

**Table 27c. Survival according to birthweight group, by year**

Birthweight group (Grams)	All Babies in study				Babies who survived							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	32	49	50	43	2	6	2	4	5	10	2	5
501-600	115	114	141	116	7	6	16	14	14	10	13	11
601-700	155	170	183	149	38	25	37	22	36	20	35	23
701-800	208	232	237	244	72	35	99	43	106	45	104	43
801-900	277	256	280	301	162	58	143	56	171	61	183	61
901-1000	343	365	349	382	230	67	255	70	252	72	269	70
1001-1000	365	324	354	393	279	76	254	78	295	83	312	79
1101-1200	370	404	451	457	305	82	331	82	389	86	384	84
1201-1300	441	513	493	509	374	85	450	88	424	86	437	86
1301-1400	489	538	536	537	440	90	474	88	495	92	470	88
1401-1500	559	620	577	568	506	91	559	90	530	92	514	90
1501-2500	2899	3390	3408	3661	2381	82	2864	84	2943	86	3134	86
>2500	2770	3412	3776	3859	2217	80	2787	82	3226	85	3333	86
Total	9023	10387	10835	11219	7013	78	8271	80	8886	82	9190	82
501-1000	1098	1137	1190	1192	509	46	550	48	579	49	604	51
1001-1500	2224	2399	2411	2464	1904	86	2068	86	2133	88	2117	86
501-1500	3322	3536	3601	3656	2413	73	2618	74	2712	75	2721	74

**Table 27d. Survival among inborn babies according to birthweight group, by year**

Birthweight group (Grams)	Inborn babies in study				Inborn babies who survived							
					2005		2006		2007		2008	
	2005	2006	2007	2008	No	%	No	%	No	%	No	%
<=500	32	45	49	42	2	6	2	4	5	10	2	5
501-600	106	107	129	110	6	6	13	12	14	11	12	11
601-700	141	157	171	136	32	23	34	22	36	21	32	24
701-800	183	197	214	215	64	35	89	45	99	46	88	41
801-900	227	219	252	257	136	60	125	57	158	63	155	60
901-1000	285	303	306	338	194	68	210	69	224	73	239	71
1001-1000	305	281	303	345	239	78	220	78	258	85	274	79
1101-1200	302	341	381	373	250	83	280	82	334	88	312	84
1201-1300	367	448	434	440	311	85	392	88	375	86	382	87
1301-1400	408	452	470	464	370	91	406	90	435	93	404	87
1401-1500	469	537	485	494	427	91	488	91	448	92	451	91
1501-2500	2365	2829	2930	3166	1958	83	2406	85	2541	87	2715	86
>2500	2116	2667	3021	3172	1717	81	2212	83	2604	86	2758	87
Total	7306	8583	9145	9552	5706	78	6877	80	7531	82	7824	82
501-1000	942	983	1072	1056	432	46	471	48	531	50	526	50
1001-1500	1851	2059	2073	2116	1597	86	1786	87	1850	89	1823	86
501-1500	2793	3042	3145	3172	2029	73	2257	74	2381	76	2349	74

**Table 28. Inborn-Outborn survival status according to Centre, 2008**

Centres	All Babies in study	Inborn Babies		Inborn Babies who Survived		Outborn Babies		Outborn Babies who Survived	
		No	%	No	%	No	%	No	%
All Centres	11219	9552	85	7824	82	1666	15	1365	82
2	483	368	76	298	81	115	24	91	79
3	526	429	82	366	85	97	18	83	86
4	209	179	86	148	83	29	14	25	86
5	737	552	75	417	76	185	25	150	81
6	523	404	77	299	74	119	23	92	77
7	786	675	86	542	80	111	14	89	80
8	554	477	86	370	78	77	14	58	75
9	371	345	93	277	80	26	7	20	77
10	304	265	87	224	85	39	13	32	82
11	110	104	95	85	82	6	5	5	83
12	209	187	89	161	86	22	11	18	82
13	249	186	75	148	80	63	25	47	75
14	168	150	89	128	85	18	11	18	100
15	237	192	81	153	80	45	19	38	84
16	366	333	91	290	87	33	9	32	97
17	353	324	92	277	85	29	8	21	72
18	97	88	91	70	80	9	9	8	89
19	372	258	69	219	85	114	31	101	89
20	193	169	88	136	80	24	12	21	88
21	142	124	87	107	86	18	13	13	72
22	509	446	88	391	88	63	12	54	86
23	573	493	86	419	85	80	14	72	90
24	473	410	87	347	85	63	13	50	79
25	317	262	83	212	81	55	17	44	80
26	624	537	86	396	74	87	14	73	84
27	162	136	84	104	76	26	16	20	77
28	100	82	82	62	76	18	18	14	78
29	363	344	95	289	84	19	5	15	79
30	228	212	93	181	85	16	7	15	94
31	282	253	90	198	78	29	10	19	66
32	204	197	97	167	85	7	3	7	100
33	395	371	94	343	92	24	6	20	83

**Table 29. Place of discharge, if child alive, according to birthweight group 2008**

<b>Birthweight group (Grams)</b>	<b>Home</b>	<b>Other Non Peads Wards</b>	<b>Transfer to other hospitals</b>	<b>Social welfare home</b>	<b>Still hospitalized as of first birthday</b>
< 500	2	0	0	0	0
501-750	80	0	8	2	0
751-1000	470	1	38	2	3
1001-1500	2006	0	103	4	2
1501-2500	2974	3	142	13	2
>2500	3173	4	147	7	2
Total	8705	8	438	28	9

**Table 30. Post-transfer disposition**

<b>Place of disposition</b>	<b>No</b>	<b>%</b>
Home	278	63
Transferred again to another hospital	30	7
Death	13	3
Readmitted to your hospital	66	15
Still hospitalized as of first birthday	35	8
Missing data	16	4
Total Cases	438	100

## PROBLEMS and DIAGNOSIS

**Table 31. Specific morbidities according to birthweight group, 2008**

	501-1000 gm		1001-1500 gm		1501-2500 gm		>2500 gm		Total
	No	%	No	%	No	%	No	%	No
RDS Yes	985	83	1806	73	1847	50	361	9	5022
RDS No	207	17	658	27	1814	50	3497	91	6196
NA/Unknown	0	0	0	0	0	0	1	0	1
PDA Yes	335	28	513	21	391	11	301	8	1544
PDA No	857	72	1951	79	3270	89	3558	92	9675
ECHO Done	213	64	342	67	325	83	286	95	1166
Indomethacin/ibuprofen >24hr	162	48	247	48	83	21	4	1	498
Ligation	4	1	5	1	7	2	3	1	19
Not treated	70	21	97	19	96	25	72	24	337
Pneumothorax Yes	74	6	85	3	134	4	216	6	510
Pneumothorax No	1118	94	2377	97	3526	96	3642	94	10705
NA/Unknown	0	0	2	0	1	0	1	0	4
NEC Yes	0	59	5	67	3	38	1	18	0
NEC No	100	1132	95	2397	97	3622	99	3841	100
Surgical Rx	0	32	3	43	2	24	1	12	0
Supplemental oxygen at 28 days Yes	292	25	310	13	177	5	150	4	932
Supplemental oxygen at 28 days No	899	75	2153	87	3484	95	3709	96	10285
NA/Unknown	1	0	1	0	0	0	0	0	2
Supplemental oxygen at 36 weeks corrected age Yes	139	12	188	8	177	5	126	3	630
Supplemental oxygen at 36 weeks corrected age No	1052	88	2239	91	2940	80	1598	42	7872
NA/Unknown	1	0	37	1	544	15	2135	55	2717
Seizures Yes	45	4	54	2	163	4	540	14	804
Seizures No	1147	96	2408	98	3497	96	3319	86	10412
Seizures NA/Unknown	0	0	2	0	1	0	0	0	3
Infection Yes	682	57	1336	54	1591	43	1644	43	5262
Infection No	507	43	1121	45	2059	56	2209	57	5929
NA/Unknown	3	0	7	0	11	0	6	0	28
For confirmed sepsis Group B strep	7	1	15	1	17	1	45	3	85
MRSA	25	4	24	2	19	1	17	1	85
CoNS	67	10	87	7	57	4	54	3	267
ESBL organisms	13	2	9	1	11	1	9	1	42
Fungal	14	2	19	1	7	0	7	0	47
Staphylococcus aureus	17	2	24	2	13	1	11	1	65
Klebsiella	25	4	53	4	39	2	22	1	140
Pseudomonas	14	2	18	1	17	1	29	2	78
Acinetobacter	11	2	19	1	12	1	13	1	55
Others	51	7	84	6	94	6	77	5	307
Grade 1 IVH	131	28	174	38	86	48	15	31	408
Grade 2 IVH	146	31	145	32	54	30	13	27	358
Grade 3 IVH	111	24	100	22	20	11	10	21	241
Grade 4 IVH	85	18	45	10	20	11	10	21	162
VP shunt/reservoir inserted*	3	1	1	0	3	2	2	4	9



Stage 0 ROP	213	46	616	71	204	80	8	100	1041
Stage 1 ROP	103	22	117	14	37	15	0	0	257
Stage 2 ROP	96	21	91	11	8	3	0	0	195
Stage 3 ROP	44	9	34	4	5	2	0	0	85
Stage 4 ROP	3	1	0	0	0	0	0	0	3
Stage 5 ROP	0	0	0	0	0	0	0	0	0
Laser for ROP (% of all screened)	8	2	12	1	1	0	0	0	22
Cryotherapy for ROP (% of all screened)	0	0	1	0	0	0	0	0	1
Other diagnosis									
Meconium aspiration syndrome	0	0	13	1	122	3	702	18	837
Transient tachypnoea of newborn	6	1	52	2	155	4	181	5	394
Pulmonary haemorrhage	92	8	78	3	44	1	46	1	261
Pulmonary interstitial emphysema	15	1	5	0	2	0	3	0	25
Pneumonia	156	13	296	12	680	19	1037	27	2170
Neonatal encephalopathy	1	0	12	0	31	1	95	2	139
Neonatal meningitis	6	1	11	0	32	1	34	1	83

\*Total in Table 33 is the total of babies with BW>500

**Table 31a. Specific morbidities according to birthweight group, 2008**

	<500 gm		501-1000 gm		1001-1500 gm		1501-2500 gm		>2500 gm		Total
	No	%	No	%	No	%	No	%	No	%	No
Infants with no congenital anomalies	38	88	1107	93	2235	91	2964	81	2990	77	9334
Infants with congenital anomalies	5	12	84	7	228	9	696	19	868	22	1881
Infants with non-syndromes (single or multiple anomalies)	3	60	20	24	74	32	191	27	247	28	535
Infants with syndromes	0	0	31	37	66	29	231	33	200	23	528
Down syndrome	0	0	3	10	17	26	83	36	130	65	233
Edward syndrome	0	0	12	39	28	42	69	30	6	3	115
Patau syndrome	0	0	2	6	6	9	26	11	20	10	54
Other syndrome	0	0	14	45	15	23	53	23	45	23	127
Infants with Isolated Major Abnormality	2	40	33	39	88	39	274	39	421	49	818
Infants with CVS	0	0	19	23	67	29	227	33	294	34	607
CVS Cyanotic	0	0	3	16	18	27	78	34	138	47	237
CVS Acyanotic	0	0	11	58	45	67	128	56	135	46	319
Infants with CNS	0	0	7	8	41	18	69	10	86	10	203
CNS hydrocephalus	0	0	6	86	31	76	39	57	58	67	134
CNS others	0	0	1	14	9	22	28	41	28	33	66
Infants with NTD	1	20	9	11	22	10	64	9	61	7	157
Spina bifida	0	0	0	0	5	23	13	20	22	36	40
Anencephaly	1	100	9	100	16	73	42	66	22	36	90
Others	0	0	0	0	1	5	10	16	17	28	28
Skeletal dysplasia	0	0	5	6	14	6	32	5	20	2	71
Respiratory anomalies	0	0	6	7	16	7	47	7	45	5	114
GIT anomalies	1	20	6	7	11	5	100	14	105	12	223
Hydrops	1	20	1	1	7	3	15	2	17	2	41
Renal	0	0	2	2	7	3	28	4	21	2	58
Infants with Cleft	1	20	6	7	17	7	80	11	165	19	269
Cleft lip	0	0	0	0	2	12	8	10	19	12	29
Cleft palate	0	0	1	17	4	24	12	15	40	24	57
Cleft lip and palate	1	100	5	83	11	65	60	75	106	64	183
Other isolated anomalies	1	20	10	12	27	12	83	12	96	11	217

**Table 31a. Specific morbidities according to birthweight group, 2008**

	<500 gm		501-1000 gm		1001-1500 gm		1501-2500 gm		>2500 gm		Total
	No	%	No	%	No	%	No	%	No	%	No
Inborn errors of metabolism	0	0	0	0	10	0	27	1	41	1	78

**Table 32. HIE according to birthweight group, 2008**

Birthweight group (Grams)	None	Mild/moderate	Severe	NA/Unknown	Not applicable
<=500	0	0	0	0	43
501-750	0	0	0	0	379
751-1000	0	0	0	0	813
1001-1500	0	0	0	0	2464
1501-2000	0	0	0	0	2025
2001-2500	1208	107	42	279	0
2501-3000	1339	245	87	145	0
3001-3500	1018	219	78	85	0
3501-4000	377	69	24	28	0
4001-4500	90	11	6	6	0
4501-5000	19	4	1	1	0
>5000	7	0	0	0	0
Total	4058	655	238	544	5724

**Table 33. Episodes of confirmed bacterial sepsis according to birthweight group and survival status, 2008.**

Birthweight group (Grams)	All Babies in study	Overall episodes of confirmed bacterial sepsis		Overall episodes of fungal sepsis		Survivors per BW group		Episodes of confirmed bacterial sepsis among survivors	
		No	%	No	%	No	%	No	%
<=500	43	5	12	0	0	2	5	3	7
501-750	379	54	14	4	1	90	24	34	9
751-1000	813	176	22	10	1	514	63	122	15
1001-1500	2464	333	14	19	1	2117	86	257	10
1501-2500	3661	279	8	7	0	3134	86	215	6
>2500	3859	277	7	7	0	3333	86	213	6
Overall	11219	1124	10	47	0	9190	82	844	8

(Bacterial sepsis = Grp B strep, MRSA, CoNS, ESBL and Others (excludes fungal sepsis). 1 tick for any of these is 1 episode of bacterial sepsis)

**Table 34. Mortality rate of confirmed bacterial sepsis according to birthweight group, 2008**

Birthweight group (Grams)	All Babies in study	Babies with any confirmed bacterial sepsis		Babies with any confirmed bacterial sepsis who died		Babies without any confirmed bacterial sepsis		Babies without any confirmed bacterial sepsis who died	
		No	%	No	%	No	%	No	%
<=500	43	4	9	2	5	39	91	39	91
501-750	379	49	13	17	4	330	87	272	72
751-1000	813	152	19	43	5	661	81	256	31
1001-1500	2464	302	12	64	3	2162	88	283	11
1501-2500	3661	250	7	56	2	3411	93	471	13
>2500	3859	253	7	52	1	3606	93	474	12
Overall	11219	1010	9	234	2	10209	91	1795	16

**Table 35. Mortality rate of confirmed fungal sepsis according to birthweight group, 2008**

Birthweight group (Grams)	All Babies in study	Babies with any fungal sepsis		Babies with any fungal sepsis who died		Babies without any fungal sepsis		Babies without any fungal sepsis who died	
		No	%	No	%	No	%	No	%
<=500	43	0	0	0	0	43	100	41	95
501-750	379	4	1	3	1	375	99	286	75
751-1000	813	10	1	5	1	803	99	294	36
1001-1500	2464	19	1	7	0	2445	99	340	14
1501-2500	3661	7	0	3	0	3654	100	524	14
>2500	3859	7	0	2	0	3852	100	524	14
Overall	11219	47	0	20	0	11172	100	2009	18

**Table 36. Supplemental oxygen use according to survival status of birthweight group, 2008**

Birthweight group (Grams)	All Babies in study	Babies who survived		Babies who survived and on oxygen at Day 28		Babies who survived and on oxygen at 36 weeks corrected gestational		Babies who died		Babies who died and on oxygen at Day 28		Babies who died and on oxygen at 36 weeks corrected gestational	
		No	%	No	%	No	%	No	%	No	%	No	%
<=500	43	2	5	2	100	0	0	41	95	1	2	0	0
501-750	379	90	24	54	60	22	24	289	76	12	4	1	0
751-1000	813	514	63	203	39	109	21	299	37	23	8	7	2
1001-1500	2464	2117	86	281	13	173	8	347	14	29	8	15	4
1501-2500	3661	3134	86	144	5	163	5	527	14	33	6	14	3
>2500	3859	3333	86	110	3	114	3	526	14	40	8	12	2
Overall	11219	9190	82	794	9	581	6	2029	18	138	7	49	2

**Table 36a. Supplemental oxygen use according to survival status of gestational age group, 2008**

Gestational age group (weeks)	All Babies in study	Babies who survived		Babies who survived and on oxygen at Day 28		Babies who survived and on oxygen at 36 weeks corrected gestational		Babies who died		Babies who died and on oxygen at Day 28		Babies who died and on oxygen at 36 weeks corrected gestational	
		No	%	No	%	No	%	No	%	No	%	No	%
<22	11	1	9	0	0	0	0	10	91	0	0	0	0
22-24	224	40	18	23	57	7	18	184	82	2	1	0	0
25-27	686	366	53	175	48	77	21	320	47	28	9	4	1
28-31	2427	2048	84	321	16	173	8	379	16	29	8	13	3
32-36	3567	3156	88	138	4	244	8	411	12	26	6	21	5
>=37	4304	3579	83	137	4	80	2	725	17	53	7	11	2
Overall	11219	9190	82	794	9	581	6	2029	18	138	7	49	2

**Table 37. Use of antenatal steroid among inborn babies to centres, 2008**

Centres	Babies < 32 weeks	Babies < 32 weeks given antenatal steroids		Inborn babies < 32 weeks gestation	Inborn babies < 32 weeks given antenatal steroids	
		No	%		No	%
<b>All centres</b>	3348	2003	60	2898	1856	64
2	157	103	66	124	84	68
3	196	151	77	168	136	81
4	62	42	68	52	35	67
5	253	125	49	206	113	55
6	136	76	56	110	70	64
7	221	140	63	193	136	70
8	160	54	34	140	52	37
9	113	68	60	106	66	62
10	91	37	41	82	37	45
11	36	16	44	34	16	47
12	91	76	84	80	72	90
13	82	54	66	66	45	68
14	44	31	70	40	28	70
15	74	43	58	60	35	58
16	140	91	65	125	86	69
17	85	40	47	77	40	52
18	37	25	68	34	23	68
19	125	95	76	100	86	86
20	70	43	61	61	40	66
21	39	21	54	34	19	56
22	89	65	73	80	65	81
23	161	131	81	152	126	83
24	194	104	54	165	98	59
25	75	56	75	62	50	81
26	173	49	28	154	44	29
27	80	53	66	65	49	75
28	43	6	14	35	6	17
29	70	30	43	67	30	45
30	38	24	63	32	22	69
31	115	86	75	104	82	79
32	54	39	72	54	39	72
33	44	29	66	36	26	72

**Table 37a. Use of antenatal steroid among outborn babies to centres, 2008**

Centres	Babies < 32 weeks	Babies < 32 weeks given antenatal steroids		Outborn babies < 32 weeks gestation	Outborn babies < 32 weeks given antenatal steroids	
		No	%		No	%
<b>All centres</b>	3348	2003	60	450	147	33
2	157	103	66	33	19	58
3	196	151	77	28	15	54
4	62	42	68	10	7	70
5	253	125	49	47	12	26
6	136	76	56	26	6	23
7	221	140	63	28	4	14
8	160	54	34	20	2	10
9	113	68	60	7	2	29
10	91	37	41	9	0	0
11	36	16	44	2	0	0
12	91	76	84	11	4	36
13	82	54	66	16	9	56
14	44	31	70	4	3	75
15	74	43	58	14	8	57
16	140	91	65	15	5	33
17	85	40	47	8	0	0
18	37	25	68	3	2	67
19	125	95	76	25	9	36
20	70	43	61	9	3	33
21	39	21	54	5	2	40
22	89	65	73	9	0	0
23	161	131	81	9	5	56
24	194	104	54	29	6	21
25	75	56	75	13	6	46
26	173	49	28	19	5	26
27	80	53	66	15	4	27
28	43	6	14	8	0	0
29	70	30	43	3	0	0
30	38	24	63	6	2	33
31	115	86	75	11	4	36
32	54	39	72	0	0	0
33	44	29	66	8	3	38

**Table 38. Use of surfactant in Respiratory Distress Syndrome (RDS) according to centres, 2008**

Centres	All Babies in study	Babies with RDS		Babies with RDS requiring VS		Babies with RDS requiring VS given surfactant	
	No	No	%	No	%	No	%
<b>All centres</b>	11219	3699	33	2814	76	1919	68
2	483	171	35	139	81	96	69
3	526	176	33	114	65	86	75
4	209	73	35	45	62	23	51
5	737	278	38	191	69	133	70
6	523	172	33	131	76	90	69
7	786	234	30	173	74	98	57
8	554	155	28	109	70	76	70
9	371	147	40	101	69	50	50
10	304	117	38	74	63	52	70
11	110	42	38	40	95	31	78
12	209	95	45	89	94	54	61
13	249	80	32	59	74	26	44
14	168	48	29	39	81	25	64
15	237	85	36	72	85	41	57
16	366	139	38	116	83	104	90
17	353	87	25	63	72	31	49
18	97	31	32	22	71	20	91
19	372	159	43	109	69	92	84
20	193	74	38	62	84	49	79
21	142	41	29	30	73	21	70
22	509	100	20	76	76	63	83
23	573	173	30	155	90	114	74
24	473	198	42	156	79	141	90
25	317	91	29	81	89	68	84
26	624	233	37	199	85	96	48
27	162	85	52	56	66	43	77
28	100	44	44	34	77	16	47
29	363	88	24	61	69	51	84
30	228	46	20	38	83	21	55
31	282	136	48	108	79	61	56
32	204	56	27	34	61	28	82
33	395	45	11	38	84	19	50



**Table 39. Use of Parenteral nutrition (PN) according to centres, 2008**

Centres	All Babies in study	Babies with BW 501-1500g		Babies with BW 501-1500g given PN		Babies with VS		Babies with VS given PN	
	No	No	%	No	%	No	%	No	%
All centres	11219	3656	33	1710	47	10186	91	2703	27
2	483	171	35	101	59	464	96	130	28
3	526	176	33	105	60	430	82	171	40
4	209	71	34	31	44	197	94	48	24
5	737	275	37	83	30	630	85	113	18
6	523	171	33	64	37	453	87	122	27
7	786	232	30	122	53	703	89	170	24
8	554	154	28	129	84	513	93	425	83
9	371	146	39	34	23	294	79	35	12
10	304	117	38	52	44	281	92	66	23
11	110	42	38	2	5	109	99	2	2
12	209	92	44	59	64	206	99	77	37
13	249	79	32	38	48	239	96	53	22
14	168	48	29	16	33	158	94	20	13
15	237	81	34	46	57	191	81	64	34
16	366	137	37	83	61	345	94	100	29
17	353	87	25	62	71	353	100	78	22
18	97	30	31	21	70	82	85	39	48
19	372	157	42	78	50	337	91	89	26
20	193	74	38	50	68	166	86	61	37
21	142	40	28	22	55	135	95	49	36
22	509	99	19	45	45	447	88	62	14
23	573	171	30	93	54	542	95	117	22
24	473	197	42	28	14	411	87	40	10
25	317	91	29	87	96	297	94	256	86
26	624	231	37	98	42	593	95	120	20
27	162	85	52	12	14	147	91	17	12
28	100	44	44	3	7	87	87	3	3
29	363	87	24	0	0	342	94	2	1
30	228	46	20	11	24	199	87	20	10
31	282	126	45	95	75	248	88	109	44
32	204	54	26	21	39	202	99	23	11
33	395	45	11	19	42	385	97	22	6

**Table 40. Pneumothorax according to centres, 2008**

Centres	All Babies in study	Babies with VS		Babies with VS and pneumothorax		Babies with VS and pneumothorax who died	
	No	No	%	No	%	No	%
<b>All centres</b>	11219	10186	91	507	5	213	42
2	483	464	96	26	6	9	35
3	526	430	82	16	4	5	31
4	209	197	94	9	5	3	33
5	737	630	85	42	7	14	33
6	523	453	87	48	11	33	69
7	786	703	89	24	3	14	58
8	554	513	93	18	4	10	56
9	371	294	79	26	9	12	46
10	304	281	92	7	2	3	43
11	110	109	99	2	2	0	0
12	209	206	99	7	3	5	71
13	249	239	96	11	5	4	36
14	168	158	94	7	4	0	0
15	237	191	81	12	6	4	33
16	366	345	94	13	4	4	31
17	353	353	100	39	11	18	46
18	97	82	85	3	4	0	0
19	372	337	91	18	5	6	33
20	193	166	86	8	5	4	50
21	142	135	95	0	0	0	0
22	509	447	88	18	4	4	22
23	573	542	95	16	3	6	38
24	473	411	87	21	5	11	52
25	317	297	94	18	6	6	33
26	624	593	95	21	4	13	62
27	162	147	91	11	7	5	45
28	100	87	87	0	0	0	0
29	363	342	94	17	5	3	18
30	228	199	87	9	5	4	44
31	282	248	88	13	5	8	62
32	204	202	99	8	4	3	38
33	395	385	97	19	5	2	11

**Table 41. Use of supplemental oxygen on day 28 among VLBW babies according to centres, 2008**

Centres	Babies with BW 501-1000g	Babies with BW 501-1000g who survived		Babies with BW 501-1000g who survived with use of oxygen on day 28		Babies with BW 1001-1500g	Babies with BW 1001-1500g who survived		Babies with BW 1001-1500g who survived with use of oxygen on day 28	
	No	No	%	No	%	No	No	%	No	%
<b>All centres</b>	1192	604	51	257	43	2464	2117	86	281	13
2	55	28	51	8	29	116	91	78	8	9
3	65	34	52	7	21	111	96	86	7	7
4	15	5	33	1	20	56	52	93	8	15
5	95	34	36	13	38	180	153	85	17	11
6	38	11	29	6	55	133	108	81	25	23
7	90	49	54	16	33	142	121	85	7	6
8	42	12	29	3	25	112	89	79	4	4
9	37	20	54	10	50	109	96	88	7	7
10	43	22	51	7	32	74	66	89	2	3
11	15	10	67	6	60	27	23	85	5	22
12	29	18	62	9	50	63	58	92	15	26
13	28	14	50	3	21	51	41	80	6	15
14	18	9	50	3	33	30	28	93	1	4
15	33	18	55	10	56	48	43	90	4	9
16	42	28	67	10	36	95	85	89	10	12
17	31	16	52	7	44	56	46	82	11	24
18	15	7	47	4	57	15	13	87	4	31
19	52	28	54	25	89	105	97	92	36	37
20	21	7	33	2	29	53	45	85	5	11
21	11	5	45	3	60	29	25	86	2	8
22	33	24	73	8	33	66	56	85	13	23
23	71	44	62	19	43	100	90	90	3	3
24	59	37	63	22	59	138	123	89	30	24
25	26	12	46	7	58	65	57	88	4	7
26	83	38	46	8	21	148	119	80	9	8
27	20	7	35	7	100	65	58	89	12	21
28	10	4	40	0	0	34	30	88	2	7
29	23	12	52	6	50	64	52	81	7	13
30	17	8	47	5	63	29	24	83	3	13
31	44	30	68	14	47	82	73	89	6	8
32	23	9	39	6	67	31	27	87	1	4
33	8	4	50	2	50	37	32	86	7	22

**Table 41a. Use of supplemental oxygen on day 28 among Inborn VLBW babies according to centres, 2008**

Centres	Inborn Babies with BW 501-1000g	Inborn Babies with BW 501-1000g who survived		Inborn Babies with BW 501-1000g who survived with use of oxygen on day 28		Inborn Babies with BW 1001-1500g	Inborn Babies with BW 1001-1500g who survived		Inborn Babies with BW 1001-1500g who survived with use of oxygen on day 28	
	No	No	%	No	%	No	No	%	No	%
<b>All centres</b>	1056	526	50	222	42	2116	1823	86	225	12
2	45	23	51	6	26	91	73	80	7	10
3	62	32	52	7	22	89	77	87	2	3
4	14	5	36	1	20	50	46	92	7	15
5	82	25	30	9	36	137	118	86	9	8
6	32	9	28	5	56	113	92	81	18	20
7	75	36	48	14	39	128	110	86	6	5
8	38	11	29	2	18	101	80	79	4	5
9	34	19	56	10	53	105	92	88	7	8
10	39	21	54	7	33	63	57	90	1	2
11	15	10	67	6	60	26	22	85	5	23
12	26	15	58	7	47	57	53	93	13	25
13	23	11	48	2	18	44	35	80	5	14
14	16	7	44	1	14	27	25	93	1	4
15	27	14	52	8	57	39	35	90	3	9
16	39	25	64	9	36	83	74	89	8	11
17	27	15	56	7	47	50	41	82	10	24
18	15	7	47	4	57	13	12	92	4	33
19	46	24	52	22	92	77	72	94	24	33
20	19	7	37	2	29	47	39	83	4	10
21	8	5	63	3	60	25	22	88	2	9
22	27	20	74	5	25	61	52	85	13	25
23	66	41	62	17	41	95	86	91	3	3
24	52	34	65	21	62	112	100	89	24	24
25	19	7	37	3	43	54	47	87	4	9
26	78	34	44	8	24	128	103	80	8	8
27	17	6	35	6	100	55	50	91	10	20
28	7	3	43	0	0	28	25	89	1	4
29	22	11	50	5	45	63	51	81	7	14
30	16	7	44	4	57	22	18	82	3	17
31	40	29	73	13	45	73	64	88	6	9
32	23	9	39	6	67	30	26	87	1	4
33	7	4	57	2	50	30	26	87	5	19

**Table 41b. Use of supplemental oxygen at 36 weeks corrected gestation among VLBW babies according to centres, 2008**

Centres	Babies with BW 501-1000g	Babies with BW 501-1000g who survived		Babies with BW 501-1000g who survived with use of oxygen on 36 weeks		Babies with BW 1001-1500g	Babies with BW 1001-1500g who survived		Babies with BW 1001-1500g who survived with use of oxygen on 36 weeks	
	No	No	%	No	%	No	No	%	No	%
<b>All centres</b>	1192	604	51	131	22	2464	2117	86	173	8
2	55	28	51	1	4	116	91	78	2	2
3	65	34	52	1	3	111	96	86	0	0
4	15	5	33	0	0	56	52	93	2	4
5	95	34	36	5	15	180	153	85	16	10
6	38	11	29	2	18	133	108	81	11	10
7	90	49	54	28	57	142	121	85	36	30
8	42	12	29	2	17	112	89	79	0	0
9	37	20	54	6	30	109	96	88	3	3
10	43	22	51	2	9	74	66	89	0	0
11	15	10	67	2	20	27	23	85	1	4
12	29	18	62	9	50	63	58	92	7	12
13	28	14	50	1	7	51	41	80	2	5
14	18	9	50	2	22	30	28	93	2	7
15	33	18	55	4	22	48	43	90	0	0
16	42	28	67	1	4	95	85	89	1	1
17	31	16	52	3	19	56	46	82	3	7
18	15	7	47	2	29	15	13	87	0	0
19	52	28	54	21	75	105	97	92	23	24
20	21	7	33	0	0	53	45	85	2	4
21	11	5	45	2	40	29	25	86	1	4
22	33	24	73	5	21	66	56	85	3	5
23	71	44	62	3	7	100	90	90	2	2
24	59	37	63	5	14	138	123	89	5	4
25	26	12	46	1	8	65	57	88	1	2
26	83	38	46	1	3	148	119	80	4	3
27	20	7	35	3	43	65	58	89	3	5
28	10	4	40	0	0	34	30	88	0	0
29	23	12	52	9	75	64	52	81	35	67
30	17	8	47	1	13	29	24	83	1	4
31	44	30	68	2	7	82	73	89	3	4
32	23	9	39	5	56	31	27	87	1	4
33	8	4	50	2	50	37	32	86	3	9

**Table 41c. Use of supplemental oxygen at 36 weeks corrected gestation among Inborn VLBW babies according to centres, 2008**

Centres	Inborn Babies with BW 501-1000g	Inborn Babies with BW 501-1000g who survived		Inborn Babies with BW 501-1000g who survived with use of oxygen on 36 weeks		Inborn Babies with BW 1001-1500g	Inborn Babies with BW 1001-1500g who survived		Inborn Babies with BW 1001-1500g who survived with use of oxygen on 36 weeks	
	No	No	%	No	%	No	No	%	No	%
<b>All centres</b>	1056	526	50	110	21	2116	1823	86	146	8
2	45	23	51	1	4	91	73	80	2	3
3	62	32	52	1	3	89	77	87	0	0
4	14	5	36	0	0	50	46	92	2	4
5	82	25	30	4	16	137	118	86	10	8
6	32	9	28	2	22	113	92	81	9	10
7	75	36	48	21	58	128	110	86	31	28
8	38	11	29	1	9	101	80	79	0	0
9	34	19	56	6	32	105	92	88	3	3
10	39	21	54	2	10	63	57	90	0	0
11	15	10	67	2	20	26	22	85	1	5
12	26	15	58	7	47	57	53	93	6	11
13	23	11	48	0	0	44	35	80	1	3
14	16	7	44	1	14	27	25	93	2	8
15	27	14	52	3	21	39	35	90	0	0
16	39	25	64	0	0	83	74	89	1	1
17	27	15	56	3	20	50	41	82	3	7
18	15	7	47	2	29	13	12	92	0	0
19	46	24	52	19	79	77	72	94	15	21
20	19	7	37	0	0	47	39	83	1	3
21	8	5	63	2	40	25	22	88	1	5
22	27	20	74	3	15	61	52	85	2	4
23	66	41	62	3	7	95	86	91	2	2
24	52	34	65	4	12	112	100	89	5	5
25	19	7	37	0	0	54	47	87	1	2
26	78	34	44	1	3	128	103	80	3	3
27	17	6	35	3	50	55	50	91	3	6
28	7	3	43	0	0	28	25	89	0	0
29	22	11	50	9	82	63	51	81	34	67
30	16	7	44	1	14	22	18	82	1	6
31	40	29	73	2	7	73	64	88	3	5
32	23	9	39	5	56	30	26	87	1	4
33	7	4	57	2	50	30	26	87	3	12

**Table 42. Cerebral ultrasound scanning (CUS) and intraventricular haemorrhage (IVH) among VLBW babies according to centres, 2008**

Centres	All Babies with BW 501-1000g	Babies with BW 501-1000g & CUS		Babies with BW 501-1000g & CUS who has Grade 1 IVH		Babies with BW 501-1000g & CUS who has Grade 2 IVH		Babies with BW 501-1000g & CUS who has Grade 3 IVH		Babies with BW 501-1000g & CUS who has Grade 4 IVH		Babies with BW 501-1000g, CUS & Grade 3 or 4 IVH who died	
	No	No	%	No	%	No	%	No	%	No	%	No	%
<b>All centres</b>	3656	2492	68	299	12	289	12	210	8	129	5	215	9
2	171	143	84	15	10	9	6	5	3	8	6	10	7
3	176	121	69	16	13	4	3	11	9	4	3	7	6
4	71	57	80	14	25	6	11	1	2	2	4	1	2
5	275	162	59	12	7	15	9	8	5	11	7	13	8
6	171	94	55	6	6	14	15	25	27	15	16	24	26
7	232	105	45	22	21	12	11	7	7	1	1	6	6
8	154	55	36	7	13	6	11	17	31	4	7	15	27
9	146	114	78	7	6	7	6	8	7	3	3	4	4
10	117	104	89	11	11	12	12	5	5	3	3	7	7
11	42	26	62	0	0	1	4	1	4	1	4	1	4
12	92	38	41	9	24	1	3	3	8	2	5	4	11
13	79	54	68	8	15	10	19	5	9	4	7	6	11
14	48	30	63	3	10	9	30	3	10	1	3	2	7
15	81	59	73	4	7	8	14	6	10	1	2	3	5
16	137	100	73	12	12	6	6	3	3	2	2	5	5
17	87	81	93	17	21	25	31	6	7	1	1	3	4
18	30	19	63	0	0	0	0	1	5	0	0	0	0
19	157	111	71	5	5	5	5	3	3	4	4	6	5
20	74	52	70	3	6	2	4	1	2	7	13	7	13
21	40	30	75	2	7	1	3	2	7	1	3	0	0
22	99	78	79	10	13	10	13	5	6	2	3	3	4
23	171	128	75	16	13	12	9	14	11	5	4	12	9
24	197	165	84	20	12	20	12	21	13	18	11	21	13
25	91	86	95	16	19	11	13	4	5	5	6	7	8
26	231	151	65	19	13	27	18	22	15	12	8	22	15
27	85	48	56	10	21	12	25	5	10	2	4	5	10
28	44	29	66	1	3	2	7	1	3	0	0	0	0
29	87	28	32	6	21	4	14	1	4	0	0	1	4
30	46	32	70	4	13	13	41	1	3	1	3	1	3
31	126	108	86	15	14	12	11	6	6	2	2	7	6
32	54	44	81	2	5	8	18	4	9	5	11	9	20
33	45	40	89	7	18	5	13	5	13	2	5	3	8

**Table 43. Retinopathy of prematurity (ROP) (Babies < 32 weeks gestation) according to centres, 2008**

Centres	Babies in study	Babies who survived		Babies who survived and had ROP screening		Babies who survived and had ROP screening with Grade 3 ROP		Babies who survived and had ROP screening with Grade 4 ROP		Babies who survived and had ROP screening with Grade 5	
	No	No	%	No	%	No	%	No	%	No	%
<b>All centres</b>	3348	2455	73	1191	49	73	6	2	0	0	0
2	157	111	71	45	41	0	0	0	0	0	0
3	196	152	78	65	43	5	8	0	0	0	0
4	62	47	76	17	36	0	0	0	0	0	0
5	253	166	66	18	11	2	11	0	0	0	0
6	136	92	68	6	7	3	50	0	0	0	0
7	221	161	73	97	60	2	2	1	1	0	0
8	160	105	66	26	25	3	12	1	4	0	0
9	113	85	75	74	87	4	5	0	0	0	0
10	91	65	71	21	32	1	5	0	0	0	0
11	36	29	81	25	86	5	20	0	0	0	0
12	91	75	82	18	24	2	11	0	0	0	0
13	82	57	70	19	33	2	11	0	0	0	0
14	44	33	75	17	52	1	6	0	0	0	0
15	74	52	70	39	75	2	5	0	0	0	0
16	140	114	81	55	48	1	2	0	0	0	0
17	85	62	73	25	40	1	4	0	0	0	0
18	37	25	68	6	24	0	0	0	0	0	0
19	125	93	74	82	88	4	5	0	0	0	0
20	70	50	71	14	28	0	0	0	0	0	0
21	39	31	79	12	39	0	0	0	0	0	0
22	89	72	81	32	44	8	25	0	0	0	0
23	161	124	77	88	71	1	1	0	0	0	0
24	194	161	83	110	68	4	4	0	0	0	0
25	75	56	75	48	86	1	2	0	0	0	0
26	173	115	66	36	31	5	14	0	0	0	0
27	80	61	76	45	74	2	4	0	0	0	0
28	43	32	74	7	22	0	0	0	0	0	0
29	70	49	70	16	33	1	6	0	0	0	0
30	38	25	66	16	64	3	19	0	0	0	0
31	115	85	74	62	73	6	10	0	0	0	0
32	54	35	65	30	86	2	7	0	0	0	0
33	44	35	80	20	57	2	10	0	0	0	0



**Table 43a. Retinopathy of prematurity (ROP) (Inborn Babies < 32 weeks gestation) according to centres, 2008**

Centres	Inborn Babies in study	Inborn Babies who survived		Inborn Babies who survived and had ROP screening		Inborn Babies who survived and had ROP screening with Grade 3 ROP		Inborn Babies who survived and had ROP screening with Grade 4 ROP		Inborn Babies who survived and had ROP screening with Grade 5	
	No	No	%	No	%	No	%	No	%	No	%
<b>All centres</b>	2898	2114	73	1016	48	58	6	0	0	0	0
2	124	90	73	36	40	0	0	0	0	0	0
3	168	128	76	53	41	4	8	0	0	0	0
4	52	38	73	16	42	0	0	0	0	0	0
5	206	131	64	11	8	0	0	0	0	0	0
6	110	73	66	4	5	2	50	0	0	0	0
7	193	138	72	78	57	1	1	0	0	0	0
8	140	92	66	21	23	2	10	0	0	0	0
9	106	81	76	70	86	4	6	0	0	0	0
10	82	60	73	21	35	1	5	0	0	0	0
11	34	27	79	23	85	4	17	0	0	0	0
12	80	64	80	15	23	2	13	0	0	0	0
13	66	44	67	14	32	2	14	0	0	0	0
14	40	29	73	15	52	0	0	0	0	0	0
15	60	40	67	29	73	2	7	0	0	0	0
16	125	100	80	47	47	0	0	0	0	0	0
17	77	57	74	21	37	1	5	0	0	0	0
18	34	23	68	6	26	0	0	0	0	0	0
19	100	72	72	63	88	3	5	0	0	0	0
20	61	43	70	14	33	0	0	0	0	0	0
21	34	29	85	12	41	0	0	0	0	0	0
22	80	66	83	29	44	6	21	0	0	0	0
23	152	117	77	82	70	0	0	0	0	0	0
24	165	139	84	92	66	4	4	0	0	0	0
25	62	46	74	39	85	1	3	0	0	0	0
26	154	101	66	30	30	5	17	0	0	0	0
27	65	50	77	40	80	2	5	0	0	0	0
28	35	28	80	6	21	0	0	0	0	0	0
29	67	48	72	15	31	1	7	0	0	0	0
30	32	19	59	12	63	2	17	0	0	0	0
31	104	77	74	57	74	6	11	0	0	0	0
32	54	35	65	30	86	2	7	0	0	0	0
33	36	29	81	15	52	1	7	0	0	0	0

**Table 44. Retinopathy of prematurity (ROP) (Babies with BW < 1250g) according to centres, 2008**

Centres	Babies with BW < 1250g	Babies who survived		Babies who survived and had ROP screening		Babies who survived and had ROP screening with Grade 3 ROP		Babies who survived and had ROP screening with Grade 4 ROP		Babies who survived and had ROP screening with Grade 5	
	No	No	%	No	%	No	%	No	%	No	%
<b>All centres</b>	2201	1401	64	860	61	67	8	0	0	0	0
2	104	65	63	32	49	0	0	0	0	0	0
3	118	79	67	52	66	4	8	0	0	0	0
4	35	22	63	11	50	0	0	0	0	0	0
5	156	79	51	16	20	1	6	0	0	0	0
6	81	44	54	6	14	3	50	0	0	0	0
7	149	99	66	73	74	2	3	0	0	0	0
8	94	50	53	13	26	3	23	0	0	0	0
9	68	46	68	46	100	4	9	0	0	0	0
10	70	46	66	18	39	1	6	0	0	0	0
11	23	18	78	17	94	4	24	0	0	0	0
12	62	46	74	18	39	2	11	0	0	0	0
13	52	33	63	17	52	2	12	0	0	0	0
14	29	19	66	12	63	1	8	0	0	0	0
15	52	31	60	27	87	2	7	0	0	0	0
16	89	66	74	41	62	1	2	0	0	0	0
17	59	37	63	16	43	1	6	0	0	0	0
18	21	11	52	6	55	0	0	0	0	0	0
19	94	64	68	62	97	3	5	0	0	0	0
20	48	30	63	10	33	0	0	0	0	0	0
21	17	9	53	6	67	0	0	0	0	0	0
22	60	43	72	25	58	8	32	0	0	0	0
23	106	72	68	63	88	1	2	0	0	0	0
24	118	86	73	74	86	4	5	0	0	0	0
25	48	31	65	27	87	0	0	0	0	0	0
26	156	89	57	37	42	6	16	0	0	0	0
27	49	34	69	32	94	1	3	0	0	0	0
28	21	14	67	3	21	0	0	0	0	0	0
29	45	27	60	13	48	1	8	0	0	0	0
30	28	15	54	12	80	3	25	0	0	0	0
31	89	61	69	46	75	7	15	0	0	0	0
32	38	19	50	18	95	1	6	0	0	0	0
33	22	16	73	11	69	1	9	0	0	0	0

**Table 44a. Retinopathy of prematurity (ROP) (Inborn Babies with BW < 1250g) according to centres, 2008**

Centres	Inborn Babies with BW < 1250g	Inborn Babies who survived		Inborn Babies who survived and had ROP screening		Inborn Babies who survived and had ROP screening with Grade 3 ROP		Inborn Babies who survived and had ROP screening with Grade 4 ROP		Inborn Babies who survived and had ROP screening with Grade 5	
	No	No	%	No	%	No	%	No	%	No	%
All centres	1925	1207	63	735	61	54	7	1	0	0	0
2	83	53	64	26	49	0	0	0	0	0	0
3	102	64	63	42	66	3	7	0	0	0	0
4	30	18	60	10	56	0	0	0	0	0	0
5	131	61	47	10	16	0	0	0	0	0	0
6	68	37	54	5	14	2	40	0	0	0	0
7	127	80	63	58	73	1	2	0	0	0	0
8	83	44	53	11	25	2	18	0	0	0	0
9	63	43	68	43	100	4	9	0	0	0	0
10	64	43	67	17	40	1	6	0	0	0	0
11	22	17	77	16	94	3	19	0	0	0	0
12	55	40	73	15	38	2	13	0	0	0	0
13	43	27	63	13	48	2	15	0	0	0	0
14	26	16	62	10	63	0	0	0	0	0	0
15	44	25	57	22	88	2	9	0	0	0	0
16	79	57	72	34	60	0	0	0	0	0	0
17	52	33	63	14	42	1	7	0	0	0	0
18	20	10	50	6	60	0	0	0	0	0	0
19	82	55	67	53	96	3	6	0	0	0	0
20	45	29	64	10	34	0	0	0	0	0	0
21	14	9	64	6	67	0	0	0	0	0	0
22	51	36	71	22	61	6	27	0	0	0	0
23	99	67	68	58	87	0	0	0	0	0	0
24	99	73	74	62	85	4	6	0	0	0	0
25	38	24	63	20	83	0	0	0	0	0	0
26	140	77	55	29	38	5	17	1	3	0	0
27	43	30	70	28	93	1	4	0	0	0	0
28	15	10	67	2	20	0	0	0	0	0	0
29	43	26	60	12	46	1	8	0	0	0	0
30	24	12	50	9	75	2	22	0	0	0	0
31	82	57	70	44	77	7	16	0	0	0	0
32	38	19	50	18	95	1	6	0	0	0	0
33	20	15	75	10	67	1	10	0	0	0	0

**Table 45. Necrotising enterocolitis (NEC) among VLBW babies according to centres, 2008**

Centres	Babies with BW 501-1500gm	Babies with BW 501-1500gm who died		Babies with BW 501-1500gm & NEC		Babies with BW 501-1500gm & NEC who died	
	No	No	%	No	%	No	%
All centres	3656	935	26	126	3	46	37
2	171	52	30	11	6	4	36
3	176	46	26	8	5	3	38
4	71	14	20	2	3	0	0
5	275	88	32	10	4	3	30
6	171	52	30	3	2	0	0
7	232	62	27	18	8	8	44
8	154	53	34	6	4	3	50
9	146	30	21	7	5	3	43
10	117	29	25	1	1	0	0
11	42	9	21	1	2	1	100
12	92	16	17	1	1	0	0
13	79	24	30	0	0	0	0
14	48	11	23	1	2	0	0
15	81	20	25	4	5	1	25
16	137	24	18	3	2	1	33
17	87	25	29	6	7	2	33
18	30	10	33	1	3	0	0
19	157	32	20	2	1	1	50
20	74	22	30	5	7	2	40
21	40	10	25	1	3	0	0
22	99	19	19	3	3	3	100
23	171	37	22	2	1	2	100
24	197	37	19	11	6	2	18
25	91	22	24	0	0	0	0
26	231	74	32	7	3	3	43
27	85	20	24	1	1	1	100
28	44	10	23	0	0	0	0
29	87	23	26	7	8	1	14
30	46	14	30	0	0	0	0
31	126	23	18	3	2	1	33
32	54	18	33	1	2	1	100
33	45	9	20	0	0	0	0

**Table 45a. Necrotising enterocolitis (NEC) among Inborn VLBW babies according to centres, 2008**

Centres	Inborn Babies with BW 501-1500gm	Inborn Babies with BW 501-1500gm who died		Inborn Babies with BW 501-1500gm & NEC		Inborn Babies with BW 501-1500gm & NEC who died	
	No	No	%	No	%	No	%
<b>All centres</b>	3172	823	26	100	3	36	36
2	136	40	29	9	7	3	33
3	151	42	28	7	5	2	29
4	64	13	20	1	2	0	0
5	219	76	35	7	3	3	43
6	145	44	30	3	2	0	0
7	203	57	28	11	5	6	55
8	139	48	35	5	4	2	40
9	139	28	20	6	4	2	33
10	102	24	24	1	1	0	0
11	41	9	22	1	2	1	100
12	83	15	18	1	1	0	0
13	67	21	31	0	0	0	0
14	43	11	26	0	0	0	0
15	66	17	26	4	6	1	25
16	122	23	19	2	2	1	50
17	77	21	27	6	8	2	33
18	28	9	32	1	4	0	0
19	123	27	22	1	1	1	100
20	66	20	30	5	8	2	40
21	33	6	18	1	3	0	0
22	88	16	18	2	2	2	100
23	161	34	21	1	1	1	100
24	164	30	18	10	6	2	20
25	73	19	26	0	0	0	0
26	206	69	33	5	2	3	60
27	72	16	22	0	0	0	0
28	35	7	20	0	0	0	0
29	85	23	27	7	8	1	14
30	38	13	34	0	0	0	0
31	113	20	18	2	2	0	0
32	53	18	34	1	2	1	100
33	37	7	19	0	0	0	0

**Table 45b. Necrotising enterocolitis (NEC) among Outborn VLBW babies according to centres, 2008**

Centres	Outborn Babies with BW 501-1500gm	Outborn Babies with BW 501-1500gm who died		Outborn Babies with BW 501-1500gm & with NEC		Outborn Babies with BW 501-1500gm & NEC who died	
	No	No	%	No	%	No	%
<b>All centres</b>	484	112	23	26	5	10	38
2	35	12	34	2	6	1	50
3	25	4	16	1	4	1	100
4	7	1	14	1	14	0	0
5	56	12	21	3	5	0	0
6	26	8	31	0	0	0	0
7	29	5	17	7	24	2	29
8	15	5	33	1	7	1	100
9	7	2	29	1	14	1	100
10	15	5	33	0	0	0	0
11	1	0	0	0	0	0	0
12	9	1	11	0	0	0	0
13	12	3	25	0	0	0	0
14	5	0	0	1	20	0	0
15	15	3	20	0	0	0	0
16	15	1	7	1	7	0	0
17	10	4	40	0	0	0	0
18	2	1	50	0	0	0	0
19	34	5	15	1	3	0	0
20	8	2	25	0	0	0	0
21	7	4	57	0	0	0	0
22	11	3	27	1	9	1	100
23	10	3	30	1	10	1	100
24	33	7	21	1	3	0	0
25	18	3	17	0	0	0	0
26	25	5	20	2	8	0	0
27	13	4	31	1	8	1	100
28	9	3	33	0	0	0	0
29	2	0	0	0	0	0	0
30	8	1	13	0	0	0	0
31	13	3	23	1	8	1	100
32	1	0	0	0	0	0	0
33	8	2	25	0	0	0	0

**Table 46. Episodes of confirmed bacterial sepsis (exclude fungal sepsis) among VLBW babies according to centres, 2008**

Centres	Babies with BW 501-1500 gm	No of episodes of confirmed bacterial sepsis among babies with BW 501-1500 gm		Babies with BW > 1500 gm	No of episodes of confirmed bacterial sepsis among babies with BW > 1500 gm		Total Babies with BW > 500gm	Total no of episodes of confirmed bacterial sepsis among babies with BW > 500gm	
	No	No	%	No	No	%	No	No	%
All centres	3656	563	15	7520	556	7	11176	1119	10
2	171	16	9	312	15	5	483	31	6
3	176	18	10	350	18	5	526	36	7
4	71	9	13	136	10	7	207	19	9
5	275	38	14	459	38	8	734	76	10
6	171	15	9	351	18	5	522	33	6
7	232	62	27	552	62	11	784	124	16
8	154	40	26	399	33	8	553	73	13
9	146	16	11	224	19	8	370	35	9
10	117	16	14	187	19	10	304	35	12
11	42	7	17	68	2	3	110	9	8
12	92	16	17	114	6	5	206	22	11
13	79	17	22	169	21	12	248	38	15
14	48	6	13	120	7	6	168	13	8
15	81	16	20	152	11	7	233	27	12
16	137	9	7	227	7	3	364	16	4
17	87	27	31	266	44	17	353	71	20
18	30	2	7	66	2	3	96	4	4
19	157	9	6	213	12	6	370	21	6
20	74	6	8	119	5	4	193	11	6
21	40	0	0	101	7	7	141	7	5
22	99	13	13	409	8	2	508	21	4
23	171	35	20	400	21	5	571	56	10
24	197	47	24	275	20	7	472	67	14
25	91	19	21	226	21	9	317	40	13
26	231	59	26	391	49	13	622	108	17
27	85	7	8	77	5	6	162	12	7
28	44	0	0	56	3	5	100	3	3
29	87	10	11	275	33	12	362	43	12
30	46	3	7	182	9	5	228	12	5
31	126	18	14	146	12	8	272	30	11
32	54	3	6	148	4	3	202	7	3
33	45	4	9	350	15	4	395	19	5

**Table 46a. Episodes of confirmed bacterial sepsis (exclude fungal sepsis) among Inborn VLBW babies with according to centres, 2008**

Centres	Inborn Babies with BW 501-1500 gm	No of episodes of confirmed bacterial sepsis among babies with BW 501-1500 gm		Inborn Babies with BW > 1500 gm	No of episodes of confirmed bacterial sepsis among babies with BW > 1500 gm		Total Inborn Babies with BW > 500gm	Total no of episodes of confirmed bacterial sepsis among babies with BW > 500gm	
	No	No	%	No	No	%	No	No	%
All centres	3172	475	15	6338	452	7	9510	927	10
2	136	9	7	232	10	4	368	19	5
3	151	16	11	278	16	6	429	32	7
4	64	8	13	113	9	8	177	17	10
5	219	20	9	330	24	7	549	44	8
6	145	11	8	258	11	4	403	22	5
7	203	53	26	470	47	10	673	100	15
8	139	36	26	337	29	9	476	65	14
9	139	16	12	205	18	9	344	34	10
10	102	14	14	163	15	9	265	29	11
11	41	7	17	63	2	3	104	9	9
12	83	12	14	101	6	6	184	18	10
13	67	14	21	118	19	16	185	33	18
14	43	6	14	107	6	6	150	12	8
15	66	10	15	122	7	6	188	17	9
16	122	9	7	209	6	3	331	15	5
17	77	26	34	247	40	16	324	66	20
18	28	2	7	59	2	3	87	4	5
19	123	6	5	133	6	5	256	12	5
20	66	6	9	103	4	4	169	10	6
21	33	0	0	90	7	8	123	7	6
22	88	9	10	357	6	2	445	15	3
23	161	33	20	330	15	5	491	48	10
24	164	40	24	245	19	8	409	59	14
25	73	16	22	189	16	8	262	32	12
26	206	54	26	329	44	13	535	98	18
27	72	7	10	64	2	3	136	9	7
28	35	0	0	47	3	6	82	3	4
29	85	10	12	259	29	11	344	39	11
30	38	3	8	174	8	5	212	11	5
31	113	17	15	130	9	7	243	26	11
32	53	2	4	142	4	3	195	6	3
33	37	3	8	334	13	4	371	16	4



**Table 46b. Episodes of confirmed bacterial sepsis (exclude fungal sepsis) among outborn VLBW babies according to centres, 2008**

Centres	Outborn Babies with BW 501-1500 gm	No of episodes of confirmed bacterial sepsis among babies with BW 501-1500 gm		Outborn Babies with BW > 1500 gm	No of episodes of confirmed bacterial sepsis among babies with BW > 1500 gm		Total Outborn Babies with BW > 500gm	Total no of episodes of confirmed bacterial sepsis among babies with BW > 500gm	
	No	No	%	No	No	%	No	No	%
All centres	484	88	18	1181	104	9	1665	192	12
2	35	7	20	80	5	6	115	12	10
3	25	2	8	72	2	3	97	4	4
4	7	1	14	22	1	5	29	2	7
5	56	18	32	129	14	11	185	32	17
6	26	4	15	93	7	8	119	11	9
7	29	9	31	82	15	18	111	24	22
8	15	4	27	62	4	6	77	8	10
9	7	0	0	19	1	5	26	1	4
10	15	2	13	24	4	17	39	6	15
11	1	0	0	5	0	0	6	0	0
12	9	4	44	13	0	0	22	4	18
13	12	3	25	51	2	4	63	5	8
14	5	0	0	13	1	8	18	1	6
15	15	6	40	30	4	13	45	10	22
16	15	0	0	18	1	6	33	1	3
17	10	1	10	19	4	21	29	5	17
18	2	0	0	7	0	0	9	0	0
19	34	3	9	80	6	8	114	9	8
20	8	0	0	16	1	6	24	1	4
21	7	0	0	11	0	0	18	0	0
22	11	4	36	52	2	4	63	6	10
23	10	2	20	70	6	9	80	8	10
24	33	7	21	30	1	3	63	8	13
25	18	3	17	37	5	14	55	8	15
26	25	5	20	62	5	8	87	10	11
27	13	0	0	13	3	23	26	3	12
28	9	0	0	9	0	0	18	0	0
29	2	0	0	16	4	25	18	4	22
30	8	0	0	8	1	13	16	1	6
31	13	1	8	16	3	19	29	4	14
32	1	1	100	6	0	0	7	1	14
33	8	1	13	16	2	13	24	3	13

**Table 47. Confirmed bacterial sepsis (exclude fungal sepsis) according to centres, 2008**

Centres	All Babies in study	No who died		Babies with confirmed sepsis		Babies with confirmed bacterial sepsis who died	
	No	No	%	No	%	No	%
<b>All centres</b>	11219	2029	18	1124	10	280	25
2	483	94	19	31	6	10	32
3	526	77	15	36	7	8	22
4	209	35	17	19	9	2	11
5	737	170	23	76	10	17	22
6	523	132	25	33	6	6	18
7	786	155	20	124	16	36	29
8	554	126	23	73	13	33	45
9	371	74	20	35	9	12	34
10	304	48	16	35	12	8	23
11	110	20	18	9	8	4	44
12	209	30	14	23	11	3	13
13	249	54	22	38	15	9	24
14	168	22	13	13	8	3	23
15	237	46	19	27	11	4	15
16	366	44	12	16	4	4	25
17	353	55	16	71	20	6	8
18	97	19	20	4	4	2	50
19	372	52	14	21	6	6	29
20	193	36	19	11	6	3	27
21	142	22	15	7	5	0	0
22	509	64	13	21	4	10	48
23	573	82	14	56	10	4	7
24	473	76	16	68	14	8	12
25	317	61	19	40	13	17	43
26	624	155	25	108	17	38	35
27	162	38	23	12	7	2	17
28	100	24	24	3	3	3	100
29	363	59	16	43	12	4	9
30	228	32	14	12	5	0	0
31	282	65	23	32	11	12	38
32	204	30	15	8	4	2	25
33	395	32	8	19	5	4	21

**Table 47a. Confirmed bacterial sepsis (exclude fungal sepsis) among inborn babies according to centres, 2008**

Centres	All Inborn Babies in study	No who died		Inborn Babies with confirmed sepsis		Inborn Babies with confirmed bacterial sepsis who died	
	No	No	%	No	%	No	%
All centres	9552	1728	18	932	10	241	26
2	368	70	19	19	5	4	21
3	429	63	15	32	7	7	22
4	179	31	17	17	9	2	12
5	552	135	24	44	8	14	32
6	404	105	26	22	5	4	18
7	675	133	20	100	15	25	25
8	477	107	22	65	14	31	48
9	345	68	20	34	10	12	35
10	265	41	15	29	11	6	21
11	104	19	18	9	9	4	44
12	187	26	14	19	10	3	16
13	186	38	20	33	18	8	24
14	150	22	15	12	8	3	25
15	192	39	20	17	9	4	24
16	333	43	13	15	5	4	27
17	324	47	15	66	20	5	8
18	88	18	20	4	5	2	50
19	258	39	15	12	5	4	33
20	169	33	20	10	6	3	30
21	124	17	14	7	6	0	0
22	446	55	12	15	3	9	60
23	493	74	15	48	10	4	8
24	410	63	15	60	15	8	13
25	262	50	19	32	12	14	44
26	537	141	26	98	18	37	38
27	136	32	24	9	7	1	11
28	82	20	24	3	4	3	100
29	344	55	16	39	11	4	10
30	212	31	15	11	5	0	0
31	253	55	22	28	11	10	36
32	197	30	15	7	4	2	29
33	371	28	8	16	4	4	25

**Table 47b. Confirmed bacterial sepsis (exclude fungal sepsis) among outborn babies according to centres, 2008**

Centres	All Outborn Babies in study	No who died		Outborn Babies with confirmed sepsis		Outborn Babies with confirmed bacterial sepsis who died	
	No	No	%	No	%	No	%
<b>All centres</b>	1666	301	18	192	12	39	20
2	115	24	21	12	10	6	50
3	97	14	14	4	4	1	25
4	29	4	14	2	7	0	0
5	185	35	19	32	17	3	9
6	119	27	23	11	9	2	18
7	111	22	20	24	22	11	46
8	77	19	25	8	10	2	25
9	26	6	23	1	4	0	0
10	39	7	18	6	15	2	33
11	6	1	17	0	0	0	0
12	22	4	18	4	18	0	0
13	63	16	25	5	8	1	20
14	18	0	0	1	6	0	0
15	45	7	16	10	22	0	0
16	33	1	3	1	3	0	0
17	29	8	28	5	17	1	20
18	9	1	11	0	0	0	0
19	114	13	11	9	8	2	22
20	24	3	13	1	4	0	0
21	18	5	28	0	0	0	0
22	63	9	14	6	10	1	17
23	80	8	10	8	10	0	0
24	63	13	21	8	13	0	0
25	55	11	20	8	15	3	38
26	87	14	16	10	11	1	10
27	26	6	23	3	12	1	33
28	18	4	22	0	0	0	0
29	19	4	21	4	21	0	0
30	16	1	6	1	6	0	0
31	29	10	34	4	14	2	50
32	7	0	0	1	14	0	0
33	24	4	17	3	13	0	0

**Table 48. Confirmed bacterial sepsis among VLBW babies according to centres, 2008**

Centres	Babies with BW 501-1000gm	Babies with BW 501-1000gm with confirmed sepsis		Babies with BW 1001-1500gm	Babies with BW 1001-1500gm with confirmed sepsis	
	No	No	%	No	No	%
<b>All centres</b>	1192	230	19	2464	333	14
2	55	2	4	116	14	12
3	65	7	11	111	11	10
4	15	2	13	56	7	13
5	95	18	19	180	20	11
6	38	1	3	133	14	11
7	90	34	38	142	28	20
8	42	8	19	112	32	29
9	37	8	22	109	8	7
10	43	10	23	74	6	8
11	15	0	0	27	7	26
12	29	6	21	63	10	16
13	28	5	18	51	12	24
14	18	2	11	30	4	13
15	33	7	21	48	9	19
16	42	4	10	95	5	5
17	31	9	29	56	18	32
18	15	0	0	15	2	13
19	52	1	2	105	8	8
20	21	1	5	53	5	9
21	11	0	0	29	0	0
22	33	9	27	66	4	6
23	71	22	31	100	13	13
24	59	23	39	138	24	17
25	26	8	31	65	11	17
26	83	24	29	148	35	24
27	20	2	10	65	5	8
28	10	0	0	34	0	0
29	23	2	9	64	8	13
30	17	2	12	29	1	3
31	44	11	25	82	7	9
32	23	2	9	31	1	3
33	8	0	0	37	4	11

**Table 48a. Confirmed bacterial sepsis among Inborn VLBW babies according to centres, 2008**

Centres	Inborn Babies with BW 501-1000gm	Inborn Babies with BW 501-1000gm with confirmed sepsis		Inborn Babies with BW 1001-1500gm	Inborn Babies with BW 1001-1500gm with confirmed sepsis	
	No	No	%	No	No	%
<b>All centres</b>	1056	199	19	2116	276	13
2	45	2	4	91	7	8
3	62	7	11	89	9	10
4	14	2	14	50	6	12
5	82	12	15	137	8	6
6	32	1	3	113	10	9
7	75	29	39	128	24	19
8	38	7	18	101	29	29
9	34	8	24	105	8	8
10	39	9	23	63	5	8
11	15	0	0	26	7	27
12	26	4	15	57	8	14
13	23	2	9	44	12	27
14	16	2	13	27	4	15
15	27	5	19	39	5	13
16	39	4	10	83	5	6
17	27	9	33	50	17	34
18	15	0	0	13	2	15
19	46	1	2	77	5	6
20	19	1	5	47	5	11
21	8	0	0	25	0	0
22	27	6	22	61	3	5
23	66	20	30	95	13	14
24	52	22	42	112	18	16
25	19	5	26	54	11	20
26	78	23	29	128	31	24
27	17	2	12	55	5	9
28	7	0	0	28	0	0
29	22	2	9	63	8	13
30	16	2	13	22	1	5
31	40	10	25	73	7	10
32	23	2	9	30	0	0
33	7	0	0	30	3	10

**Table 48b. Confirmed bacterial sepsis among Outborn VLBW babies according to centres, 2008**

Centres	Outborn Babies with BW 501-1000gm	Outborn Babies with BW 501-1000gm with confirmed sepsis		Outborn Babies with BW 1001-1500gm	Outborn Babies with BW 1001-1500gm with confirmed sepsis	
	No	No	%	No	No	%
All centres	136	31	23	348	57	16
2	10	0	0	25	7	28
3	3	0	0	22	2	9
4	1	0	0	6	1	17
5	13	6	46	43	12	28
6	6	0	0	20	4	20
7	15	5	33	14	4	29
8	4	1	25	11	3	27
9	3	0	0	4	0	0
10	4	1	25	11	1	9
11	0	0	0	1	0	0
12	3	2	67	6	2	33
13	5	3	60	7	0	0
14	2	0	0	3	0	0
15	6	2	33	9	4	44
16	3	0	0	12	0	0
17	4	0	0	6	1	17
18	0	0	0	2	0	0
19	6	0	0	28	3	11
20	2	0	0	6	0	0
21	3	0	0	4	0	0
22	6	3	50	5	1	20
23	5	2	40	5	0	0
24	7	1	14	26	6	23
25	7	3	43	11	0	0
26	5	1	20	20	4	20
27	3	0	0	10	0	0
28	3	0	0	6	0	0
29	1	0	0	1	0	0
30	1	0	0	7	0	0
31	4	1	25	9	0	0
32	0	0	0	1	1	100
33	1	0	0	7	1	14

**Table 49. Fungal sepsis among VLBW babies (501-1500gm) according to centres, 2008**

Centres	Babies with BW 501-1000gm	Babies with BW 501-1000gm with fungal sepsis		Babies with BW 1001-1500gm	Babies with BW 1001-1500gm with fungal sepsis	
	No	No	%	No	No	%
<b>All centres</b>	1192	14	1	2464	19	1
2	55	1	2	116	1	1
3	65	2	3	111	1	1
4	15	0	0	56	0	0
5	95	2	2	180	1	1
6	38	0	0	133	0	0
7	90	2	2	142	2	1
8	42	0	0	112	3	3
9	37	0	0	109	0	0
10	43	0	0	74	0	0
11	15	1	7	27	0	0
12	29	0	0	63	0	0
13	28	0	0	51	0	0
14	18	0	0	30	0	0
15	33	0	0	48	0	0
16	42	0	0	95	0	0
17	31	0	0	56	0	0
18	15	0	0	15	0	0
19	52	1	2	105	2	2
20	21	0	0	53	0	0
21	11	0	0	29	0	0
22	33	0	0	66	0	0
23	71	0	0	100	2	2
24	59	1	2	138	1	1
25	26	1	4	65	2	3
26	83	1	1	148	2	1
27	20	0	0	65	0	0
28	10	0	0	34	0	0
29	23	0	0	64	1	2
30	17	0	0	29	0	0
31	44	0	0	82	1	1
32	23	2	9	31	0	0
33	8	0	0	37	0	0



**Table 50. Perinatal and neonatal death and mortality rate according to centres, 2008**

<b>Centres</b>	<b>No. Stillbirths</b>	<b>No of Livebirths</b>	<b>Total Births</b>	<b>Inborn deaths &lt; 7 days</b>	<b>Inborn deaths &lt; 28 days</b>	<b>PMR per 1000 TBs</b>	<b>NMR per 1000 LBs</b>
<b>All centres</b>	<b>2198</b>	<b>256437</b>	<b>258635</b>	<b>1216</b>	<b>1577</b>	<b>13.20</b>	<b>6.15</b>
2	104	10148	10252	42	62	14.24	6.11
3	91	9452	9543	49	57	14.67	6.03
4	32	4520	4552	27	29	12.96	6.42
5	167	12339	12506	103	125	21.59	10.13
6	130	12790	12920	77	97	16.02	7.58
7	122	12800	12922	95	121	16.79	9.45
8	105	11925	12030	54	96	13.22	8.05
9	97	10692	10789	42	60	12.88	5.61
10	47	7269	7316	30	36	10.52	4.95
11	20	4493	4513	13	17	7.31	3.78
12	51	5208	5259	18	23	13.12	4.42
13	31	5319	5350	28	33	11.03	6.20
14	26	5812	5838	19	22	7.71	3.79
15	49	7500	7549	32	36	10.73	4.80
16	68	8325	8393	29	40	11.56	4.80
17	65	8381	8446	34	45	11.72	5.37
18	19	3628	3647	16	17	9.60	4.69
19	46	5007	5053	24	32	13.85	6.39
20	56	6153	6209	19	32	12.08	5.20
21	38	4945	4983	14	16	10.44	3.24
22	79	9062	9141	44	51	13.46	5.63
23	116	13254	13370	54	71	12.72	5.36
24	98	11669	11767	47	58	12.32	4.97
25	70	6841	6911	20	41	13.02	5.99
26	162	15041	15203	96	129	16.97	8.58
27	42	5349	5391	28	32	12.98	5.98
28	33	3343	3376	15	18	14.22	5.38
29	68	8393	8461	43	50	13.12	5.96
30	26	5968	5994	24	30	8.34	5.03
31	59	8121	8180	44	50	12.59	6.16
32	42	7810	7852	17	26	7.51	3.33
33	39	4880	4919	19	25	11.79	5.12

**Table 51. Survival of extremely preterm (22-27 weeks' gestation) and very preterm (28-31 weeks' gestation) according to centres, 2008**

Centres	Extremely preterm babies (gestation 22-27 weeks)	Extremely preterm who survived		Very preterm babies (gestation 28-31 weeks)	Very preterm who survived		Extremely and Very preterm babies	Extremely and Very preterm who survived	
	No	No	%	No	No	%	No	No	%
All centres	910	406	45	2427	2048	84	3337	2454	74
2	35	12	34	122	99	81	157	111	71
3	54	28	52	141	124	88	195	152	78
4	12	3	25	50	44	88	62	47	76
5	71	24	34	180	142	79	251	166	66
6	31	5	16	105	87	83	136	92	68
7	70	35	50	150	126	84	220	161	73
8	34	8	24	126	97	77	160	105	66
9	25	12	48	87	72	83	112	84	75
10	31	14	45	60	51	85	91	65	71
11	9	6	67	27	23	85	36	29	81
12	26	15	58	64	60	94	90	75	83
13	23	9	39	59	48	81	82	57	70
14	12	5	42	32	28	88	44	33	75
15	34	14	41	40	38	95	74	52	70
16	39	23	59	101	91	90	140	114	81
17	19	8	42	66	54	82	85	62	73
18	10	2	20	27	23	85	37	25	68
19	38	13	34	84	80	95	122	93	76
20	19	9	47	51	41	80	70	50	71
21	10	4	40	29	27	93	39	31	79
22	22	15	68	67	57	85	89	72	81
23	51	26	51	110	98	89	161	124	77
24	51	31	61	142	130	92	193	161	83
25	18	6	33	57	50	88	75	56	75
26	28	11	39	145	104	72	173	115	66
27	29	17	59	51	44	86	80	61	76
28	9	5	56	34	27	79	43	32	74
29	21	9	43	49	40	82	70	49	70
30	7	3	43	31	22	71	38	25	66
31	44	24	55	70	61	87	114	85	75
32	19	6	32	35	29	83	54	35	65
33	9	4	44	35	31	89	44	35	80

**Table 51a. Survival of extremely preterm (22-27 weeks' gestation) and very preterm (28-31 weeks' gestation) inborn babies according to centres, 2008**

Centres	Extremely preterm inborn babies (gestation 22-27 weeks)	Extremely preterm inborn babies who survived		Very preterm inborn babies (gestation 28-31 weeks)	Very preterm inborn babies who survived		Extremely and Very inborn babies preterm babies	Extremely and Very preterm inborn babies who survived	
	No	No	%	No	No	%	No	No	%
<b>All centres</b>	790	339	43	2098	1774	85	2888	2113	73
2	26	9	35	98	81	83	124	90	73
3	50	25	50	117	103	88	167	128	77
4	10	2	20	42	36	86	52	38	73
5	63	20	32	141	111	79	204	131	64
6	25	3	12	85	70	82	110	73	66
7	58	24	41	134	114	85	192	138	72
8	30	7	23	110	85	77	140	92	66
9	24	12	50	81	68	84	105	80	76
10	29	14	48	53	46	87	82	60	73
11	8	5	63	26	22	85	34	27	79
12	21	10	48	58	54	93	79	64	81
13	18	6	33	48	38	79	66	44	67
14	10	3	30	30	26	87	40	29	73
15	27	9	33	33	31	94	60	40	67
16	37	21	57	88	79	90	125	100	80
17	16	8	50	61	49	80	77	57	74
18	10	2	20	24	21	88	34	23	68
19	34	12	35	63	60	95	97	72	74
20	16	7	44	45	36	80	61	43	70
21	7	4	57	27	25	93	34	29	85
22	16	11	69	64	55	86	80	66	83
23	47	24	51	105	93	89	152	117	77
24	44	27	61	121	112	93	165	139	84
25	14	3	21	48	43	90	62	46	74
26	27	10	37	127	91	72	154	101	66
27	24	14	58	41	36	88	65	50	77
28	8	5	63	27	23	85	35	28	80
29	19	8	42	48	40	83	67	48	72
30	6	2	33	26	17	65	32	19	59
31	40	23	57	63	54	86	103	77	75
32	19	6	32	35	29	83	54	35	65
33	7	3	43	29	26	90	36	29	81

**Table 52. Survival of ELBW and VLBW babies according to centres, 2008**

Centres	ELBW babies (BW501 - 1000gm)	ELBW (BW501 - 1000gm) who survived		VLBW babies (BW1001 - 1500gm)	VLBW (BW1001 - 1500gm) who survived		ELBW + VLBW (BW501 - 1500gm)	ELBW + VLBW (BW501 - 1500gm) who survived	
	No	No	%	No	No	%	No	No	%
<b>All centres</b>	1192	604	51	2464	2117	86	3656	2721	74
2	55	28	51	116	91	78	171	119	70
3	65	34	52	111	96	86	176	130	74
4	15	5	33	56	52	93	71	57	80
5	95	34	36	180	153	85	275	187	68
6	38	11	29	133	108	81	171	119	70
7	90	49	54	142	121	85	232	170	73
8	42	12	29	112	89	79	154	101	66
9	37	20	54	109	96	88	146	116	79
10	43	22	51	74	66	89	117	88	75
11	15	10	67	27	23	85	42	33	79
12	29	18	62	63	58	92	92	76	83
13	28	14	50	51	41	80	79	55	70
14	18	9	50	30	28	93	48	37	77
15	33	18	55	48	43	90	81	61	75
16	42	28	67	95	85	89	137	113	82
17	31	16	52	56	46	82	87	62	71
18	15	7	47	15	13	87	30	20	67
19	52	28	54	105	97	92	157	125	80
20	21	7	33	53	45	85	74	52	70
21	11	5	45	29	25	86	40	30	75
22	33	24	73	66	56	85	99	80	81
23	71	44	62	100	90	90	171	134	78
24	59	37	63	138	123	89	197	160	81
25	26	12	46	65	57	88	91	69	76
26	83	38	46	148	119	80	231	157	68
27	20	7	35	65	58	89	85	65	76
28	10	4	40	34	30	88	44	34	77
29	23	12	52	64	52	81	87	64	74
30	17	8	47	29	24	83	46	32	70
31	44	30	68	82	73	89	126	103	82
32	23	9	39	31	27	87	54	36	67
33	8	4	50	37	32	86	45	36	80

**Table 52a. Survival of ELBW and Inborn VLBW babies according to centres, 2008**

Centres	ELBW inborn babies (BW501 - 1000gm)	ELBW (BW501 - 1000gm) who survived		VLBW inborn babies (BW1001 - 1500gm)	VLBW (BW1001 - 1500gm) who survived		ELBW + VLBW (BW501 - 1500gm)	ELBW + VLBW (BW501 - 1500gm) who survived	
	No	No	%	No	No	%	No	No	%
All centres	1056	526	50	2116	1823	86	3172	2349	74
2	45	23	51	91	73	80	136	96	71
3	62	32	52	89	77	87	151	109	72
4	14	5	36	50	46	92	64	51	80
5	82	25	30	137	118	86	219	143	65
6	32	9	28	113	92	81	145	101	70
7	75	36	48	128	110	86	203	146	72
8	38	11	29	101	80	79	139	91	65
9	34	19	56	105	92	88	139	111	80
10	39	21	54	63	57	90	102	78	76
11	15	10	67	26	22	85	41	32	78
12	26	15	58	57	53	93	83	68	82
13	23	11	48	44	35	80	67	46	69
14	16	7	44	27	25	93	43	32	74
15	27	14	52	39	35	90	66	49	74
16	39	25	64	83	74	89	122	99	81
17	27	15	56	50	41	82	77	56	73
18	15	7	47	13	12	92	28	19	68
19	46	24	52	77	72	94	123	96	78
20	19	7	37	47	39	83	66	46	70
21	8	5	63	25	22	88	33	27	82
22	27	20	74	61	52	85	88	72	82
23	66	41	62	95	86	91	161	127	79
24	52	34	65	112	100	89	164	134	82
25	19	7	37	54	47	87	73	54	74
26	78	34	44	128	103	80	206	137	67
27	17	6	35	55	50	91	72	56	78
28	7	3	43	28	25	89	35	28	80
29	22	11	50	63	51	81	85	62	73
30	16	7	44	22	18	82	38	25	66
31	40	29	73	73	64	88	113	93	82
32	23	9	39	30	26	87	53	35	66
33	7	4	57	30	26	87	37	30	81

**Table 53. Survival of cases with ventilatory support (VS) according to centres, 2008**

Centres	All Babies in study	No who survived		Babies with ventilatory support		Babies with VS who survived	
	No	No	%	No	%	No	%
<b>All centres</b>	11219	9190	82	10186	91	8504	83
2	483	389	81	464	96	376	81
3	526	449	85	430	82	387	90
4	209	174	83	197	94	168	85
5	737	567	77	630	85	501	80
6	523	391	75	453	87	335	74
7	786	631	80	703	89	584	83
8	554	428	77	513	93	408	80
9	371	297	80	294	79	236	80
10	304	256	84	281	92	236	84
11	110	90	82	109	99	90	83
12	209	179	86	206	99	177	86
13	249	195	78	239	96	189	79
14	168	146	87	158	94	137	87
15	237	191	81	191	81	157	82
16	366	322	88	345	94	305	88
17	353	298	84	353	100	298	84
18	97	78	80	82	85	66	80
19	372	320	86	337	91	301	89
20	193	157	81	166	86	137	83
21	142	120	85	135	95	115	85
22	509	445	87	447	88	399	89
23	573	491	86	542	95	475	88
24	473	397	84	411	87	344	84
25	317	256	81	297	94	240	81
26	624	469	75	593	95	465	78
27	162	124	77	147	91	113	77
28	100	76	76	87	87	66	76
29	363	304	84	342	94	294	86
30	228	196	86	199	87	175	88
31	282	217	77	248	88	201	81
32	204	174	85	202	99	174	86
33	395	363	92	385	97	355	92

**Table 54. Survival of cases among babies without congenital anomalies with ventilatory support (VS) according to centres, 2008**

Centres	All Babies minus those with congenital anomalies in study	No without congenital anomalies who survived		Babies without congenital anomalies with ventilatory support		Babies without congenital anomalies with VS who survived	
	No	No	%	No	%	No	%
<b>All centres</b>	9338	8052	86	8877	95	7739	87
2	415	353	85	402	97	341	85
3	409	350	86	354	87	324	92
4	183	165	90	176	96	160	91
5	545	456	84	504	92	428	85
6	395	310	78	367	93	284	77
7	623	538	86	591	95	519	88
8	481	396	82	459	95	382	83
9	280	236	84	256	91	215	84
10	270	232	86	253	94	217	86
11	101	87	86	101	100	87	86
12	193	171	89	193	100	171	89
13	215	179	83	208	97	174	84
14	145	128	88	141	97	125	89
15	176	151	86	155	88	135	87
16	326	295	90	316	97	288	91
17	327	286	87	327	100	286	87
18	77	61	79	73	95	59	81
19	309	272	88	289	94	263	91
20	155	130	84	144	93	123	85
21	129	114	88	123	95	109	89
22	421	388	92	402	95	374	93
23	496	445	90	481	97	438	91
24	377	332	88	345	92	300	87
25	233	198	85	230	99	195	85
26	532	431	81	518	97	428	83
27	141	114	81	132	94	107	81
28	93	73	78	82	88	63	77
29	321	289	90	311	97	285	92
30	180	167	93	175	97	164	94
31	246	200	81	228	93	191	84
32	189	169	89	187	99	169	90
33	355	336	95	354	100	335	95

**Table 55. Duration of hospital stay for babies of BW 501-750 gm according to centres, 2008**

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay in days		Babies who died		For dead, duration of hospital stay in days	
	No	No	%	Mean	SD	No	%	Mean	SD
<b>All centres</b>	379	90	24	102	57	289	76	5	12
2	15	4	27	99	7	11	73	2	4
3	19	3	16	74	67	16	84	5	17
4	7	0	0	0	0	7	100	0	0
5	41	6	15	60	24	35	85	5	9
6	11	1	9	120	0	10	91	5	7
7	32	8	25	113	74	24	75	6	11
8	12	1	8	92	0	11	92	2	3
9	16	2	13	104	3	14	88	13	21
10	8	3	38	103	68	5	63	1	1
11	0	0	0	0	0	0	0	0	0
12	8	2	25	72	2	6	75	11	21
13	10	0	0	0	0	10	100	2	2
14	7	4	57	84	17	3	43	2	3
15	13	1	8	98	0	12	92	6	14
16	12	3	25	110	5	9	75	10	17
17	3	1	33	81	0	2	67	5	1
18	6	0	0	0	0	6	100	0	0
19	20	4	20	179	101	16	80	7	16
20	5	0	0	0	0	5	100	2	5
21	3	0	0	0	0	3	100	0	0
22	9	4	44	160	137	5	56	11	22
23	23	7	30	98	17	16	70	5	9
24	21	7	33	93	23	14	67	8	20
25	5	2	40	220	142	3	60	17	27
26	23	6	26	66	22	17	74	7	13
27	5	1	20	116	0	4	80	0	1
28	1	1	100	76	0	0	0	0	0
29	10	1	10	37	0	9	90	0	0
30	6	3	50	85	21	3	50	1	1
31	17	12	71	92	22	5	29	10	16
32	10	3	30	153	27	7	70	6	8
33	1	0	0	0	0	1	100	14	0



**Table 55a. Duration of hospital stay for babies of BW 751-1000 gm according to centres, 2008**

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay in days		Babies who died		For dead, duration of hospital stay in days	
	No	No	%	Mean	SD	No	%	Mean	SD
<b>All centres</b>	813	514	63	74	42	299	37	12	30
2	40	24	60	74	18	16	40	11	18
3	46	31	67	46	28	15	33	9	19
4	8	5	63	75	21	3	38	20	25
5	54	28	52	67	24	26	48	9	17
6	27	10	37	68	10	17	63	10	13
7	58	41	71	69	30	17	29	21	32
8	30	11	37	78	20	19	63	11	15
9	21	18	86	77	24	3	14	14	19
10	35	19	54	74	24	16	46	16	20
11	15	10	67	72	16	5	33	19	16
12	21	16	76	66	34	5	24	9	12
13	18	14	78	55	21	4	22	4	6
14	11	5	45	64	22	6	55	4	4
15	20	17	85	107	104	3	15	3	5
16	30	25	83	65	12	5	17	13	10
17	28	15	54	59	12	13	46	5	5
18	9	7	78	84	29	2	22	6	5
19	32	24	75	114	85	8	25	28	51
20	16	7	44	57	21	9	56	9	15
21	8	5	63	82	19	3	38	11	18
22	24	20	83	108	81	4	17	33	51
23	48	37	77	74	26	11	23	10	9
24	38	30	79	67	25	8	21	55	143
25	21	10	48	92	63	11	52	9	10
26	60	32	53	62	30	28	47	8	12
27	15	6	40	76	12	9	60	5	8
28	9	3	33	70	22	6	67	2	1
29	13	11	85	72	14	2	15	1	1
30	11	5	45	58	5	6	55	1	1
31	27	18	67	70	20	9	33	8	14
32	13	6	46	118	51	7	54	20	21
33	7	4	57	93	36	3	43	2	3

**Table 55b. Duration of hospital stay for babies of BW 1001-1250 gm according to centres, 2008**

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay in days		Babies who died		For dead, duration of hospital stay in days	
	No	No	%	Mean	SD	No	%	Mean	SD
<b>All centres</b>	1046	868	83	52	31	178	17	15	31
2	56	43	77	58	17	13	23	10	11
3	53	45	85	38	16	8	15	16	24
4	21	20	95	48	17	1	5	0	0
5	69	54	78	46	22	15	22	8	23
6	46	36	78	53	14	10	22	6	11
7	61	54	89	47	20	7	11	25	29
8	54	41	76	53	13	13	24	11	13
9	38	33	87	70	61	5	13	36	68
10	28	25	89	62	56	3	11	3	1
11	9	9	100	57	8	0	0	0	0
12	34	31	91	42	16	3	9	6	5
13	23	19	83	50	19	4	17	2	1
14	11	10	91	50	19	1	9	3	0
15	16	14	88	58	26	2	13	4	2
16	48	40	83	46	16	8	17	5	3
17	28	21	75	41	23	7	25	5	4
18	5	4	80	66	33	1	20	5	0
19	41	37	90	82	88	4	10	52	79
20	28	24	86	52	15	4	14	8	8
21	6	5	83	54	11	1	17	9	0
22	27	20	74	58	23	7	26	22	57
23	35	30	86	56	33	5	14	3	3
24	61	52	85	50	17	9	15	22	26
25	23	20	87	48	12	3	13	34	19
26	77	57	74	50	21	20	26	21	31
27	33	30	91	48	10	3	9	3	1
28	11	10	91	45	15	1	9	3	0
29	23	17	74	53	15	6	26	6	7
30	13	9	69	37	13	4	31	3	7
31	41	36	88	48	22	5	12	66	95
32	13	10	77	62	11	3	23	10	9
33	14	12	86	61	24	2	14	10	13

**Table 55c. Duration of hospital stay for babies of BW 1251-1500 gm according to centres, 2008**

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay in days		Babies who died		For dead, duration of hospital stay in days	
	No	No	%	Mean	SD	No	%	Mean	SD
All centres	1418	1249	88	35	17	169	12	9	16
2	60	48	80	44	18	12	20	9	16
3	58	51	88	29	12	7	12	6	8
4	35	32	91	39	24	3	9	7	10
5	111	99	89	34	18	12	11	3	7
6	87	72	83	38	15	15	17	4	13
7	81	67	83	34	15	14	17	8	14
8	58	48	83	35	13	10	17	15	25
9	71	63	89	35	13	8	11	11	15
10	46	41	89	40	18	5	11	32	49
11	18	14	78	43	13	4	22	12	17
12	29	27	93	30	13	2	7	6	6
13	28	22	79	34	13	6	21	9	11
14	19	18	95	31	9	1	5	1	0
15	32	29	91	38	10	3	9	1	1
16	47	45	96	32	11	2	4	7	4
17	28	25	89	33	18	3	11	11	9
18	10	9	90	31	20	1	10	0	0
19	64	60	94	39	24	4	6	16	24
20	25	21	84	33	19	4	16	8	5
21	23	20	87	33	12	3	13	2	2
22	39	36	92	41	22	3	8	5	6
23	65	60	92	41	19	5	8	22	23
24	77	71	92	31	18	6	8	2	4
25	42	37	88	40	18	5	12	12	9
26	71	62	87	31	15	9	13	16	20
27	32	28	88	34	14	4	13	7	9
28	23	20	87	37	14	3	13	10	16
29	41	35	85	30	9	6	15	2	4
30	16	15	94	27	14	1	6	10	0
31	41	37	90	35	17	4	10	2	3
32	18	17	94	36	12	1	6	15	0
33	23	20	87	34	12	3	13	14	13

**Table 55d. Duration of hospital stay for babies of BW 1501-2500 gm according to centres, 2008**

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay in days		Babies who died		For dead, duration of hospital stay in days	
	No	No	%	Mean	SD	No	%	Mean	SD
<b>All centres</b>	3661	3134	86	18	20	527	14	9	26
2	150	129	86	25	33	21	14	19	46
3	187	174	93	14	12	13	7	3	4
4	62	54	87	22	54	8	13	3	3
5	221	182	82	17	17	39	18	12	28
6	151	121	80	17	13	30	20	21	67
7	293	241	82	19	17	52	18	9	24
8	190	157	83	18	13	33	17	10	15
9	101	79	78	21	31	22	22	12	33
10	102	94	92	19	13	8	8	9	11
11	29	25	86	16	8	4	14	6	8
12	67	61	91	15	13	6	9	6	8
13	86	70	81	15	9	16	19	23	37
14	45	40	89	14	10	5	11	3	6
15	79	67	85	22	15	12	15	2	3
16	132	119	90	17	13	13	10	8	18
17	120	103	86	14	10	17	14	5	8
18	37	33	89	15	9	4	11	3	3
19	134	120	90	25	21	14	10	7	11
20	60	51	85	18	13	9	15	7	9
21	51	49	96	16	9	2	4	2	1
22	203	182	90	23	24	21	10	4	6
23	199	176	88	18	17	23	12	6	14
24	164	142	87	17	16	22	13	8	26
25	84	73	87	23	32	11	13	16	14
26	206	159	77	18	19	47	23	4	8
27	33	23	70	27	47	10	30	4	8
28	35	27	77	15	11	8	23	4	4
29	120	101	84	14	9	19	16	5	12
30	69	59	86	14	23	10	14	6	9
31	73	57	78	17	18	16	22	10	22
32	69	63	91	22	15	6	9	19	19
33	109	103	94	14	10	6	6	15	26

**Table 55e. Duration of hospital stay for babies of BW > 2500 gm according to centres, 2008**

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay in days		Babies who died		For dead, duration of hospital stay in days	
	No	No	%	Mean	SD	No	%	Mean	SD
<b>All centres</b>	3859	3333	86	12	18	526	14	10	22
2	162	141	87	16	34	21	13	23	48
3	163	145	89	10	11	18	11	13	31
4	74	63	85	14	39	11	15	4	11
5	238	198	83	14	15	40	17	6	9
6	200	151	76	11	10	49	25	10	18
7	259	220	85	13	15	39	15	5	12
8	209	170	81	9	7	39	19	14	17
9	123	102	83	11	9	21	17	9	13
10	85	74	87	11	11	11	13	1	1
11	39	32	82	13	6	7	18	2	2
12	47	41	87	11	8	6	13	3	2
13	83	70	84	9	6	13	16	6	12
14	75	69	92	7	5	6	8	4	3
15	73	63	86	22	27	10	14	38	63
16	95	90	95	11	18	5	5	5	7
17	146	133	91	11	25	13	9	8	17
18	29	25	86	8	7	4	14	10	16
19	79	75	95	16	16	4	5	37	71
20	59	54	92	9	8	5	8	7	11
21	50	41	82	10	6	9	18	2	3
22	206	183	89	13	21	23	11	5	8
23	201	181	90	10	10	20	10	4	7
24	111	95	86	14	28	16	14	4	3
25	142	114	80	17	32	28	20	14	21
26	185	153	83	13	17	32	17	13	28
27	44	36	82	16	23	8	18	3	2
28	21	15	71	10	8	6	29	7	11
29	155	139	90	9	6	16	10	22	40
30	113	105	93	8	8	8	7	13	27
31	73	56	77	11	14	17	23	6	8
32	79	75	95	14	13	4	5	1	1
33	241	224	93	8	17	17	7	10	21

**Table 56. Duration of hospital stay for babies with congenital anomalies (BW > 2500 gm) according to centres, 2008**

Centres	Babies with congenital anomalies in study	Babies with congenital anomalies who survived		For survivors, duration of hospital stay in days		Babies with congenital anomalies who died		For dead, duration of hospital stay in days	
	No	No	%	Mean	SD	No	%	Mean	SD
All centres	868	650	75	15	23	218	25	14	30
2	23	14	61	37	55	9	39	39	69
3	69	61	88	11	12	8	12	12	11
4	9	2	22	14	9	7	78	6	13
5	89	68	76	14	15	21	24	6	12
6	75	56	75	12	12	19	25	10	25
7	77	59	77	15	15	18	23	5	16
8	33	17	52	13	12	16	48	20	17
9	46	37	80	7	6	9	20	11	14
10	12	9	75	14	11	3	25	2	2
11	3	2	67	16	1	1	33	5	0
12	6	5	83	17	8	1	17	1	0
13	10	7	70	11	4	3	30	12	20
14	15	12	80	8	7	3	20	3	2
15	31	24	77	28	40	7	23	53	72
16	19	15	79	26	39	4	21	6	8
17	6	4	67	22	16	2	33	4	4
18	15	14	93	8	9	1	7	1	0
19	24	21	88	17	21	3	13	49	83
20	19	17	89	8	7	2	11	1	1
21	8	5	63	7	6	3	38	4	6
22	50	38	76	20	39	12	24	7	10
23	35	26	74	19	17	9	26	5	8
24	30	24	80	22	51	6	20	4	2
25	48	36	75	19	18	12	25	21	29
26	28	14	50	16	17	14	50	25	39
27	9	6	67	14	10	3	33	4	2
28	0	0	0	0	0	0	0	0	0
29	14	8	57	7	5	6	43	37	60
30	28	24	86	6	9	4	14	0	1
31	12	8	67	23	27	4	33	12	13
32	4	2	50	12	16	2	50	1	1
33	21	15	71	13	17	6	29	3	4

**Table 57. Administration of maternal antenatal steroid to mothers of babies born <32 weeks with RDS and respiratory support status according to centres, 2008**

Centres	Pre-term Babies	Preterm Babies with antenatal steroids		Preterm Babies with antenatal steroids and RDS		Preterm Babies with antenatal steroids with RDS and ventilatory support		Preterm Babies with antenatal steroids with RDS and CPAP only		Preterm Babies without antenatal steroids		Preterm Babies without antenatal steroids and RDS		Preterm Babies without antenatal steroids with RDS and ventilatory support		Preterm Babies without antenatal steroids with RDS and CPAP only	
		No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
All centres	3348	2003	60	1713	86	1678	98	186	11	1186	35	930	78	894	96	92	10
2	157	103	66	89	86	87	98	9	10	47	30	41	87	40	98	3	7
3	196	151	77	111	74	106	95	10	9	33	17	21	64	18	86	2	10
4	62	42	68	34	81	32	94	1	3	16	26	10	63	10	100	0	0
5	253	125	49	97	78	92	95	5	5	121	48	88	73	80	91	7	8
6	136	76	56	68	89	68	100	2	3	55	40	47	85	46	98	1	2
7	221	140	63	117	84	117	100	12	10	69	31	48	70	47	98	3	6
8	160	54	34	46	85	46	100	1	2	91	57	73	80	67	92	0	0
9	113	68	60	57	84	54	95	0	0	42	37	33	79	33	100	2	6
10	91	37	41	23	62	21	91	2	9	42	46	36	86	36	100	3	8
11	36	16	44	16	100	16	100	1	6	18	50	18	100	18	100	0	0
12	91	76	84	70	92	70	100	14	20	9	10	9	100	9	100	1	11
13	82	54	66	44	81	44	100	7	16	21	26	16	76	16	100	3	19
14	44	31	70	27	87	27	100	1	4	9	20	9	100	9	100	2	22
15	74	43	58	41	95	36	88	2	5	28	38	28	100	25	89	4	14
16	140	91	65	86	95	85	99	17	20	35	25	28	80	28	100	6	21
17	85	40	47	30	75	30	100	6	20	42	49	31	74	31	100	3	10
18	37	25	68	19	76	19	100	0	0	6	16	4	67	4	100	1	25
19	125	95	76	85	89	85	100	2	2	30	24	18	60	18	100	1	6
20	70	43	61	39	91	39	100	2	5	26	37	22	85	20	91	3	14
21	39	21	54	17	81	17	100	0	0	18	46	13	72	12	92	0	0
22	89	65	73	54	83	53	98	4	7	24	27	17	71	17	100	2	12
23	161	131	81	128	98	126	98	12	9	29	18	23	79	19	83	0	0
24	194	104	54	96	92	95	99	5	5	87	45	73	84	73	100	1	1
25	75	56	75	55	98	55	100	7	13	19	25	16	84	16	100	0	0
26	173	49	28	47	96	47	100	7	15	113	65	95	84	94	99	14	15
27	80	53	66	38	72	37	97	0	0	25	31	15	60	15	100	0	0
28	43	6	14	5	83	5	100	0	0	28	65	20	71	18	90	0	0
29	70	30	43	26	87	26	100	0	0	36	51	23	64	22	96	1	4
30	38	24	63	22	92	20	91	0	0	13	34	9	69	9	100	1	11
31	115	86	75	75	87	73	97	13	17	25	22	20	80	19	95	4	20
32	54	39	72	22	56	21	95	0	0	14	26	14	100	13	93	0	0
33	44	29	66	29	100	29	100	2	7	15	34	12	80	12	100	2	17

**Table 57a. Administration of maternal antenatal steroid to mothers of babies born ≤1500 g with RDS and respiratory support status according to centres, 2008**

Centres	Babies ≤ 1500g	Babies ≤1500g with antenatal steroids		Babies ≤1500g with antenatal steroids and RDS		Babies ≤1500g with antenatal steroids with RDS and ventilatory support		Babies ≤1500g with antenatal steroids with RDS and CPAP only		Babies ≤1500g without antenatal steroids		Babies ≤1500g without antenatal steroids and RDS		Babies ≤1500 g without antenatal steroids with RDS and ventilatory support		Babies ≤1500g without antenatal steroids with RDS and CPAP only	
		No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
All centres	3699	2192	59	1741	79	1698	98	220	13	1333	36	952	71	912	96	101	11
2	171	108	63	93	86	90	97	11	12	57	33	41	72	40	98	4	10
3	176	135	77	95	70	89	94	7	7	27	15	13	48	11	85	0	0
4	73	52	71	34	65	32	94	2	6	17	23	11	65	11	100	0	0
5	278	135	49	100	74	94	94	3	3	135	49	87	64	80	92	7	8
6	172	94	55	76	81	74	97	7	9	72	42	50	69	48	96	2	4
7	234	144	62	112	78	111	99	17	15	76	32	48	63	47	98	5	10
8	155	53	34	42	79	42	100	1	2	90	58	56	62	52	93	0	0
9	147	98	67	65	66	62	95	0	0	40	27	30	75	30	100	2	7
10	117	48	41	26	54	24	92	4	15	56	48	39	70	39	100	5	13
11	42	21	50	21	100	21	100	2	10	19	45	17	89	17	100	0	0
12	95	74	78	68	92	68	100	16	24	14	15	14	100	14	100	3	21
13	80	49	61	39	80	38	97	4	10	22	28	17	77	17	100	3	18
14	48	32	67	26	81	26	100	2	8	12	25	10	83	10	100	2	20
15	85	51	60	41	80	38	93	1	2	31	36	29	94	25	86	5	17
16	139	91	65	81	89	80	99	17	21	37	27	27	73	27	100	6	22
17	87	47	54	31	66	31	100	7	23	38	44	31	82	31	100	4	13
18	31	21	68	15	71	15	100	0	0	4	13	2	50	2	100	0	0
19	159	117	74	86	74	84	98	2	2	42	26	23	55	23	100	1	4
20	74	45	61	39	87	39	100	3	8	28	38	23	82	21	91	3	13
21	41	20	49	16	80	16	100	0	0	21	51	14	67	13	93	1	7
22	100	77	77	61	79	60	98	4	7	22	22	15	68	15	100	1	7
23	173	141	82	129	91	126	98	9	7	30	17	24	80	17	71	0	0
24	198	107	54	88	82	87	99	3	3	88	44	65	74	64	98	1	2
25	91	65	71	62	95	62	100	9	15	25	27	18	72	17	94	0	0
26	233	72	31	67	93	67	100	8	12	149	64	124	83	123	99	16	13
27	85	56	66	39	70	38	97	0	0	27	32	15	56	15	100	0	0
28	44	3	7	3	100	3	100	0	0	31	70	24	77	22	92	0	0
29	88	38	43	31	82	31	100	1	3	47	53	28	60	26	93	1	4
30	46	29	63	26	90	24	92	4	15	15	33	10	67	10	100	2	20
31	136	99	73	83	84	81	98	17	20	32	24	23	72	22	96	7	30
32	56	41	73	20	49	19	95	0	0	14	25	13	93	12	92	0	0
33	45	29	64	26	90	26	100	0	0	15	33	11	73	11	100	1	9



**Table 58. Babies with birth weights  $\leq 1500$ g with RDS requiring ventilator support & CPAP only according to centres, 2008**

Centre	All Babies in study	Babies with Birth weight $\leq 1500$ gms		Babies with Birth weight $\leq 1500$ gms and RDS		Babies with Birth weight $\leq 1500$ gms and RDS with Ventilatory support		Babies with Birth weight $\leq 1500$ gms and RDS with CPAP only	
		No	%	No	%	No	%	No	%
All centres	11219	3699	33	2814	76	2720	97	252	9
2	483	171	35	139	81	135	97	15	11
3	526	176	33	114	65	102	89	7	6
4	209	73	35	45	62	43	96	2	4
5	737	278	38	191	69	178	93	10	5
6	523	172	33	131	76	126	96	9	7
7	786	234	30	173	74	171	99	25	14
8	554	155	28	109	70	103	94	1	1
9	371	147	40	101	69	98	97	3	3
10	304	117	38	74	63	72	97	10	14
11	110	42	38	40	95	40	100	3	8
12	209	95	45	89	94	89	100	19	21
13	249	80	32	59	74	58	98	7	12
14	168	48	29	39	81	39	100	4	10
15	237	85	36	72	85	65	90	6	8
16	366	139	38	116	83	114	98	24	21
17	353	87	25	63	72	63	100	11	17
18	97	31	32	22	71	22	100	0	0
19	372	159	43	109	69	107	98	3	3
20	193	74	38	62	84	60	97	6	10
21	142	41	29	30	73	29	97	1	3
22	509	100	20	76	76	75	99	5	7
23	573	173	30	155	90	145	94	9	6
24	473	198	42	156	79	154	99	4	3
25	317	91	29	81	89	80	99	9	11
26	624	233	37	199	85	198	99	25	13
27	162	85	52	56	66	55	98	0	0
28	100	44	44	34	77	30	88	0	0
29	363	88	24	61	69	59	97	2	3
30	228	46	20	38	83	35	92	6	16
31	282	136	48	108	79	105	97	24	22
32	204	56	27	34	61	32	94	0	0
33	395	45	11	38	84	38	100	2	5

**Table 59. Babies with gestation <32 weeks with RDS requiring ventilator support & CPAP only according to centres, 2008**

Centre	All Babies in study	Babies <32 weeks		Babies <32 weeks and RDS		Babies <32 weeks and RDS with Ventilatory support		Babies <32 weeks and RDS with CPAP only	
		No	%	No	%	No	%	No	%
All centres	11219	3348	30	2767	83	2686	97	226	8
2	483	157	33	135	86	132	98	12	9
3	526	196	37	139	71	127	91	13	9
4	209	62	30	44	71	42	95	1	2
5	737	253	34	190	75	177	93	12	6
6	523	136	26	120	88	118	98	3	3
7	786	221	28	177	80	176	99	17	10
8	554	160	29	133	83	125	94	1	1
9	371	113	30	93	82	90	97	3	3
10	304	91	30	67	74	65	97	7	10
11	110	36	33	36	100	36	100	1	3
12	209	91	44	85	93	85	100	15	18
13	249	82	33	63	77	63	100	10	16
14	168	44	26	39	89	39	100	3	8
15	237	74	31	72	97	64	89	7	10
16	366	140	38	126	90	125	99	25	20
17	353	85	24	62	73	62	100	9	15
18	97	37	38	28	76	28	100	1	4
19	372	125	34	103	82	103	100	3	3
20	193	70	36	61	87	59	97	5	8
21	142	39	27	30	77	29	97	0	0
22	509	89	17	71	80	70	99	6	8
23	573	161	28	152	94	146	96	12	8
24	473	194	41	172	89	171	99	6	3
25	317	75	24	71	95	71	100	7	10
26	624	173	28	152	88	151	99	24	16
27	162	80	49	55	69	54	98	0	0
28	100	43	43	32	74	28	88	0	0
29	363	70	19	52	74	51	98	1	2
30	228	38	17	32	84	29	91	1	3
31	282	115	41	97	84	94	97	17	18
32	204	54	26	37	69	35	95	0	0
33	395	44	11	41	93	41	100	4	10

## APPENDICES

### Appendix 1 Level of Neonatal Care

*(Adapted from Committee on Foetus and Newborn, Levels of Neonatal Care, Paediatrics, Vol. 114 no. 5, November 2004, p.1345)*

Level I Neonatal Care (Basic), well-newborn nursery: has the capabilities to

- Provide neonatal resuscitation at every delivery
- Evaluate and provide postnatal care to healthy newborn infants
- Stabilise and provide care for infants born at 35 to 37 weeks gestation who remain physiologically stable
- Stabilise newborn infants who are ill and those born at <35 weeks gestation, until transfer to a hospital that can provide the appropriate level of neonatal care

Level II Neonatal Care (Specialty), Special care nursery: Level II units are subdivided into two categories on the basis of their ability to provide assisted ventilation including continuous positive airway pressure

*Level II A has the capability to*

Resuscitate and stabilise preterm and/or ill infants before transfer to a facility at which newborn intensive care is provided

Provide care for infants born at >32 weeks gestation and weighing ≥1500 g (1) who have physiologic(al) immaturity such as apnoea of prematurity, inability to maintain body temperature, or inability to take oral feeding or (2) who are moderately ill with problems that are anticipated to resolve rapidly and are not anticipated to need subspecialty service on an urgent basis

Provide Care for infants who are convalescing after intensive care

Level II B has the capabilities of a Level IIA nursery and the additional capability to provide mechanical ventilation for brief durations (<24 hours) or continuous positive airway pressure

Level III (Subspecialty) Neonatal Intensive Care Unit (NICU): Level III units are subdivided into three categories:

Level III A NICU has the capability to

- Provide comprehensive care for infants born at >28 weeks gestation and weighing >1000 g
- Provide sustained life support limited to conventional mechanical ventilation
- Perform minor surgical procedures such as placement of central venous catheters or inguinal hernia repair

Level III B NICU has the capability to provide

Comprehensive care for extremely low birth weight infants ( $\leq 1000$  g and  $\leq 28$  weeks gestation)

Advanced respiratory support such as high-frequency ventilation and inhaled nitric oxide

Prompt and on-site access to a full range of paediatric medical subspecialties

Advanced imaging, with interpretation on an urgent basis, including computed tomography, magnetic resonance imaging, and echocardiography Paediatric surgical specialists and paediatric anaesthesiologists on- site or at a closely related institution to perform major surgeries such as ligation of patent ductus arteriosus and repair of abdominal wall defects, necrotising enterocolitis with bowel perforation, trachea-oesophageal fistula and/or oesophageal atresia and myelomeningocele

Level III C NICU has the capabilities of a Level III B NICU and which is also located within an institution that has the capability to provide extracorporeal membrane oxygenation (ECMO) and surgical repair of complex congenital cardiac malformation that requires cardiopulmonary bypass

## **DATA DEFINITIONS AND CRITERIA**

**Centre Name:** Name of participating hospital

**Date of Admission (dd/mm/yy):** Date of first admission to the participating site

State if it is a Stillbirth or Livebirth

State if it is a new case, a readmission and to specify the referring center (*Referral from:*) if relevant

If the case is transferred from another hospital and never admitted to your hospital, it is a new case and tick and specify referral site

### **SECTION 1: Patient Particulars**

1. **Name of patient:** Name as in hospital record

2. **RN:** RN at participating hospital. If the baby dies in Labour room and has no RN, then use the mother's RN.

3. **Mother's identity:** New IC or Passport number

4. **Date of Birth:** dd/mm/yy

5. **Ethnic group:** Malay / Chinese / Indian / Orang Asli / Bumiputra Sabah / Bumiputra Sarawak / Non-citizen / Other Malaysian: If Bumiputra Sabah or Bumiputra Sarawak please specify the indigenous group. In the case of mixed marriages, ethnic group of the baby is defined by the ethnic group of the mother.

6. **Maternal Age:** Age in completed years.

7. **GPA:** G\_\_P\_\_A (of current pregnancy before delivery of this child)

8. **State 'yes' or 'no' if mother had insulin dependent diabetes (regardless of whether it is gestational or pregestational)**

### **SECTION 2: Birth History**

9. **Antenatal Steroid:** State 'yes' or 'no' if this has been given (regardless of number of doses or when it was given).

10. **Intrapartum Antibiotics:** If systemic antibiotics were given to the mother in the 24 hours prior to delivery, record as 'Yes'. This includes antibiotics given only enterally or parenterally, not topical antibiotics.

11. **Birth weight (grams):** Weight in grams at birth hospital. If there are discrepant values, use the birth hospital value for out-born babies. If birth weight is unavailable, use the first weight taken up to 24 hours of life. If birth weight is only listed as an estimate, record the estimate, but make a note on the CRF that this is an approximate birth weight.

12. **Gestation (weeks):** Best estimate of gestational age at birth given in full weeks. Preferences among estimates should be 1) obstetric estimate according to delivering obstetrician. (US date to be selected if done earlier than 25 weeks if there is a

discrepancy with LMP dates. Otherwise use LMP dates 2) new expanded Ballard scoring. If there is no definite estimate but baby is referred to as term baby, enter 40

13. **Growth status:** based on Intrauterine Growth Curves in training manual (Composite Male / Female) chart. SGA<10th centile; AGA 10-90th centile; LGA > 90th centile

14. **Gender:** Indicate Male, Female or Indeterminate

15. **Place of birth:**

**Inborn-** born in the same hospital as the participating site. If born within the wards of the participating hospital to be considered as inborn (unless in the ambulance – born before arrival)

**Outborn:** Born in another place (includes BBA) and transferred after birth to the NNU of the participating site. Includes those born in the hospital compound.

1. University Hospital
2. General Hospital
3. Private Hospital
4. District Hospital with specialist
5. District Hospital without specialist
6. Private Maternity Home
7. Home
8. Others (e.g. in transit, please specify)

All big city government hospitals are considered as General hospitals and ticked as 2. District hospitals with specialist pertain to availability of specialist post even if this post is not filled.

16. **Multiplicity:** To indicate as singleton, twin, triplet or others i.e. quadruplets, etc.

17. **Mode of delivery:** Tick as relevant. Rarely more than 1 may apply. All caesarians are considered as such without differentiation into upper or lower segment. For breech presentation in Caesarian section, tick as Caesarean section only

18. **Apgar Score at 1 min and 5 min:** Enter the apgar score at 1min and at 5 mins as noted in the Labour and delivery record

19. **Initial resuscitation:** Tick “Yes for all intervention that apply

19a. Oxygen:

Tick “Yes” if the baby received any supplemental oxygen in the delivery room  
Tick “No” if the baby did not receive supplemental oxygen in the delivery room.

19b. Bag-mask vent :

Tick “Yes” if the baby received any positive pressure breaths with a bag and face mask in the delivery room.

Tick “No” if the baby did not receive any positive pressure breaths with a bag and mask in the delivery room. Tick “No” if a bag and face mask were only used to administer CPAP (continuous positive airway pressure) and no positive pressure breaths were given.

19c. Endotracheal tube ventilation:

Tick "Yes" if the baby receive ventilation through an endotracheal tube in the delivery room

Tick "No" if the baby did not received ventilation through an endotracheal tube in the delivery room.

If an endotracheal tube was placed only for suctioning and assisted ventilation was not given through the tube, tick "No"

19d. Cardiac Compression:

Tick "Yes" if external cardiac massage was given in the delivery room

Tick "No" if external cardiac massage was not given in the delivery room

19e. Adrenaline:

Tick "Yes" if adrenaline was given in the delivery room via intravenous, intracardiac or intratracheal routes.

Tick "No" if adrenaline was not given in the delivery room via intravenous, intracardiac or intratracheal routes.

### **SECTION 3: Neonatal Event**

**20. Respiratory support:** Tick "Yes" for all ventilation support given.

1. Oxygen – infant was given supplemental oxygen at any time after leaving the delivery room

2. CPAP – in the infant was given continuous positive airway pressure applied through the nose at any time after leaving the delivery room

3. Conventional Ventilation – is intermittent positive pressure ventilation through an endotracheal tube with a conventional ventilator (IMV rate <240/min) at any time after leaving the delivery room

4. High frequency oscillatory ventilation as delivered by an oscillator. High frequency oscillatory ventilation (IMV rate > 240/min) at any time after leaving the delivery room. High frequency oscillatory ventilation via nasal prongs is not considered HFOV

5. Nitric Oxide – nitric oxide delivered as a gas via a ventilator at any time after leaving the delivery room

6. Others may include High Frequency Jet Ventilation (HFJV) or Liquid ventilation at any time after leaving the delivery room.

**21. Total Duration of Ventilatory support:** State to next complete day i.e. < 24 hours is 1 day and 2 days 4 hours is 3 days, excluding CPAP.

**22. Surfactant:** Indicate whether exogenous surfactant was given or not. If "Yes" indicate whether the infant received it at < 1hr, 1 to 2 hrs. or > 2hrs postnatal age.

**23. Post Natal Steroid for CLD:** Indicate given or not if systemic corticosteroids were used after birth to treat bronchopulmonary dysplasia or chronic lung disease (CLD). Steroids given for other purposes e.g. hypotension and laryngeal oedema will not be included. Inhaled corticosteroids are not considered systemic corticosteroids.

24. **Parenteral Nutrition:** Nutrition given intravenously. Parenteral nutrition must include amino acids with or without fats, hence plain dextrose saline infusion is not parenteral nutrition

25. **Enteral Nutrition on discharge:**

Tick 'Yes' or 'No' whether the infant received any enteral feedings with either formula milk or human milk at discharge.

Tick 'Exclusive breast feeding/Breast milk feeds' if the infant was discharged receiving human milk as their only enteral feeding, either by being breast fed and/or by receiving expressed breast milk.

Tick 'Exclusive formula feeds' if the infant was discharged receiving formula milk as their only enteral feeding.

Tick 'Mixed feeds' if the infant was discharged receiving human milk, plus human milk fortifier and/or formula milk.

26. **Ultrasound done at < 28 days of age** – Tick 'Yes' or 'No' whether ultrasound cranium was done at or before 28 days of life .

#### SECTION 4: Outcome

27 **Date of discharge: Enter the exact date**

28 **Weight (grams) of Discharge or Death or Transfer out:** Weight on Death is the last weight taken when the baby is alive. Enter the exact weight in grams.

29 **Total Duration of hospital stay (Neonatal/Paeds Care):** State to next complete day i.e. < 24 hours is 1 day and 10 days 6 hours is 11days.

30. **Outcome:** Alive or Dead – Alive at discharge or died before discharge.

**If Child Alive, state Place of discharge to:** Home, Social welfare home, Other Non-Paed Ward, 'Still hospitalised as of 1st birthday' or Transferred to other hospitals. If transferred to other hospitals, specify the name of hospital transferred to.

**Post transfer disposition.** If a case is transferred to another hospital in the NNR network, complete the CRF up to current status and send form with the baby. The referral centre would complete a new CRF and this will be analysed together with the CRF of the referring hospital.

**If the case is transferred to another hospital out of the NNR network** the referring unit **must get the final 'outcome' of the baby** from the unit that the case was referred to.

**If Child Died, tick 'Yes' or 'No' whether the infant died within 12 hours or less from the time of admission to the NICU.**

**Place of Death:** Labour Room/OT, In Transit, Neonatal Unit and others, specify:

#### SECTION 5: Problems / Diagnoses

Mandatory fields are included for some diagnoses /procedures that are very important in the care of VLBW and sick infants. Definitions of these conditions are as shown in Appendix 1. Other diagnoses or problems not given in the list can be referred to 'WHO 1992 ICD-10; Volume 1 document' and to be written in the space provided under 'Others'

**There should not be too many NA (Not available) or 'Unknown' data**



## DEFINITIONS OF CERTAIN SPECIFIED DIAGNOSES

(Modified from ICD 10)

Diagnosis	Definition
1. Respiratory distress syndrome (RDS). Tick 'yes' or 'no'	Respiratory Distress Syndrome (RDS) is defined as: A. $\text{PaO}_2 < 50$ mmHg in room air, central cyanosis in room air, or a requirement for supplemental oxygen to maintain $\text{PaO}_2 > 50$ mmHg AND B. A chest radiograph consistent with RDS (low lung volumes and reticulogranular appearance to lung fields, with or without air bronchograms).
2. Patent ductus arterious (PDA).	Clinical evidence of left to right PDA shunt documented by continuous murmur, hyperdynamic precordium, bounding pulses, wide pulse pressure, congestive heart failure, increased pulmonary vasculature or cardiomegaly by CXR, and/or increased oxygen requirement or ECHO evidence of PDA with documentation of left to right ductal shunting If ticked 'Yes', indicate whether ECHO was done and whether treatment (indomethacin/ibuprofen for >24 hours or ligation) was given or not.
3. Pneumothorax Tick 'yes' or 'no'	Presence of extrapleural air diagnosed by chest radiograph or needle aspiration (thoracocentesis). For infants who had thoracic surgery and a chest tube was placed at the time of surgery OR if free air was only present on a CXR taken immediately after thoracic surgery and was not treated with a chest tube, tick ' <b>No</b> '. For infants who had thoracic surgery and then later developed extrapleural air diagnosed by CXR or needle thoracocentesis, tick ' <b>Yes</b> '.
4. Supplemental oxygen State if required at Day 28 and 36 weeks corrected gestation	Receipt of continuous enriched oxygen concentration >0.21% by oxyhood, nasal cannula, nasal catheter, facemask or other forms of respiratory support. 'Continuous' means that the patient is receiving oxygen throughout the time period and not just in brief episodes as needed i.e. during feeds. 'Blow-by' oxygen dose not count unless it is the mode of oxygen administration used in a transport situation. Do not score oxygen given as part of a hyperoxia test.
5. Necrotising enterocolitis (NEC) (Stage 2 and above) Tick 'yes' or 'no' If "Yes" and managed surgically tick 'Surgical Rx'	NEC according to Bell's criteria stage 2 or higher <b>Stage 1</b> : Suspect (History of perinatal stress, systemic signs of ill health ie temperature instability, lethargy, apnoea, GIT manifestations ie poor feeding, increased volume of gastric aspirate, vomiting, mild abdominal distension, fecal occult blood with no anal fissure) <b>Stage 2</b> : Confirmed (Any of features of stage 1 plus persistent occult, or gastrointestinal bleeding, marked abdominal distension, abdominal radiograph;

	<p>intestinal distension, bowel wall oedema, unchanging bowel loops, pneumatosis intestinalis, portal vein gas)</p> <p><b>Stage 3</b> : Advanced ( Any of features of stages 1 or 2 plus: deterioration in vital signs, evidence of shock or severe sepsis, or marked gastrointestinal hemorrhage, or abdominal radiograph shows any of features of stage 2 plus pneumoperitoneum)</p>
<p>6. Retinopathy of prematurity (ROP) Maximum stage of ROP in left/right eye as defined by the International Committee on ROP (ICROP). Score according to the grade of ROP assigned on an eye exam done by an ophthalmologist. If there is no explicit grade listed, then score according to the descriptions given by the ICROP. Tick “Yes” if a Retinal exam is done and enter the worst stage. State if laser or cryotherapy was done. If screening was not done, state “No” AND indicate whether an appointment for retinal examination was given.</p>	<p>If an indirect ophthalmologic examination was performed at any time, enter the worst stage documented</p> <p>Stage 0 : No Evidence of ROP Stage 1: Demarcation Line Stage 2: Ridge Stage 3: Ridge with Extraretinal Fibrovascular Proliferation Stage 4: Retinal Detachment Stage 5: Vitreous haemorrhage</p>
<p>7. Intraventricular haemorrhage (IVH) Tick “Yes” if Intraventricular haemorrhage (IVH) is seen and enter the worst grade before or on 28 days of life. State if VP shunt/reservoir insertion was done. Tick “No” if there was no IVH before or on day 28. If ultrasound is not done before or on 28 days, state “Not applicable”</p>	<p>If Ultrasound of Brain done on or before 28 days of life, enter the worst grade</p> <p>Grade 1 Subependymal germinal matrix(GM) haemorrhage only Grade 2 IVH without ventricular dilatation Grade 3 IVH with ventricular dilatation Grade 4 IVH with parenchymal involvement</p>
<p>8. Seizures Tick ‘yes’ or ‘no’</p>	<p>Clinical evidence of subtle seizures, or of focal or multifocal, clonic or tonic seizures, confirmed by 2 or more clinicians or diagnosed by EEG. Used synonymously with fits or convulsions</p>
<p>9. Infections Tick ‘Yes’ if there is evidence of clinical or confirmed sepsis. State whether the onset of the infection was Day 3 and below or after 3 days of birth. NOTE: The date of birth counts as day 1 regardless of the time of birth. For an infant born at 11:59 PM on September 1, day 3 will be</p>	<p><b>Clinical sepsis</b> One of the following clinical signs or symptoms with no other recognised cause: Fever (&gt;38°C), hypothermia (&lt;37°C), apnoea, bradycardia <i>and all of the following</i>: a. Blood culture not done or no organism or antigen detected in blood b. No apparent infection at another site c. Physician institutes appropriate antimicrobial therapy for sepsis</p> <p><b>Confirmed sepsis</b></p>

September 3.	Clinical evidence of sepsis plus culture-proven infection e.g.: positive blood, urine, or CSF culture or positive bacterial antigen test. Include congenital pneumonia if blood culture was positive.
10. For Confirmed Sepsis State organism as indicated or specify others	<p>Please state the organism cultured:</p> <ol style="list-style-type: none"> <li>1 Group B streptococcus</li> <li>2 MRSA</li> <li>3 CONS (see below)</li> <li>4.ESBL organisms</li> <li>5. Fungal (see below)</li> <li>6 Staphylococcus aureus</li> <li>7 Klebsiella</li> <li>8 Pseudomonas</li> <li>9 Acinetobacter</li> <li>10 Others, specify</li> </ol> <p>For CONS: Place a tick if the infant has ALL 3 of the following:</p> <ol style="list-style-type: none"> <li>1. CONS is recovered from a blood culture obtained from either a central line, or a peripheral blood sample and/or is recovered from infant's CSF AND</li> <li>2. Signs of generalized infection (such as apnoea, temperature instability, feeding intolerance, worsening respiratory distress or haemodynamic instability) AND</li> <li>3. Treatment with 5 or more days of IV antibiotics after the above cultures were obtained. If the patient died, was discharged, or transferred prior to completion of 5 days or more of IV antibiotics, this condition would still be met if the intention was to treat for 5 or more days</li> </ol> <p>Do not place a tick if any or all of the above are not true</p> <p>For FUNGAL infection: Place a tick only if a fungus was recovered from a blood culture obtained from either a central line or peripheral blood sample after day 3 of life.</p>
11. Hypoxic ischaemic encephalopathy (HIE) This item only applies to infants with a gestational age of 36 weeks and 0 days or more	<p>HIE requires the presence of all 3 of the following criteria:</p> <ol style="list-style-type: none"> <li>1. Presence of a clinically recognized encephalopathy within 72 hours of birth. Encephalopathy is defined as the presence of 3 or more of the following findings within 72 hours after birth: <ol style="list-style-type: none"> <li>a. abnormal level of consciousness: hyperalertness, lethargy, stupor or coma</li> <li>b. abnormal muscle tone: hypertonia, hypotonia or flaccidity</li> <li>c. abnormal deep tendon reflexes: increased, depressed or absent</li> <li>d. seizures: subtle, multifocal or focal clonic</li> <li>e. abnormal Moro reflex: exaggerated, incomplete or</li> </ol> </li> </ol>

<p><i>HIE severity</i> If the infants diagnosed with HIE, record the worst stage observed during the first 7 days following birth based on the infant's level of consciousness and response to arousal maneuvers such as persistent gentle shaking, pinching, shining a light or ringing of a bell: Tick "None, Mild, Moderate, Severe" for infants of gestational age 36 weeks or more Tick "Not applicable" for infants below 36 weeks gestational age at birth</p>	<p>absent f. abnormal suck: weak or absent g. abnormal respiratory pattern: periodic, ataxic or apnoeic h. oculomotor or papillary abnormalities: skew deviation, absent or reduced Doll's eye or fixed unreactive pupils</p> <p style="text-align: center;"><b>AND</b></p> <p>2. Three or more supporting findings from the following list: a. arterial cord pH&lt;7.00 c. evidence of multiorgan system dysfunction – dysfunction of one or more of the following systems within 72 hours of birth: i. renal: oliguria or acute renal failure ii. GI: necrotizing enterocolitis, hepatic dysfunction iii. haematologic: thrombocytopaenia, disseminated intravascular coagulopathy iv. endocrine: hypoglycaemia, hyperglycaemia, hypercalcaemia, syndrome of inappropriate ADH secretion (SIADH) v. pulmonary: persistent pulmonary hypertension vi. cardiac: myocardial dysfunction, tricuspid insufficiency d. evidence of foetal distress on antepartum monitoring: persistent late decelerations, reversal of end-diastolic flow on Doppler flow studies of the umbilical artery or a biophysical profile of 2 or less e. evidence of CT, MRI, technetium or ultrasound brain scan performed within 7 days of birth of diffuse or multifocal ischaemia or of cerebral oedema f. abnormal EEG: low amplitude and frequency, periodic, paroxysmal or isoelectric</p> <p style="text-align: center;"><b>AND</b></p> <p>3. The absence of an infectious cause, a congenital malformation of the brain or an inborn error of metabolism, which could explain the encephalopathy.</p> <p><i>HIE severity</i> a. Mild (normal or hyperalert) – infants in this category are alert or hyperalert with either a normal or exaggerated response to arousal. b. Moderate (lethargic or stupor) – infants in this category are arousable but have a diminished response to arousal maneuvers c. Severe (deep stupor or coma) – infants in this category are not arousable in response to arousal</p>
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	maneuvers
<p>12. Major Congenital Anomalies State 'Yes' or 'No'. Tick "Yes" if any major congenital anomaly is present even if it is an isolated one (i.e. only one abnormality) If Yes, tick whether it is a 'Known Syndrome', 'Not a Recognised Syndrome' or 'isolated major abnormality' in 12a.</p> <p>If the syndrome is known, tick the specific syndromes or specify it.</p> <p>Proceed to 12b. (Type of Abnormalities) Tick all major abnormalities found for recognisable syndrome, nonrecognisable ones or isolated major congenital abnormality - tick the abnormalities according to the list provided. Please specify if there are abnormalities not listed.</p>	<p>A major congenital abnormality is defined as any abnormality of prenatal origin that if uncorrected or uncorrectable, significantly impairs normal physical or social function or reduce normal life expectancy</p> <p>Any abnormalities of prenatal origin that are present at birth, and do not have surgical, medical or cosmetic importance at the time of examination during the newborn period is a minor congenital abnormality and NOT included in this registry. Examples include isolated findings such as 'low-set ears', sacral dimple or single transverse palmar crease".</p>
<p>13. Inborn Errors of Metabolism (IEM) Tick "Yes" or "No". If "yes", tick either clinical diagnosis or confirmed diagnosis Specify the confirmed diagnosis if any</p>	<p>For clinical diagnosis, tick "yes" only if tandem spectrometry is not available to confirm diagnosis and there are signs such as encephalopathy not otherwise explained, hypoglycaemia, seizures, with or without associated family history or parental consanguineous marriage</p>
<p>14. Respiratory</p> <p>Meconium aspiration syndrome</p>	<p>Tick "yes" if all 5 of the following criteria are satisfied:</p> <ol style="list-style-type: none"> <li>1. Presence of meconium stained amniotic fluid at birth</li> <li>2. Respiratory distress with onset within 1 hour of birth. Respiratory distress will be defined as the presence of one of the following signs: tachypnoea, grunting, nasal flaring or intercostals retractions</li> <li>3. A <math>\text{PaO}_2 &lt; 50\text{mmHg}</math> in room air, central cyanosis in room air or a requirement for supplemental oxygen to maintain a <math>\text{PaO}_2 &gt; 50\text{mmHg}</math></li> <li>4. Abnormal CXR compatible with meconium aspiration: Findings may include coarse irregular or nodular pulmonary densities, areas of diminished aeration or consolidation alternating with areas of hyperinflation, or generalized hyperinflation</li> <li>5. Absence of culture proven early onset bacterial sepsis or pneumonia (ie negative blood culture within 72 hours of birth)</li> </ol>

Pulmonary haemorrhage	Pulmonary haemorrhage originating in the perinatal period (as diagnosed clinically by pink or red frothy liquid draining from the mouth or arising from the trachea between the vocal cord or suctioned through the endotracheal tube. Diagnosis may also be made on autopsy finding of haemorrhage in the lungs)
Pneumonia	Infection of the lungs acquired prepartum, intrapartum, at birth or after birth. (Diagnosed with or without cultures). Diagnosis is made clinically and supported by CXR findings
Transient Tachypnoea of Newborn	Benign disease of near-term, term or large premature infants with respiratory distress shortly after delivery resolving within 3 days.
Pulmonary interstitial emphysema	Dissection of air into the perivascular tissues of the lung from alveolar overdistention or overdistention of the smaller airways evident on CXR as linear or cast-like lucencies with a history of requiring increasing ventilatory support.
15. Central Nervous System	
Neonatal encephalopathy (other than HIE)	Encephalopathy in the infant at or near term during the first seven days of life, manifested by difficulty in initiating and maintaining respiration, depression of tone and reflexes, altered consciousness, and often seizures <b>not</b> fulfilling the criteria for 'Hypoxic ischaemic encephalopathy' (see above)
Neonatal meningitis	Signs of clinical sepsis and evidence of meningeal infection as shown in cerebrospinal fluid findings (i.e. cytology, biochemistry or microbiologic findings)
16. Cardiovascular	
Persistent Pulmonary Hypertension (PPHN)	Failure of normal pulmonary vasculature relaxation at or shortly after birth, resulting in impedance to pulmonary blood flow which exceeds systemic vascular resistance, such that deoxygenated blood is shunted to the systemic circulation

**Appendix 3 Census Forms**  
**National Neonatal Registry**

**MONTHLY BIRTH CENSUS**

Hospital : .....  
 Month : ..... Year : .....  
 Total Births : ..... LiveBirths: ..... Stillbirths: .....

**Deliveries versus Birth Weight**

Birth Weight (grams)	No. of Stillbirths	No. of Live Births	No. Admitted to Neonatal Unit	**No. who Died in Delivery Room
< 500				
500 – 600				
601 – 700				
701 – 800				
801 – 900				
901 – 1000				
1001 – 1250				
1251 – 1500				
1501 – 2000				
2001 – 2500				
>2500				
<b>TOTAL</b>				

\*\* CRF to be filled for each case

**Births versus Mode of Delivery**

Mode of Delivery	No. of Stillbirths	No. of LiveBirths	No. Admitted to Neonatal Unit	**No. who Died in Delivery Room
Spontaneous Vertex (SVD)				
Breech				
Forceps				
Ventouse				
Lower Segment Caesarean Section (LSCS) Elective				
LSCS Emergency				
<b>TOTAL</b>				

\*\* CRF to be filled for each case

### Births versus Ethnic Group

Ethnic Group		No. of Stillbirths	No. of Live Births	No. Admitted to Neonatal Unit	**No. who Died in Delivery Room
Malay					
Chinese					
Indian					
Orang Asli					
Bumiputra Sabah - specify ethnic group					
Bumiputra Sarawak - specify ethnic group					
Foreigner					
Other Malaysian					
TOTAL					

*\*\* CRF to be filled for each case*

**Remarks:**.....  
 .....  
 .....

Name of Site Coordinator:.....

Chop: Date:.....

- *Birth census should be sent together with the tracking forms and the completed CRFs of discharges for the month by the end of the following month. Samples of tracking forms are as follows.*



## Appendix 4 CRF 2008

MALAYSIAN NATIONAL NEONATAL REGISTRY (CRF 08)			
Centre Name: _____		<input type="checkbox"/> Stillbirth <input type="checkbox"/> Livebirth	Office use: _____ / _____
Date of Admission: _____ (dd/mm/yy)		<input type="checkbox"/> New Case <input type="checkbox"/> Readmission <input type="checkbox"/> Referral from, if relevant: _____	Centre: _____
<b>SECTION 1 : PATIENT PARTICULARS</b>			
1. Name:			2. RN:
3. Mother's I/C Number:	New IC: _____	Passport: _____	
4. Date of Birth:	(dd/mm/yy)		
5. Ethnic group:	<input type="checkbox"/> Malay <input type="checkbox"/> Indian <input type="checkbox"/> Bumiputra Sabah, specify: _____ <input type="checkbox"/> Other M'sian <input type="checkbox"/> Chinese <input type="checkbox"/> Orang Asli <input type="checkbox"/> Bumiputra Sarawak, specify: _____ <input type="checkbox"/> Non-citizen		
6. Maternal Age:			
7. GPA:	G: _____	P: _____	A: _____
8. Insulin dependent diabetes in mother:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Available		
<b>SECTION 2 : BIRTH HISTORY</b>			
Drugs Used In Labour	9. Antenatal Steroid:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
	10. Intrapartum Antibiotic:	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	
11. Birth Weight:	(grams)		
12. Gestation:	(weeks)		
13. Growth Status:	<input type="checkbox"/> SGA <input type="checkbox"/> AGA <input type="checkbox"/> LGA		
14. Gender:	<input type="checkbox"/> Male <input type="checkbox"/> Female <input type="checkbox"/> Indeterminate		
15. Place of Birth:	<input type="checkbox"/> Inborn <input type="checkbox"/> Outborn → <div style="display: inline-block; border: 1px dashed black; padding: 2px;"> <input type="checkbox"/> University Hospital <input type="checkbox"/> District Hospital with Specialist <input type="checkbox"/> Home  <input type="checkbox"/> General Hospital <input type="checkbox"/> District Hospital without Specialist <input type="checkbox"/> Others, specify: _____  <input type="checkbox"/> Private Hospital <input type="checkbox"/> Private Maternity Home         </div>		
16. Multiplicity: <i>Check only one</i>	<input type="checkbox"/> Singleton <input type="checkbox"/> Twin <input type="checkbox"/> Triplet <input type="checkbox"/> Others, specify: _____		
17. Mode of Delivery:	<input type="checkbox"/> SVD <input type="checkbox"/> Ventouse <input type="checkbox"/> Breech <input type="checkbox"/> Caesarean Section <input type="checkbox"/> Forceps <input type="checkbox"/> Unknown		
18. Apgar score at 1 min and 5 min (1-10) :	a) Score at 1min: _____ b) Score at 5 min: _____ c) <input type="checkbox"/> Not Available		
19. Initial resuscitation : <i>Check all that apply</i>	<div style="display: flex; justify-content: space-between;"> <div>           a) Oxygen: <input type="checkbox"/> Yes <input type="checkbox"/> No            b) Bag-mask vent: <input type="checkbox"/> Yes <input type="checkbox"/> No            c) Endotracheal tube vent: <input type="checkbox"/> Yes <input type="checkbox"/> No         </div> <div>           d) Cardiac Compression: <input type="checkbox"/> Yes <input type="checkbox"/> No            e) Adrenaline: <input type="checkbox"/> Yes <input type="checkbox"/> No         </div> </div>		
<b>SECTION 3 : NEONATAL EVENT</b>			
20. Respiratory Support: <i>Check all that apply</i>	<input type="checkbox"/> Yes → <div style="display: inline-block; border: 1px dashed black; padding: 2px;"> <input type="checkbox"/> Oxygen <input type="checkbox"/> Conventional Ventilation <input type="checkbox"/> Nitric Oxide  <input type="checkbox"/> CPAP <input type="checkbox"/> HFOV         </div> <input type="checkbox"/> No		
21. Total Duration of Ventilatory Support:	_____ (in days)		
22. Surfactant:	<input type="checkbox"/> Yes → <div style="display: inline-block; border: 1px dashed black; padding: 2px;"> <input type="checkbox"/> &lt; 1 hr <input type="checkbox"/> 1- 2 hrs <input type="checkbox"/> &gt; 2 hrs         </div> <input type="checkbox"/> No		
23. Post Natal Steroid for CLD:	<input type="checkbox"/> Yes <input type="checkbox"/> No		
24. Parenteral Nutrition:	<input type="checkbox"/> Yes <input type="checkbox"/> No		
25. Enteral Nutrition on discharge:	<input type="checkbox"/> Yes → <div style="display: inline-block; border: 1px dashed black; padding: 2px;"> <input type="checkbox"/> Exclusive breast feeding / breastmilk feeds <input type="checkbox"/> Exclusive formula feeds <input type="checkbox"/> Mixed feeds         </div> <input type="checkbox"/> No		
26. Ultrasound of Brain done at ≤ 28 days of life	<input type="checkbox"/> Yes <input type="checkbox"/> No		



## **Appendix 5 Presentations**

### **POSTERS, ABSTRACTS AND PAPERS PRESENTED**

1. Cheah IGS. Neonatal Survival based on 2008 data. Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2010
2. Cheah IGS. Respiratory Outcome and Morbidity in Preterm Infants on 2008 data. Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2010
3. Cheah IGS. Morbidity Data across Centres and Benchmarking, Sharing Experiences on 2008 data. Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2010
4. Boo NY. NEC and Quality Improvement on Prevention of NEC. Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2010
5. Boo NY. Quality Improvement on Infection Control in the NICU. Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2010
6. Lee JKF. Meconium Aspiration Syndrome (MAS) Outcome. Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2010
7. Soo TL. Confirmed Sepsis 2008. Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2010
8. Ramli N. Intraventricular Haemorrhage and Retinopathy of Prematurity 2008. Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2010
9. Thong MK. Congenital Anomalies (2008). Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2010
10. Abdul Latif Z. Feeding patterns at MNNR hospitals 2008. Presented at the MNNR SDP Meeting, Selayang Hospital, Selangor Malaysia, 2011
11. Cheah IGS. Audit and Benchmarking of Neonatal Intensive Care of Very Low Birth Weight infants in Malaysian NICU's. 4<sup>th</sup> National Conference for Clinical Research (NCCR'10). Kuala Lumpur, Malaysia, 2010
12. Cheah IGS. Very Low Birthweight (VLBW) Inborn versus Outborn Neonates in MNNR at 4<sup>th</sup> National Conference for Clinical Research (NCCR'10). Kuala Lumpur Malaysia, 2010.
13. Lee JKF. Predictors of Mortality in Very Low Birth Weight (VLBW) Infants in MNNR 2008. 5<sup>th</sup> National Conference for Clinical Research 2011 (NCCR '11). Petaling Jaya Selangor Malaysia, 2011
14. Lee JKF and Cheah IGS. Ventilated Meconium Aspiration Syndrome (MAS) outcome in MNNR 2008. 18<sup>th</sup> Annual Congress of the Perinatal Society of Malaysia (PSM). Penang Malaysia, 2011

## **ABBREVIATIONS**

BW	Birthweight
CA	Congenital Abnormalities
CLD	Chronic Lung Disease
CPAP	Continuous Positive Airway Pressure
CRC	Clinical Research Centre MOH
CRF	Case Report Form
CUS	Cerebral Ultrasound Scan
ELBW	Extremely Low Birth Weight
HFOV	High Frequency Oscillatory Ventilation
HFPPV	High Frequency Positive Pressure Ventilation
IMV	Intermittent Mandatory Ventilation
IMV + PTV	Intermittent Mandatory Ventilation + Patient -Triggered Ventilation
LSCS	Lower Segment Caesarean Section
MAS	Meconium Aspiration Syndrome
NE	Neonatal Encephalopathy
NEC	Necrotising Enterocolitis
NICU	Neonatal Intensive Care Unit
NNU	Neonatal Unit
NO	Nitric Oxide
NRU	Neonatal Registry Unit
PN	Parenteral Nutrition
PTX	Pneumothorax
RDS	Respiratory Distress Syndrome
ROP	Retinopathy of Prematurity
Rx	Treatment
SVD	Spontaneous Vertex Delivery
VLBW	Very Low Birth Weight
VS	Ventilatory Support



