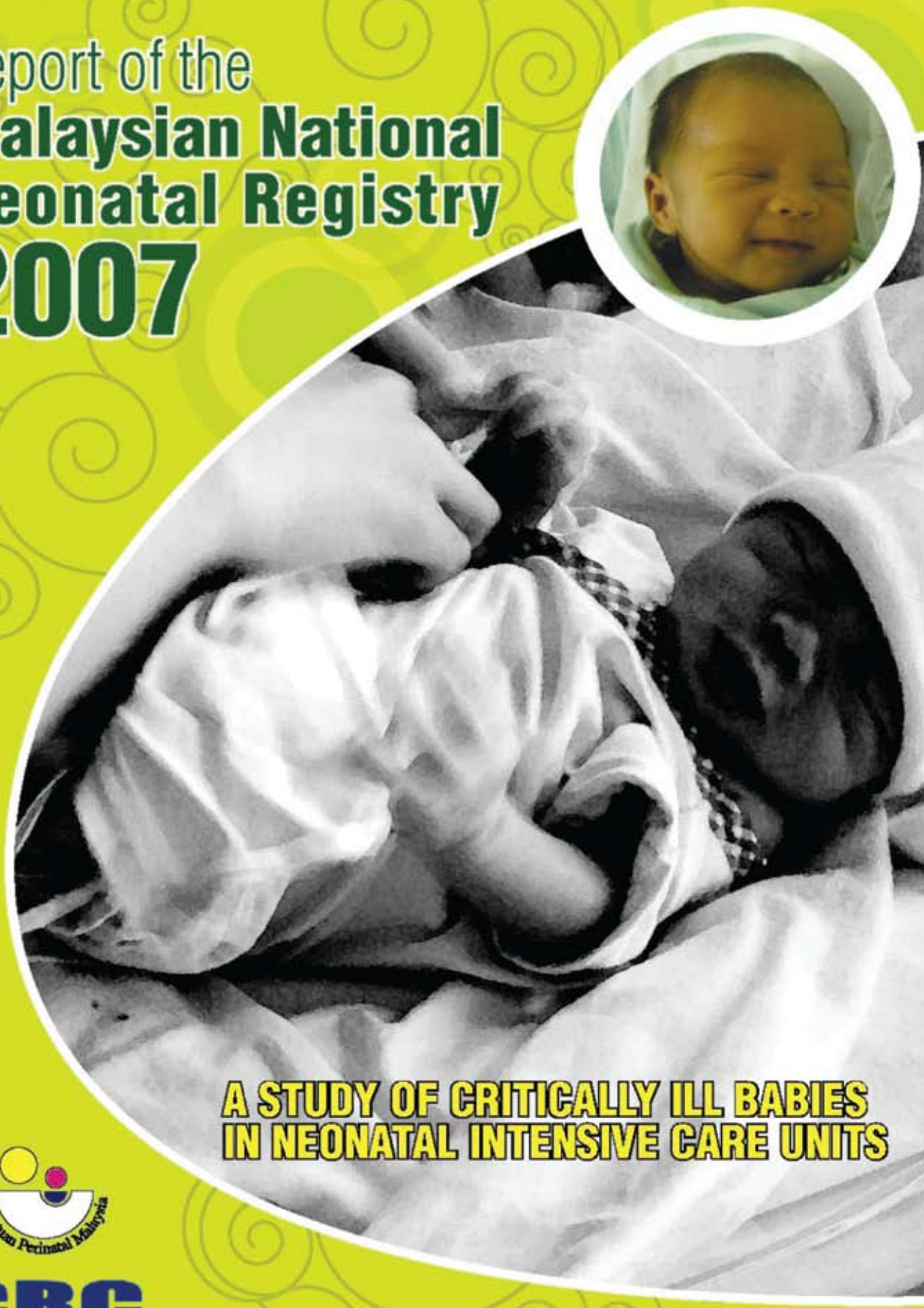
Report of the Malaysian National Neonatal Registry 2007



A STUDY OF CRITICALLY ILL BABIES IN NEONATAL INTENSIVE CARE UNITS

Pertubuhan Perinatal Malaysia

CRC
MINISTRY OF HEALTH MALAYSIA
Research that matters to patients

Ministry of Health Malaysia

Editor:
Irene Cheah Guat Sim

With contributions from:
Alvin Chang Shang Ming, Jimmy Lee Kok Foo, Boo Nem Yun, Thong Meow Keong, Soo Thian Lian, Hans van Rostenberghe

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FOREWORD

The study centres comprise 31 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 72777 are admitted for neonatal care and 10835 babies in 2007 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.B. Tan Sri Dato' Seri Dr Hj Mohd Ismail Merican, Dr Lim Teck Onn, Dr Hussain Imam and Dr Goh Pik Pin for their constant support. We would also like to record our gratitude to the late Dato' Dr Lim Nyok Ling, the past Chairman, for having persevered in the setting up and building the foundations of this registry.

This is the fourth annual report on the 'Outcome of Critically Ill Babies in the Neonatal Intensive Care Units (NICUs) in Malaysia. The rich data collected allows 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.

It is hoped that private and more university-based hospitals will join the Malaysian National Neonatal Registry (MNNR) so as to obtain a more comprehensive picture of the care of critically ill babies in Malaysia.

Dr. Irene Cheah Guat Sim
Chairman
Malaysian National Neonatal Registry

SUMMARY

The inclusion criteria for this study in 2007 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 2007, there was a total of 249468 births in the 31 participating centres, of which 2081 were stillbirths and 247387 were livebirths. Out of these, 10835 babies, who were in level III NICUs, met the study criteria, 3203 were preterm babies below 32 weeks gestational age, and 3651 babies were of birth weights of 1500 g and below.

Results:

- Twenty-four percent (24%) of the study population were small for their gestational age. The trend towards an increase in the percentage of SGA babies amongst the VLBW babies and those of gestational ages 32-36 weeks from years 2004-2006, appears to be leveling off in the year 2007 (Figure 5 & Figure 6).
- Babies born to mothers of *Orang Asli* ethnicity continued to have the highest risk, fulfilling the study criteria at 9 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 Sarawak* and *Bumiputra Sabah* ethnicity).
- In 2007, 60% of mothers of 25-33 weeks' gestation received antenatal steroids (Figure 14). There were marked differences in the use of antenatal steroids across centres, varying from 24-90% of preterm babies below 32 weeks gestational age (GA).
- Eight thousand five hundred and eighty three out of the 10835 (83.0%) babies were inborn. For babies of less than 32 weeks' gestation, 2802 out of 3203 (87.4%) were inborn. The overall maternal steroids used were only 59%, with 63% used in inborn babies and 26% in the outborn. Inborn babies had a better survival rate in all the birth weight categories with the greatest difference in the 701-900 birthweight category.
- The Caesarean section rate for VLBW babies in the MNNR was 46%, 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 (55%) between 1001-1500 g birthweight. The Caesarean section rate of 23% for the ELBW babies (see Figure 18) is relatively low and may impact on the survival outcome.
- Eighty three percent (83%) of the overall cohort required ventilatory support as in the year 2006. 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 30 days for those between 501-750 g birthweight(BW), 19 days for those 751-1000 g BW, eight days for those between 1001-1500 g BW and four days for those of more than 2500 g BW.

- Continuous positive airway pressure support as a mode of respiratory support was used alone only in 23.4% of the babies, with the highest rate of use (33%) 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.

- Two thousand six hundred and twenty five (2625) babies had Respiratory Distress Syndrome and required ventilatory support. Only 57% 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 0-86%.
- 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-conceptional age were 18.9% and 5.5% respectively; a drop from 46.2% and 18.3% respectively, in 2004. The rates among babies with birth weights 1001-1500g were 7.0% and 2.3% at Day 28 and 36 weeks post-conceptional age respectively.
- Postnatal steroids for chronic lung disease was given to 10.1% of those with birth weights $\leq$1000g and 4.6% of those with birth weights 1001 -1500g (Table 21).
- Four hundred and forty three (443; 4.1%) of the entire cohort had developed pneumothorax with high mortality in the preterm babies. Overall mortality in this group was 40%, increasing to 60% as birthweight and gestational age fell. There was a significantly lower proportion of babies with pneumothorax in the nasal CPAP therapy only group.
- The overall mortality for babies ventilated for meconium aspiration syndrome (MAS) was 15.7%. In the group receiving nitric oxide for persistent pulmonary hypertension associated with MAS, the mortality was reduced to 25% from a near 100% mortality without nitric oxide.
- Nine percent (9%) of all livebirths (n=944) in the 31 centres were ventilated for hypoxic ischaemic encephalopathy (HIE). Twenty four percent (24%) of these babies (n=222) with HIE were of severe grade; among whom 59.9% (n=133) died. In comparison, only 7.1% of the babies with mild or moderate HIE on ventilatory support died.
- About nine percent (9.2 %) of the ELBW babies and 2 % of the babies with a birth weight between 1001-1500 g had grade 4 IVH. There was a downward trend in mortality from severe intraventricular haemorrhage over the years, from 60% in 2005 and 55% in 2006 to 52% in 2007.
- Seventy (5.9%) of the babies with BW 501-1000 g and 31 (1.3%) of those between 1000-1500 g BW had developed Grade 3, 4 or 5 retinopathy of prematurity(ROP). The rate of babies who had not been screened prior to discharge seems to be decreasing in the year 2007, others being screened as outpatients (see Figure 38).
- About fifteen percent (15.1% - 1634/10835) of babies had congenital anomalies. The incidence of congenital anomaly was 152 per 1000 births. Among babies with congenital anomalies, the mortality rate was 58.4%.
- Eleven percent (11%) of babies had had one or more episodes of confirmed bacterial sepsis. In this group, mortality rate was reduced from 26.2% in year 2006 to 22% in year 2007. The infection rate was highest (21%) in the 25-27 weeks, gestation group followed by 15% in the 28-31 weeks' group.

- The overall survival to discharge had increased from 77% in year 2004 to 82% in 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 20% survival rate for the 601-700 g birthweight group to 45% survival rate for the 701-800 g birth weight group. Survival rate for the 1001-1100 g birth weight group had increased to above 80%.
- The survival rate of babies between 1001-1500 g birthweight, which is the key performance index for government NICUs, according to centres, varied from 71-96%, being above 85% for 24 out of the 31 centres.
- The survival rate of babies between 501-1000 g birthweight varied from 23-70%.

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 grades 4 & 5.

Report of the Malaysian National Neonatal Registry (MNNR) 2007

1. Organisation 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 2007 (in alphabetical order):

1. Hospital Alor Setar, Kedah
2. Hospital Batu Pahat, Johore
3. Hospital HUSM, Kelantan
4. Hospital Ipoh, Perak
5. Hospital Kangar, Perlis
6. Hospital Kajang, Selangor
7. Hospital Keningau, Sabah
8. Hospital Kota Bahru, Kelantan
9. Hospital Kuala Lumpur, Kuala Lumpur Federal Territory
10. Hospital Kuala Terengganu, Terengganu
11. Hospital Likas, Kota Kinabalu, Sabah
12. Hospital Melaka, Melaka
13. Hospital Miri, Sarawak
14. Hospital Muar, Johore
15. Hospital Pulau Pinang, Pulau Pinang
16. Hospital Putrajaya, Putrajaya Federal Territory
17. Hospital Seberang Jaya, Pulau Pinang
18. Hospital Selayang, Selangor
19. Hospital Serdang, Selangor
20. Hospital Seremban, Negri Sembilan
21. Hospital Seri Manjung, Perak
22. Hospital Sibu, Sarawak
23. Hospital Sg. Buloh, Selangor
24. Hospital Sg. Petani, Kedah
25. Hospital Sultanah Aminah, Johor Bharu, Johore
26. Hospital Taiping, Perak
27. Hospital Tengku Ampuan Rahimah, Klang, Selangor
28. Hospital Tengku Ampuan Afzan, Kuantan, Kelantan
29. Hospital Teluk Intan, Perak
30. Hospital Temerloh, Pahang
31. Hospital Umum Sarawak, Kuching, Sarawak

Hospital Serdang joined the MNNR in 2007. 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 2007, and 31 of these NICUs are source data producers (SDPs) of the MNNR (30 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 in the study, although the latter hospitals do manage the ELBW (extremely low birth weight babies) in smaller numbers. There are neonatologists in 12 out of 17 of the state hospitals/larger NICUs.

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 minimise errors are continually refined.

3. Results

3.1 In General

In 2007, total births in the 31 participating centres totaled was 249468; of which 2081 were stillbirths and 247387 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 10835 babies who were admitted met the criteria to be included in the MNNR (Table 1). Of these 3203 (29.5%) were less than 32 completed weeks' gestation (Table 2) and 3651 (33.7%) had birth weights of 1500 g and below. A total of 1240 babies (11.4%) were of birth weights 1000 g and below (Figure 1, Table 3).

There were more babies in the 2006 and 2007 cohort compared to in 2004-2005 (Figures 1 and 2); with increased numbers in the babies of more than 37 weeks' gestation and more than 2500 g birth weight (Figures 2 and 3).

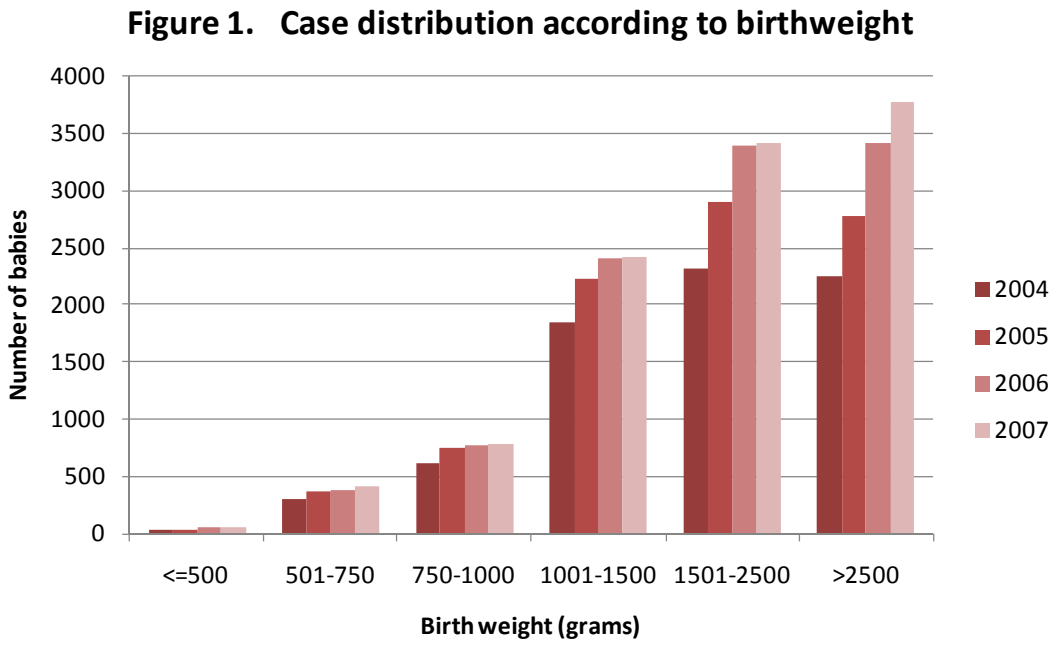


Figure 1. Case distribution according to birthweight

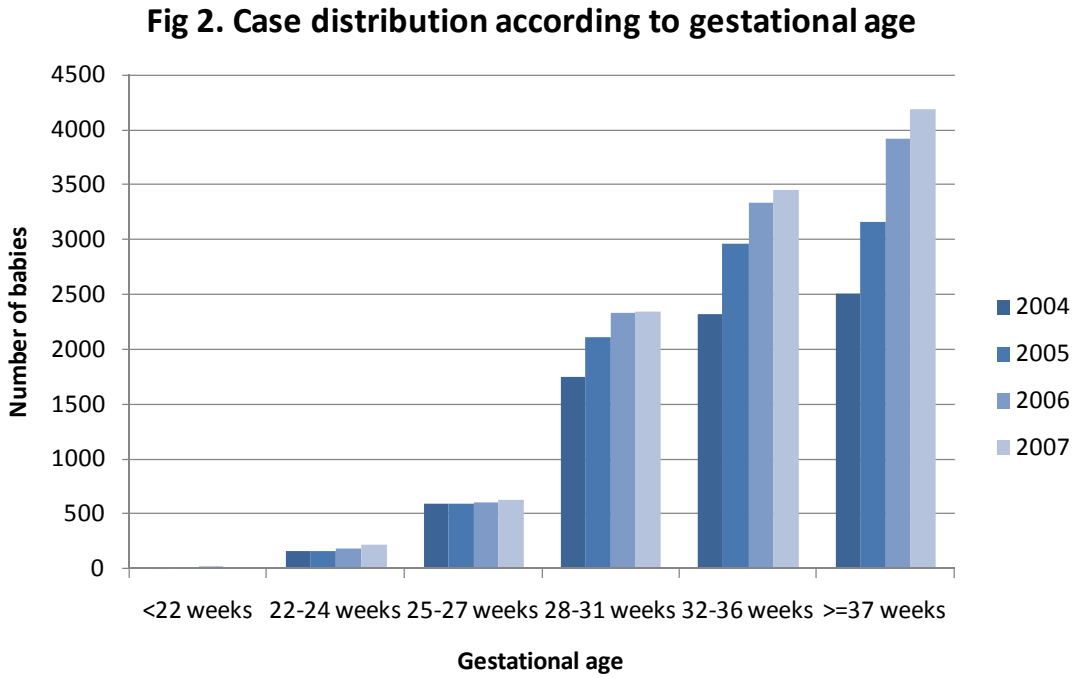


Figure 2. Case distribution according to gestational age

Fig. 3 Percentage of babies according to gestational age by year 2004-2007

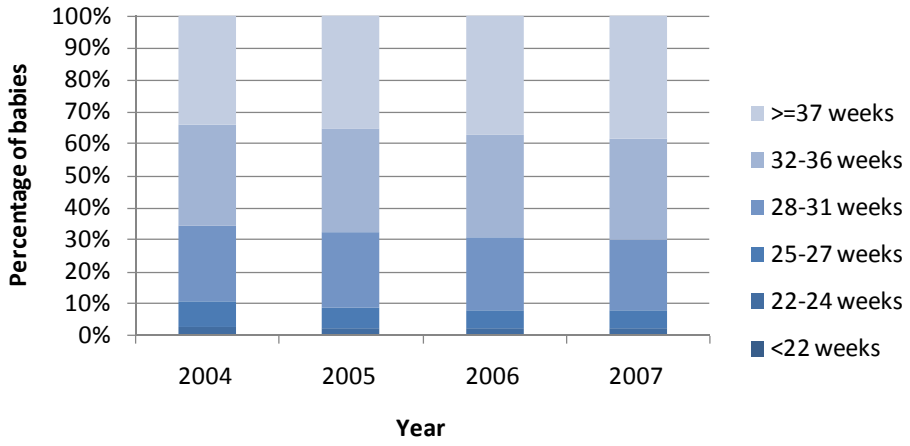
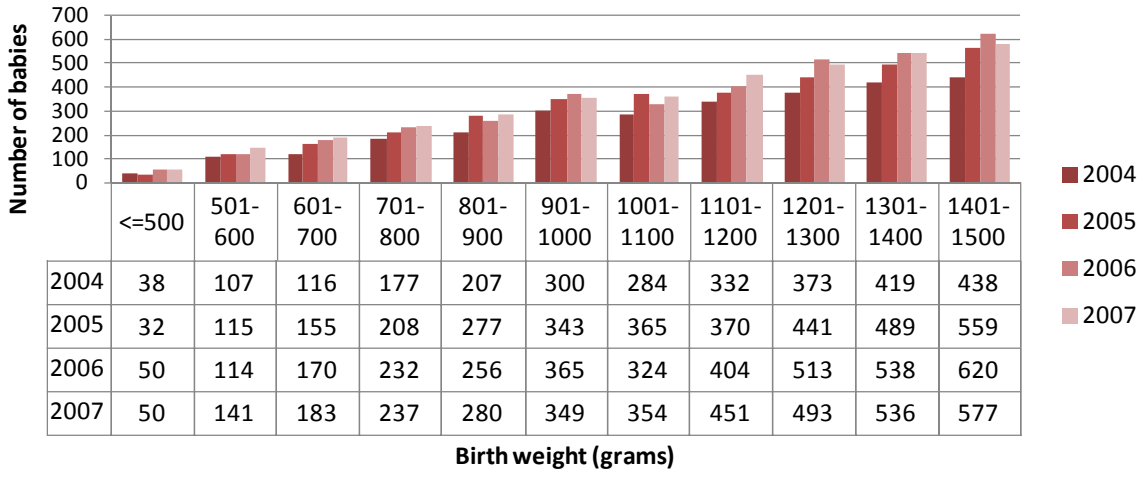


Figure 3. Percentage of babies according to gestational age by year

The babies who met the criteria for the study, totaling 10835, 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 31 centres totaled 72777 based on census collected concurrently by the NICUs; an increase of 8671 babies from 2006. Although there was an additional centre, this only accounted for 1129 additional cases to the MNNR.

Of the 247387 babies delivered in the 31 MNNR hospitals, about 1.5% of the total livebirths (in the MNNR hospitals) 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. 3408 out of 30873) and 1.8% (of all livebirths) with birth weights above 2500 g, (i.e. 3776 out of 212893) met the MNNR study criteria.

Fig. 4 Number of babies <1500g birthweight, Years 2004-2007



	<=500	501-600	601-700	701-800	801-900	901-1000	1001-1100	1101-1200	1201-1300	1301-1400	1401-1500
2004	38	107	116	177	207	300	284	332	373	419	438
2005	32	115	155	208	277	343	365	370	441	489	559
2006	50	114	170	232	256	365	324	404	513	538	620
2007	50	141	183	237	280	349	354	451	493	536	577

Figure 4. Number of babies <1500g birthweight, Years 2004-2007

3.1.1 Growth status

In terms of growth status, 2615 babies (24% of the whole study population) were small for their gestational age (SGA < 10th centile for gestation according to the revised intrauterine growth curves by Kitchen W.H. et al[1]). The SGA rate for very preterm babies (gestation <32 weeks) was 18% and VLBW babies (BW 501-1500g) was 35% (Tables 7 and 7a).

The trend towards an increase in the percentage of SGA babies amongst the VLBW babies and those of gestational ages 32-36 weeks from years 2004-2006 appears to have leveled off in the year 2007 (Figure 5 & Figure 6).

Fig 5. Percentage of SGA babies in various birthweight groups

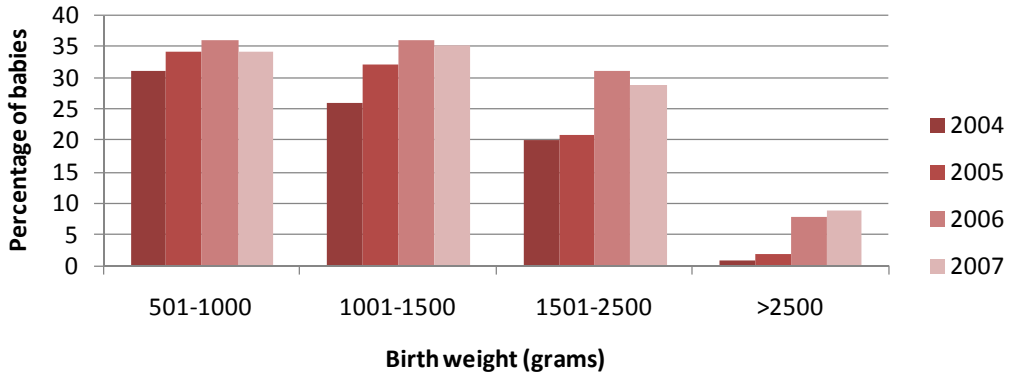


Figure 5. Percentage of SGA babies in various birthweight groups

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

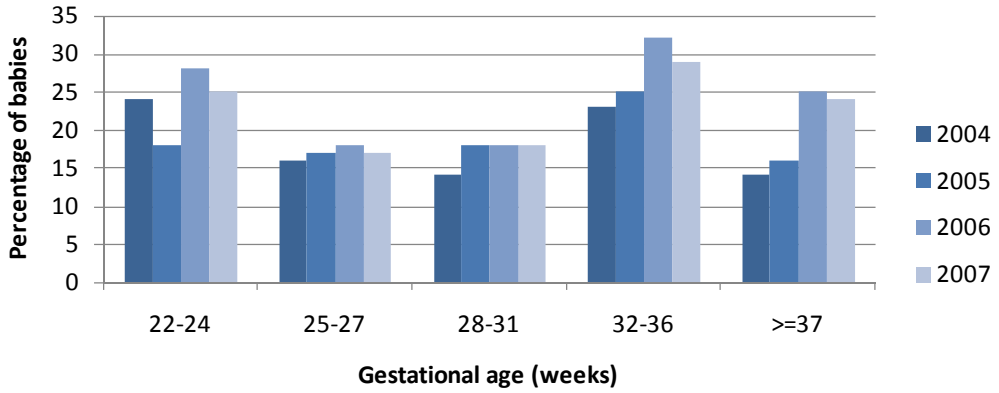


Figure 6. Percentage of SGA babies in various gestational age groups

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

LGA babies comprise 1.3 % of the VLBW babies and 8.3% of critically ill babies of birth weight more than 2500 g and 5% of term babies in the MNNR study in 2007. The number of LGA babies increased over the years due to overall increased recruitment, but the percentage remains stable (see Tables 7 and 7a, Figure 7)

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

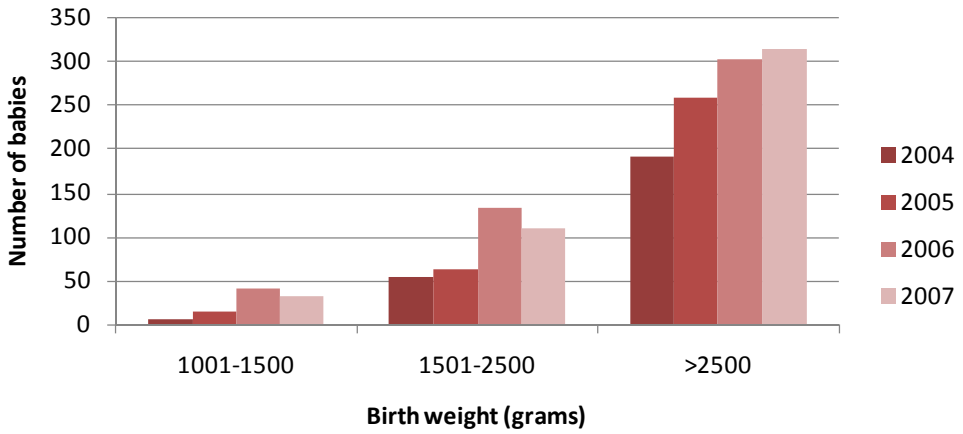


Figure 7. Number of babies with LGA growth status according to birth weight

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 96 to 847. These numbers reflected the size of the centre, the case mix of their patients and the geography and population distribution of each area.

The relative number of babies in the study group relative to the number of babies admitted to NICUs and the total livebirths per centre is shown in Figure 8. The percentage of MNNR babies (i.e. the more critically ill babies) varied between 2.5% and 6.9% between centres, with a mean of 4.3%. The centres with a descending percentage of critically ill babies according to MNNR definition are shown in Figure 9. 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).

Fig. 8 Number of babies in the MNNR relative to number of NICU admissions and number of centre livebirths

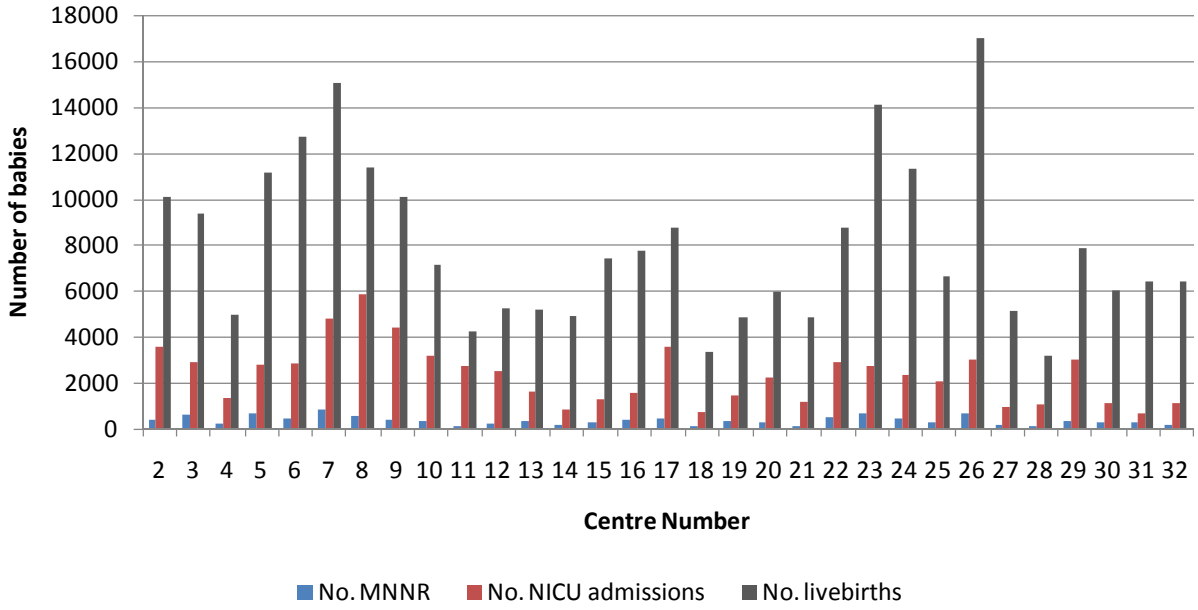


Figure 8. Number of babies in the MNNR relative to number of NICU admissions and number of centre livebirths

Fig. 9 Percentage of livebirths meeting MNNR criteria per centre

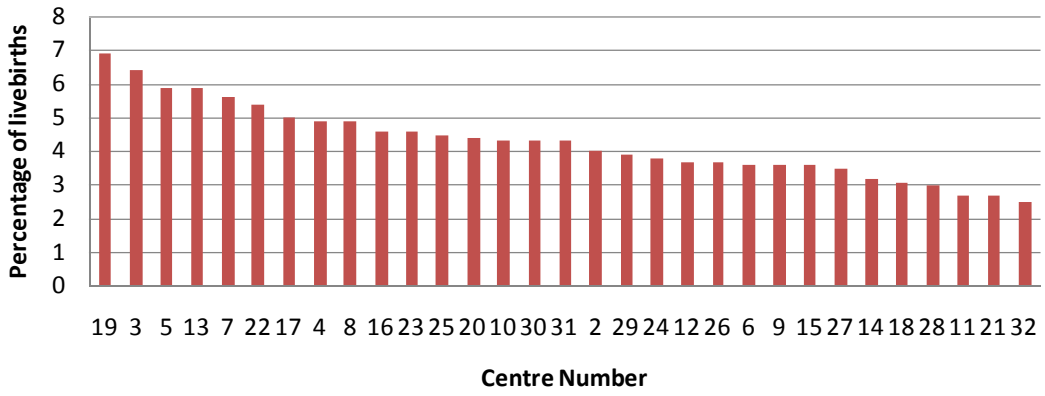


Figure 9. Percentage of livebirths meeting MNNR criteria per centre

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.

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Fig. 10 Number of babies in MNNR, by centre and gestational age

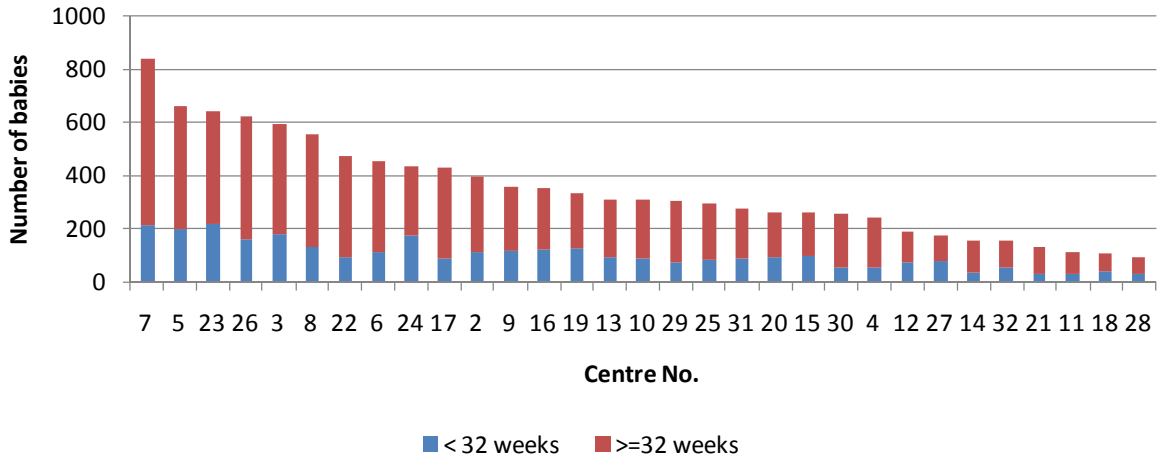


Figure 10. Number of babies in MNNR, by centre

3.2 The Mother

Ethnic distribution (according to mother's ethnicity) was 62.8% Malays, 10.7% Chinese, 7.3 % Indians, 1.4 % Orang Asli, 5.1% Bumiputra Sabah, 5.2% Bumiputra Sarawak, 0.7% Other Malaysians and 6.8% Foreigners (Table 4). This was similar to previous years.

Table 4a shows a much higher percentage of Orang Asli babies born in the SDP hospitals that met the MNNR criteria (9%), i.e. they were more ill or of very low birth weight, preterm or having significant congenital abnormalities; followed by Bumiputra Sarawak, Indian and Bumiputra Sabah. 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 4a, Figure 11).

Table 4i. Ethnic distribution of livebirths (LB) in SDP hospitals vs. Distribution in study

Ethnicity	No. of livebirths in SDP hospitals	No. of babies in MNNR	Incidence of each ethnic group in MNNR (per 1000 LB)
Malays	167174	6811	4.1
Chinese	24086	1162	4.8
Indian	14915	759	5.1
Orang asli	1749	158	9.0
Bumiputra Sabah	10871	556	5.1
Bumiputra Sarawak	10479	560	5.3
Other Malaysians	3238	81	2.5
Foreigners	14875	745	5.0

Fig. 11 Number of MNNR babies according to ethnicity, Years 2004-2007

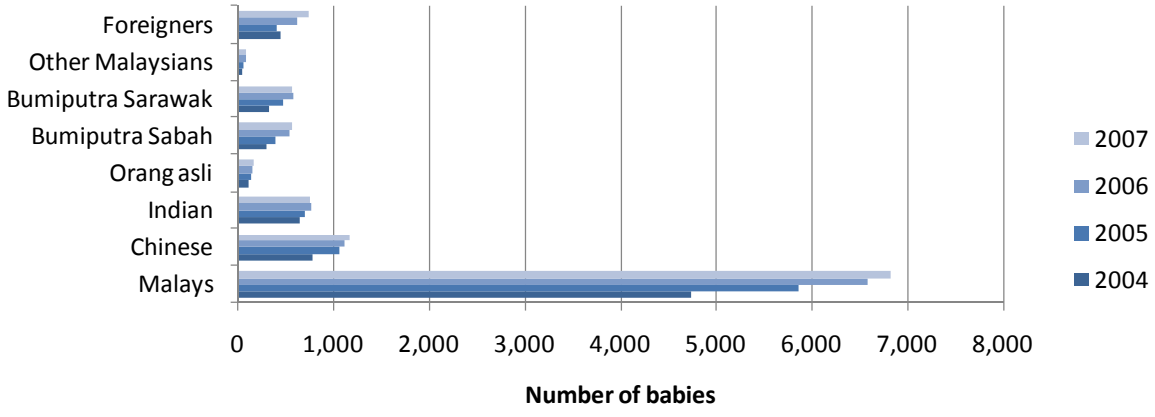


Figure 11. Number of MNNR babies according to ethnicity, Years 2004-2007

3.3 Use of Antenatal steroids

Corticosteroids are administered to the mother to enhance the maturation of the preterm baby's lungs. The first randomised controlled trial of steroid use was in New Zealand, in 1970 (Liggins & Howie, 1972). 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,

without harmful effects for mother and baby. The Perinatal Society of Malaysia in collaboration with the Ministry of Health of Malaysia has recommended that maternal corticosteroids should be considered before all births at less than 34 weeks' gestational age in order to improve neonatal outcomes[2].

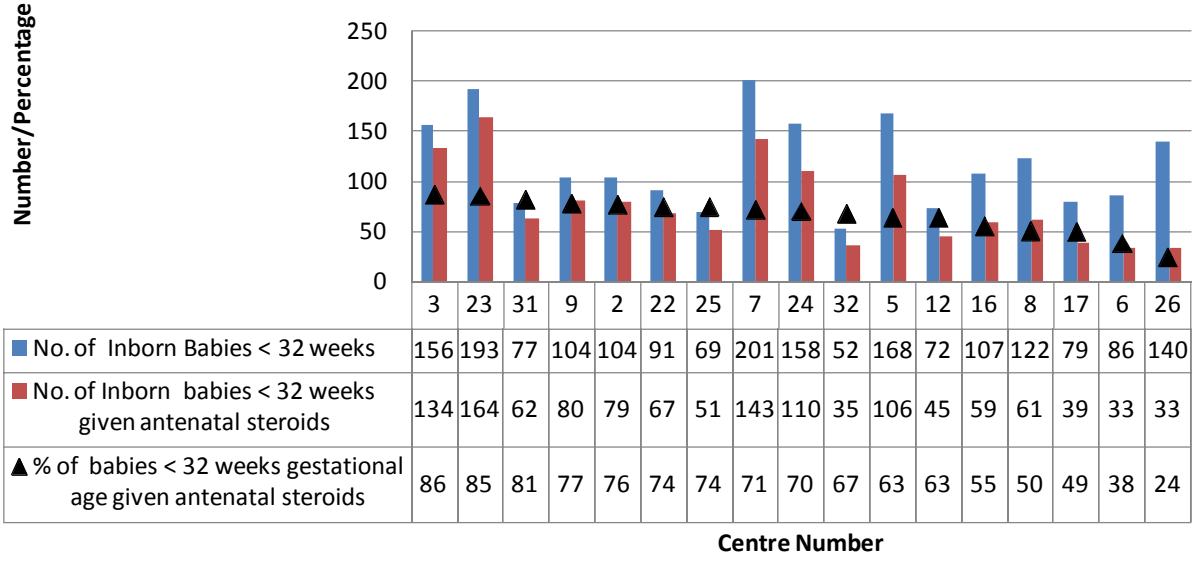
Maternal antenatal steroids were given to 61.0% of babies born less than 32 weeks' gestation. About eighty three percent; 1637/1955 (83.7%) of them had respiratory distress syndrome, of which 1528/1637 (93.3%) and 211/1637 (12.9%) received ventilatory support and CPAP only, respectively. This is in comparison to 828/1139 (72.3%) of those born less than 32 weeks' gestation who did not receive antenatal steroids and had a diagnosis of RDS. A smaller percentage of those of who did not receive antenatal steroids, i.e. 732/828 (88.4%) and 107/828 (12.9%) required ventilatory support and CPAP only, respectively (Table 58a). 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. Another possible reason was that most of the extreme preterm babies were expected to require CPAP to keep the chest splinted or ventilation for apnoea of prematurity.

Maternal antenatal steroids was given to only 58.5% of babies born with birth weight less than or equal to 1500 g. About seventy seven percent (1652/2137 - 77.3%) of them had respiratory distress syndrome of whom 1524/1652 (92.3%) and 229/1652 (13.9%) received ventilatory support and CPAP only, respectively. About sixty three percent (875/1382 - 63.3%) of those born less than 32 weeks' gestation did not receive antenatal steroids and had a diagnosis of RDS. About eighty seven percent (763/875 - 87.2%) and 120/875 (13.7%) 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 40), ranging from 24%-86% in Level IIIB hospitals and 7%-90% in Level IIIA hospitals.

[2] Clinical Practice Guidelines, Perinatal Society of Malaysia 1995 updated 2001

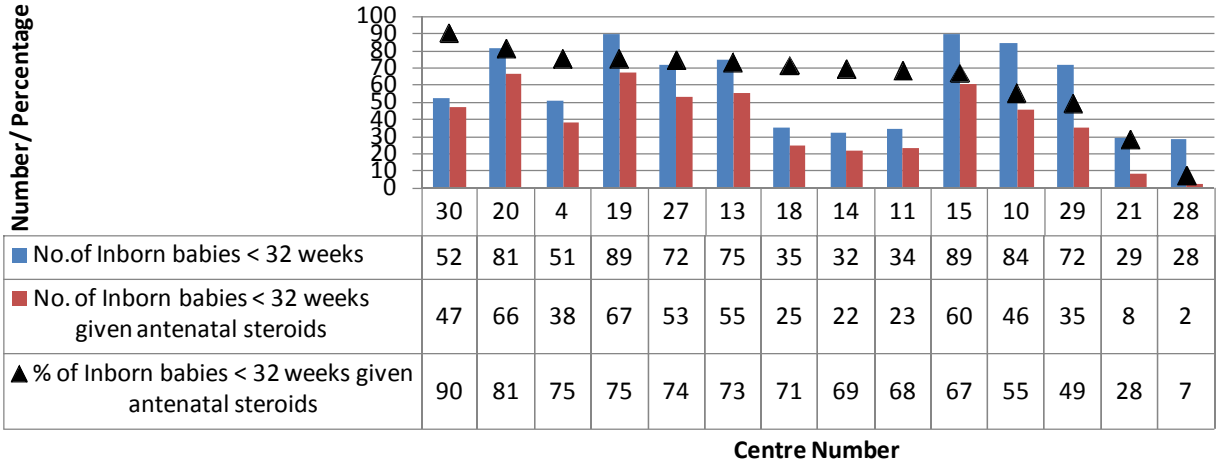
Fig . 12 Number and percentage of inborn babies <32 weeks gestational age in Level IIIB hospitals who received antenatal steroids



	3	23	31	9	2	22	25	7	24	32	5	12	16	8	17	6	26
No. of Inborn Babies < 32 weeks	156	193	77	104	104	91	69	201	158	52	168	72	107	122	79	86	140
No. of Inborn babies < 32 weeks given antenatal steroids	134	164	62	80	79	67	51	143	110	35	106	45	59	61	39	33	33
▲% of babies < 32 weeks gestational age given antenatal steroids	86	85	81	77	76	74	74	71	70	67	63	63	55	50	49	38	24

Figure 12. Number and percentage of inborn babies <32 weeks gestational age in Level IIIB hospitals who received antenatal steroids

Fig. 13 Number and Percentage of Inborn babies <32 weeks gestational age in Level IIIA Hospitals who received antenatal steroids



	30	20	4	19	27	13	18	14	11	15	10	29	21	28
No.of Inborn babies < 32 weeks	52	81	51	89	72	75	35	32	34	89	84	72	29	28
No. of Inborn babies < 32 weeks given antenatal steroids	47	66	38	67	53	55	25	22	23	60	46	35	8	2
▲% of Inborn babies < 32 weeks given antenatal steroids	90	81	75	75	74	73	71	69	68	67	55	49	28	7

Figure 13. 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). ***There is an increasing trend in the use of antenatal steroids per gestational age below 34 weeks from 2005-2007.***

In the UK National Neonatal Audit Programme May 2009[3], which involved 178 neonatal units, the national average for antenatal steroids usage was 60% of babies between 24 and 34 weeks gestational age.

Under the California Perinatal Quality Care Collaborative quality improvement programme[4], 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%.

Fig. 14 Use of antenatal steroids according to gestational age, 2005-2007

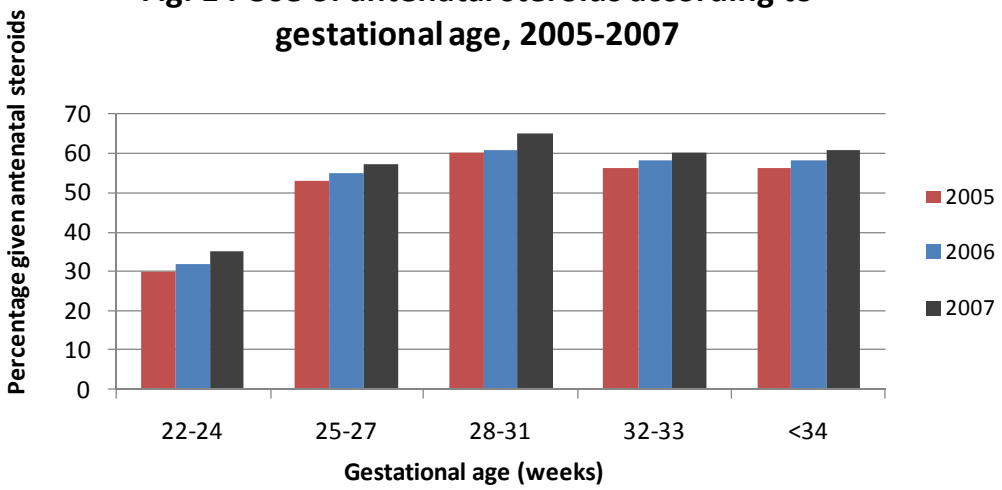


Figure 14. Use of antenatal steroids according to gestational age, 2005-2007

3.4 The baby

3.4.1 Gender

Fifty seven percent (6194/10835) were males and 42% (4592/10835) were females. Gender was indeterminate in 48 babies (0.4%) (see Table 8). As there are relatively more males admitted

[3] Annual report for National Neonatal Audit Programme, Royal College of Paediatrics and Child Health, UK 2009

[4] Wirtschafter et al. *The Journal of Pediatrics*, 148, (5):606-612.e1

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). Male babies ≥2500 g birth weight were 1.3 times more likely than the females to have met the MNNR criteria. Similarly male babies of term gestation were 1.5 times more likely than female babies to have met the MNNR criteria.

3.4.2 Multiple births

Ninety one percent (n=9895) were singletons, 8% (n=869) twins, and 1% (n=61) triplets in the study (See Tables 11 and 11a).
A total of 940 (8.6%) babies in the study were from multiple births. Thirteen percent of preterm babies were from multiple births.

3.5 Birth

3.5.1 Inborn vs. Outborn Babies

Babies were usually cared for in the hospital of their births. However some high-risk babies may need to be transferred to a hospital with aLevel III NICU, if care is being received at a hospital without NICU facilities. When this risk was anticipated, both mother and baby may be transferred before birth (in-utero), or if risk was not anticipated, the baby is transferred only after being born (ex-utero). Transfer was usually made to the nearest NICU with an available bed, and in most places an escort transport system was used. Sometimes this transfer may have to be made to a NICU which was far away from the referring unit. The odds of death or major morbidity for VLBW babies who are born at non-subspecialty perinatal centres was twice that of babies who were born at subspecialty centres, despite controlling for demographic (odds ratio [OR]: 2.64; 95% confidence interval [CI]: 1.7– 4.2) and practice characteristics (OR: 1.96; 95% CI: 1.2–3.2). The effect of birth hospital type on death or major morbidity was greater for babies of 1000 to 1499 g birth weight (OR: 3.42; 95% CI: 2.0–6.1) than for babies of 500 to 999 g birth weight[5]. **Existing Academy of Pediatrics and American College of Obstetricians and Gynecologists recommendations are that deliveries at <32 weeks gestational age occur at subspecialty perinatal centres, the equivalent in Malaysia being level IIIB centres. Table 10 and Figure 15 reveals that 14% of babies below 32 weeks gestational age and 13% of babies between 1001 to 1500 g birth weight were delivered as outborn babies and not in Level IIIB hospitals.**

In this study, there were 3650 babies ≤1500g with 87.5% inborn (IB) and 12.5% outborn (OB) (see Table 10a and Figure 15). Three thousand two hundred and three (3203) babies had gestational age of < 32 weeks with a similar proportion of 87.4% IB and 12.5% OB. The overall percentage of SGA babies was 35% (36% IB versus 32% OB, p= 0.0630). Maternal steroids

[5] Warner et al. The effect of birth hospital type on the outcome of very low birth weight babies. *Pediatrics* 2004;113;35-41

usage was only 59% and as in other studies, usage was higher in IB 63% vs. OB 26%, p value 0.0001. As expected, more IB babies were delivered by LSCS (IB 50% vs. OB 19%, p= 0.0001).

Surfactant usage was 49% (IB 48% vs. OB 51%). Sixty eight percent (68%) of the IB babies received surfactant within ≤2 hours of life compared to 33% OB babies (p=0.00). Eighteen percent (18%) of babies required CPAP alone (IB 18% vs. OB 16%) and 80% were on conventional ventilation (IB 80% vs. OB 81%). Five percent (5%) of IB babies were put on HFOV compared to 8% OB, p=0.0064. For ventilated babies, the median ventilation duration was the same for IB and OB babies - at 5 days (Inter-quartile range (IQR) 2-13 days for IB vs. IQR 2-14 days for OB). It should be noted that in 2007, the data for ventilator-days included days on CPAP.

Fig. 15 Case distribution according to birth weight and inborn - outborn status

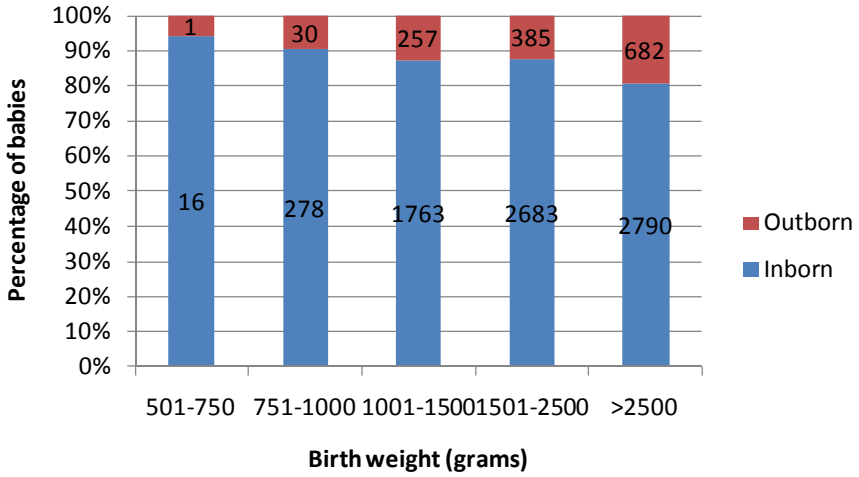


Figure 15. Case distribution according to birth weight and inborn - outborn status

Number in column = number of inborn or outborn babies in each birthweight category

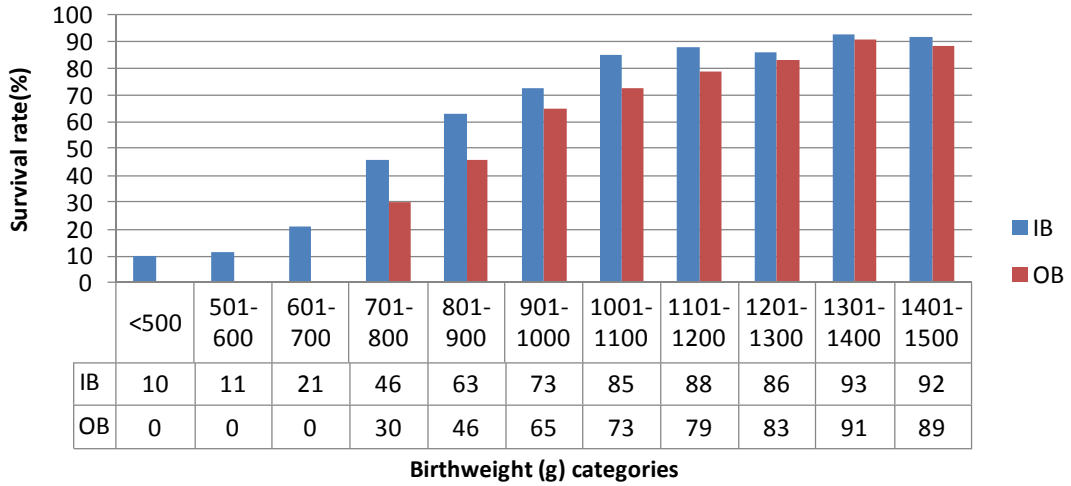
The survival rate for ELBW and VLBW babies has shown slight progressive improvement from 2004 to 2007 (see Figure 16). Inborn VLBW and ELBW had better survival rates. In 2007, the survival rate for ELBW was 48.6% (IB 49.4% vs. OB 40.7%), 88.5% (IB 89% vs. OB 84%) for 1001-1500 g and 75.3% (IB 75.7% vs. OB 72.6%) for VLBW. The IB babies had better survival in all the birthweight categories compared to the OB babies.

For those who died, the median age of death was 1-day for IB babies (IQR 0-8) and 2-days for OB babies (IQR 1-12). For survivors, the median age of discharge of 49 days was similar for both IB and OB babies.

There was only slight difference in the incidence of respiratory distress syndrome (72% IB vs. 75% OB) and retinopathy of prematurity (ROP) between inborn and outborn babies (IB 18% vs OB 13%, p=0.0560). The others remained the same ie. chronic lung disease (8%),

necrotising enterocolitis (6-7%), intraventricular haemorrhage(34%) and confirmed sepsis (14%), for both the IB and OB babies.

Fig. 16 Survival rate (%) in birthweight categories in VLBW babies – IB versus OB babies



	<500	501-600	601-700	701-800	801-900	901-1000	1001-1100	1101-1200	1201-1300	1301-1400	1401-1500
IB	10	11	21	46	63	73	85	88	86	93	92
OB	0	0	0	30	46	65	73	79	83	91	89

Figure 16. Survival rate (%) in birthweight categories in VLBW babies – IB versus OB babies

3.5.2 Place of birth

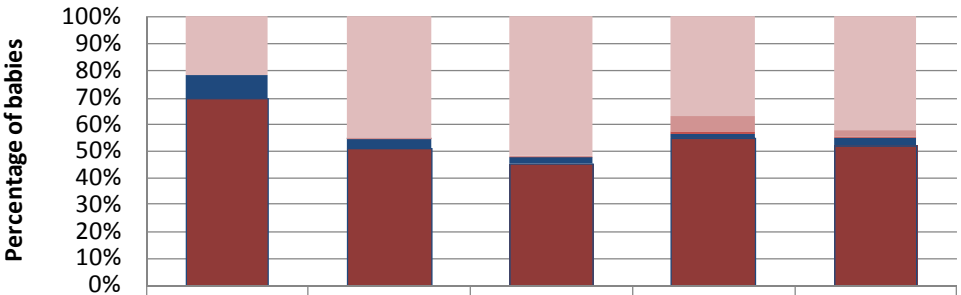
NICUs are generally placed in general hospitals, university hospitals and some district hospitals with specialists. Some private hospitals also provided neonatal intensive care for sick babies either in a separate NICU or as part of a general ICU. There are no private hospitals participating in the MNNR. 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% (5383/10835) and Caesarean section rate was 44% (4813/10835). For very preterm (<32 weeks' gestation) babies the Caesarean section rate was 39.8% (1276/ 3203) (Table 12) and for those of 32-36 weeks' gestation, it was 52%. ***The Caesarean section rate for VLBW babies in the MNNR was 46%, 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 1001-1500 g birth weight was 55% (Table 12a). This is comparable to the Caesarean section delivery rate in the United States in years 1999-2000 (see Figure 19).

Fig. 17 Mode of delivery vs. Gestational Age

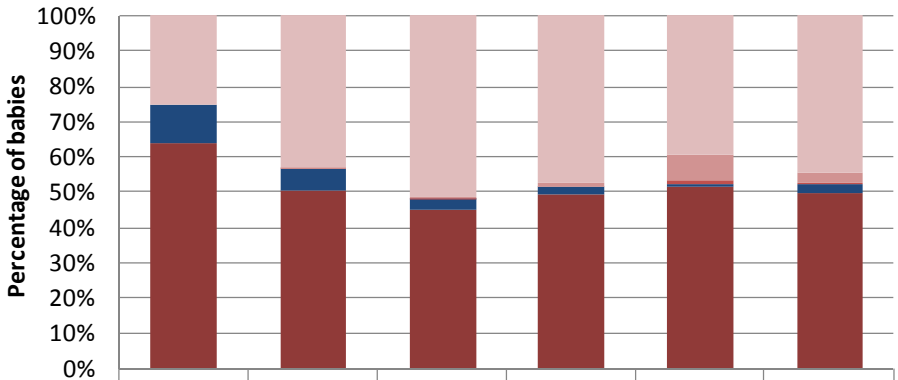


	Up to 27	28-31	32-36	37 and above	Total cases
C-section	178	1047	1717	1458	4400
Ventouse	0	3	20	221	244
Forceps	0	4	16	26	46
Breech	70	86	80	59	295
SVD	572	1192	1494	2140	5398

Gestational age (weeks)

Figure 17. Mode of delivery vs. Gestational Age

Fig 18. Mode of delivery vs. Birth weight



	501-750	751-1000	1001-1500	1501-2500	>2500	Total cases
C-section	106	333	1247	1618	1499	4803
Ventouse	0	1	2	34	262	299
Forceps	0	1	4	12	33	50
Breech	46	49	79	65	42	281
SVD	266	388	1077	1678	1937	5346

Figure 18. Mode of delivery vs. Birth weight

Fig. 19 United States of America Caesarean section delivery rates by birth weight, Years 1999-2000

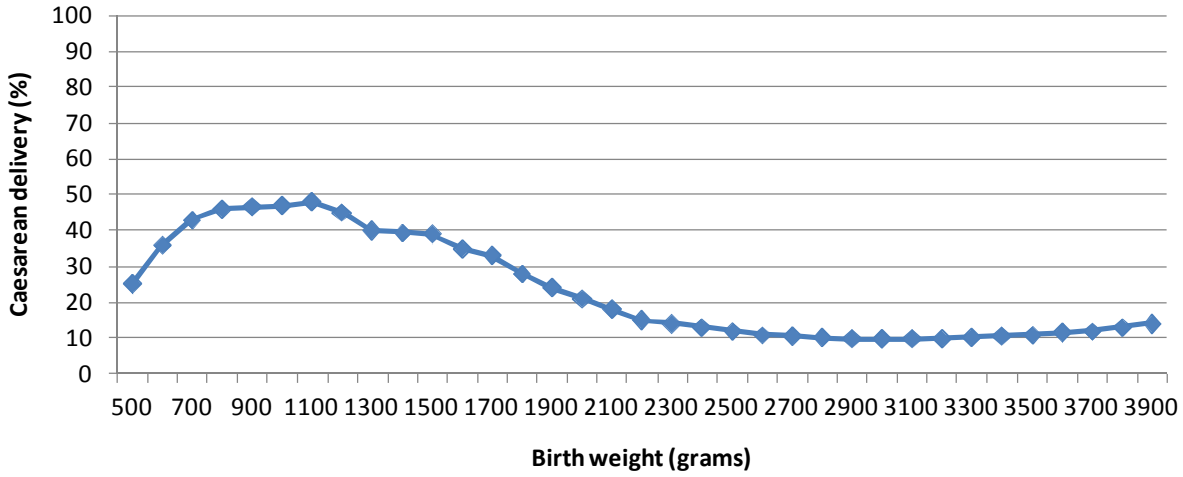
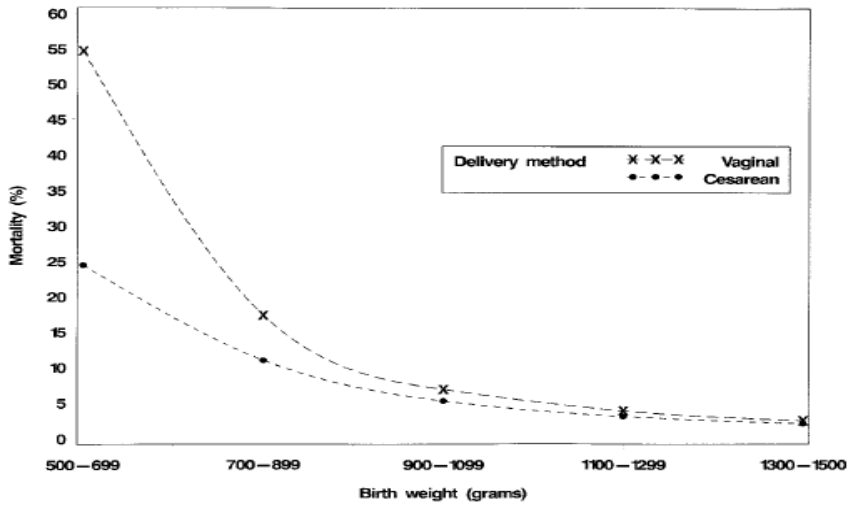


Figure 19. USA Caesarean section delivery rates by birth weight, Years 1999-2000

Data source: National Center for Health Statistics. 1999, 2000 Birth Cohort Linked Birth and Infant Death Data Set[6]

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[6].

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

[6] National Center for Health Statistics.1999, 2000 Birth Cohort Linked Birth and Infant Death Data Set

In an analysis of United States birth cohort of 54695 VLBW babies[7] 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 Figure 20). **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, 2661/3203 (83%) received ventilatory support which included Continuous Positive Airway Pressure (CPAP), Intermittent Mandatory Ventilation (IMV), IMV + Patient-Trigger Ventilation (PTV), 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 6401/7632 (83.9%) (Table 13). The overall VS support rate was 83.6% (9062/10835).

CPAP alone as a mode of ventilatory support was given to 2116 (23.4%) of the babies; highest rate of use (about 33%) being among babies in the gestational age group of 32-36 weeks and BW group of 1501-2500 g (Tables 14 and 14a). Another 2640 of the total 10835 (24.4%) babies were supported with CPAP in combination of other VS modes, most commonly IMV.

Figure 21 shows the usage of IMV, CPAP, HFOV, NO and PTV in all babies, for the year 2007. Figure 22 shows the proportions in percentage of the same over the years 2004, 2005, 2006 and 2007. Usage according to gestational age and birthweight groups are as shown in Tables 14-17a.

Fig. 21 Number of babies using specific modes of ventilation

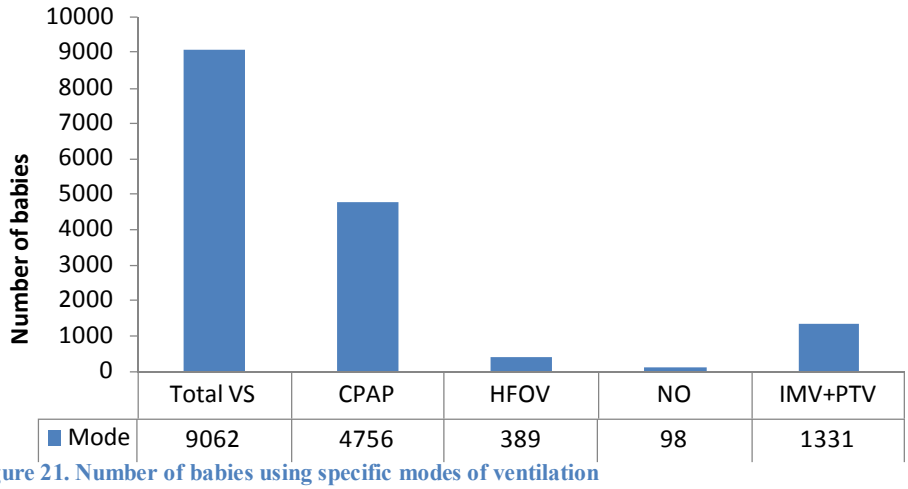


Figure 21. Number of babies using specific modes of ventilation

[7] Lee and Gould. Survival advantage associated with Cesarean Delivery in Very Low Birth Weight Vertex Neonates . Obstet Gynecol 2006; 107(1):97-105

Fig. 22 Modes of ventilatory support, Years 2004-2007

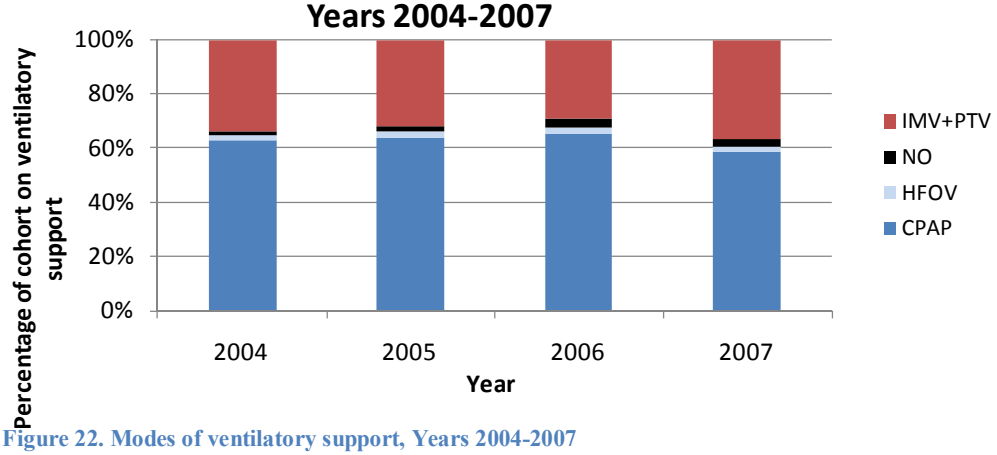


Figure 22. Modes of ventilatory support, Years 2004-2007

Ventilatory support including CPAP only, was given to about 80% of babies between 501-1000 g over the three years and only offered to 32% of babies of below 500 g birth weight. In 2007, only 76% of babies weighing 1001-1500 g required some form of ventilatory support (Figure 23). The total percentage of babies on CPAP alone increased marginally from 20 to 23% of total babies on respiratory support, with the largest increase in the 32-36 weeks gestational age group (29% to 33%) and 1001-2500 g birth weight groups (from 26% to 31%) (see Tables 14 and 14a). **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 use of antenatal steroids.**

Fig. 23 Ventilatory support according to birth weight, 2004-2007

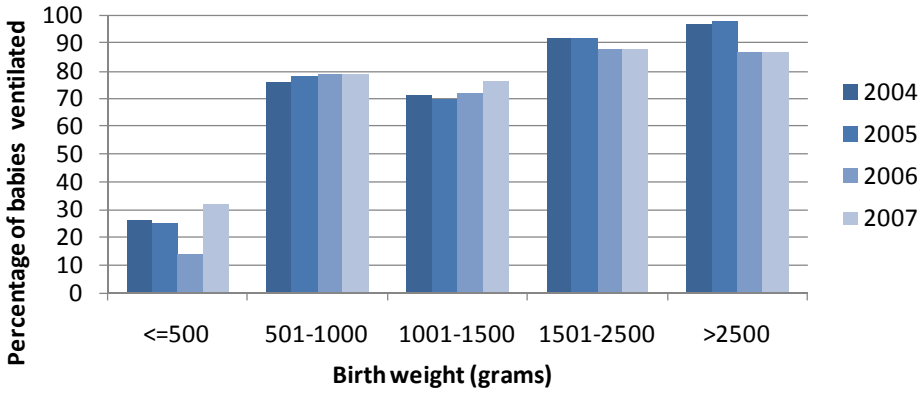


Figure 23. Ventilatory support according to birth weight, 2004-2007

Fig. 24 Ventilatory support according to gestational age

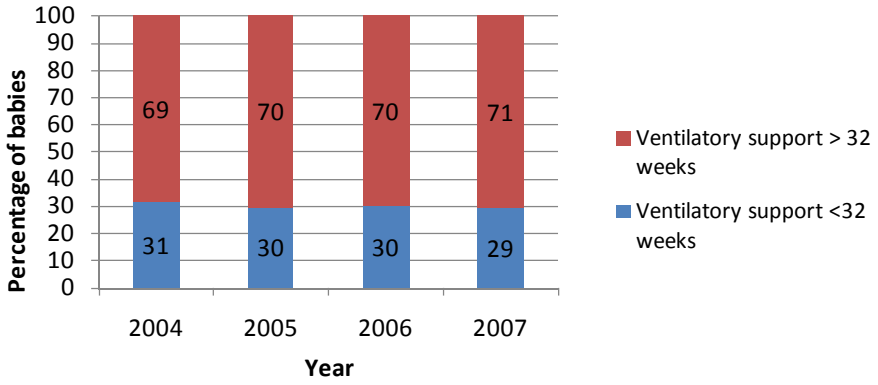


Figure 24. Ventilatory support according to gestational age

In all four years from 2004-2007, about 70% of ventilated babies were of more than 32 weeks' gestation and more than 1500 g in birth weight (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 thatthe 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 18).

For very low birthweight babies who survived, the duration of ventilatory support was highest in the birth weight group of 501-1000 g and with an increase from 2005-2007. 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).

Fig.25 Mean duration of ventilatory support for survivors according to birth weight groups

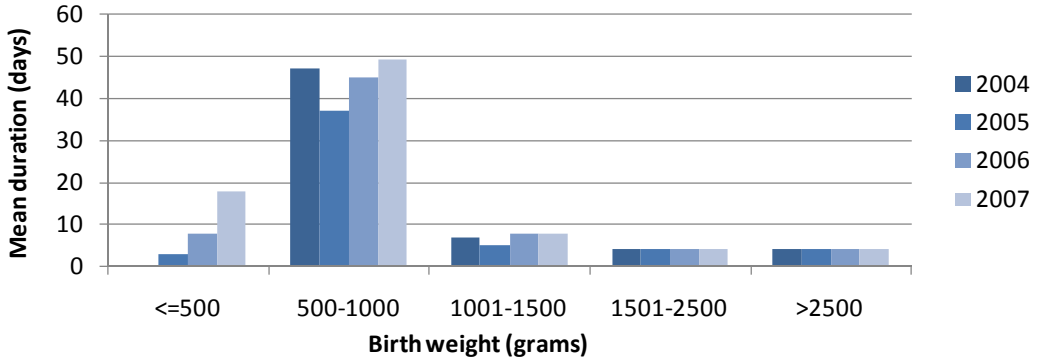


Figure 25. Mean duration of ventilatory support for survivors according to birth weight groups

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 3651 out of 10835 (34%). From this, 2625/3651 (72%) in the year 2007 needed ventilatory support (Table 41, 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 two percent (71.9%) of babies of birth weight $\leq$ 1500 g had RDS, out of which 90.3% (2372/2625) and 13.8% (363/2625) of these babies with RDS received ventilatory support (including CPAP) and CPAP only, respectively. (Tables 59. and 59)

About eighty percent (79.7%) of babies with gestation < 32 weeks had RDS, of which 91.5% (2335/2552) and 12.9% (329/2552) of these babies with RDS received ventilatory support and CPAP only, respectively. (Tables 60 and 60a).

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[8] and this treatment in the Malaysian Clinical Practice Guidelines is recommended for babies who are ventilated for RDS. Of the 2625 babies in 2007 who had RDS and required ventilatory support, 1496 (57%) were treated with surfactant. Although this has remained unchanged over the years, the number of babies with RDS requiring ventilatory support has reduced from 2006 to 2007 (Table 41, Figure 27).

[8] Soll RF Multiple vs. single dose natural surfactant extract for severe neonatal respiratory distress syndrome. *Cochrane Database of systematic reviews*. 2003

Fig. 26 Number of babies with respiratory distress syndrome for years 2004-2007

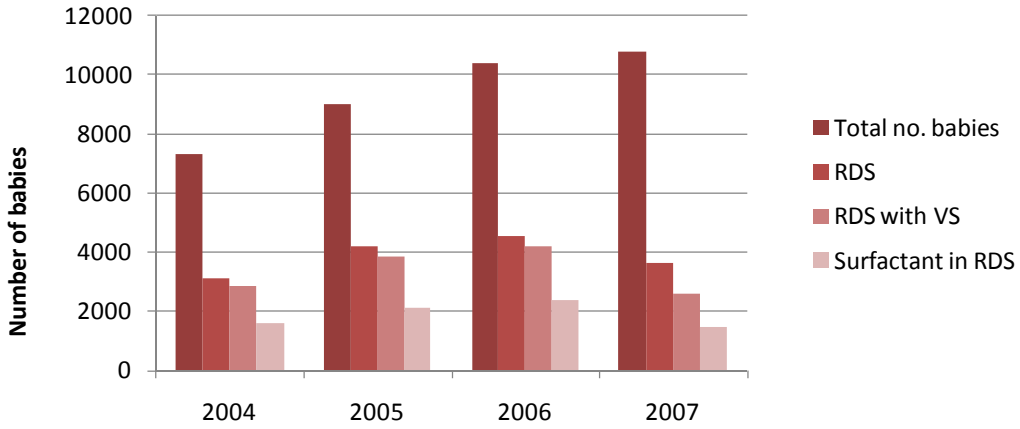


Figure 26. Number of babies with respiratory distress syndrome for years 2004-2007

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

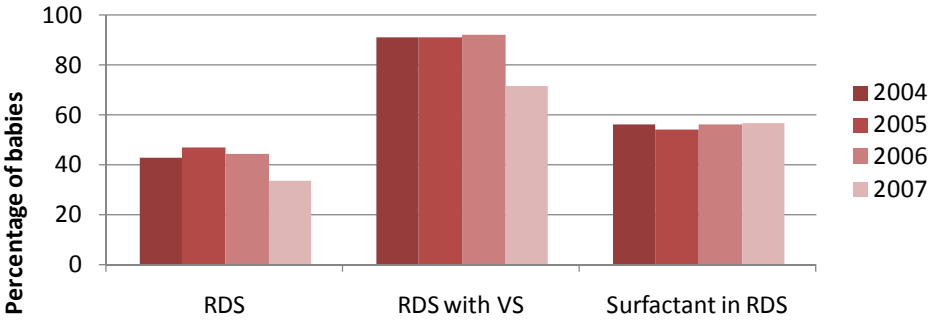


Figure 27. Percentage of babies with RDS, ventilatory support and given surfactant

Of note, there is variation in the use of surfactant amongst NICUs as shown in Figure 28 below.

Fig. 28 Use of surfactant in RDS requiring ventilatory support

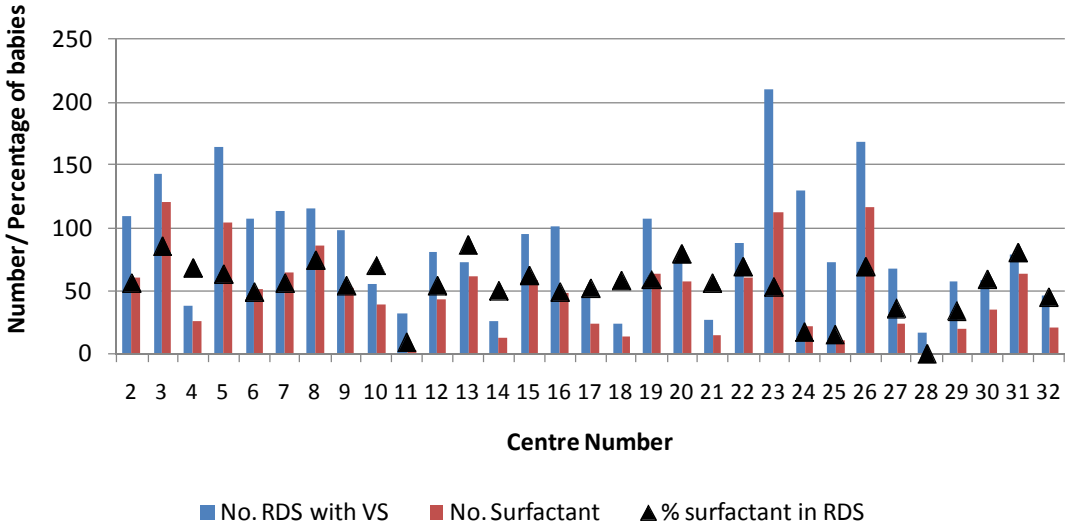


Figure 28. Use of surfactant in RDS requiring ventilatory support

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 40.7% and 20.4% respectively. The rates among survivors with birth weights 1001-1500g were 10.4% and 6.4% at Day 28 and 36 weeks respectively. (Tables 39 and 39a).

Postnatal steroids for chronic lung disease was given to 10.1% of those with birth weights ≤1000g and 4.6% of those with birth weights 1001 -1500 g. (Table 21).

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[9]. 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

[9]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

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).[10]
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 1915 babies with congenital pneumonia; 204 (11%) of which died (Figure 32). Twenty three percent (23%) of babies more than 2500 g birth weight were ventilated for congenital pneumonia (Table 33).

3.7.1.5 Meconium aspiration syndrome (MAS)

Six hundred and fifty four (654) cases were ventilated for Meconium Aspiration Syndrome (MAS) in 2007. The incidence of MAS as a reason for ventilation of term babies varied from 2% to 32% in the various centres (Figure 29).

Fig. 29 Percentage of MAS Among Ventilated Term Babies, by Centre

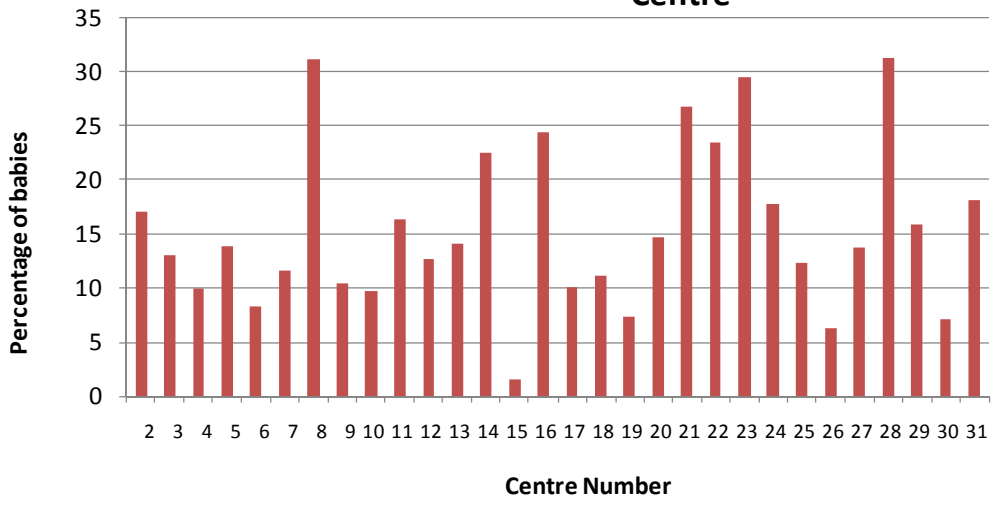


Figure 29. Percentage of MAS Among Ventilated Term Babies, by Centre

Of the 654 cases of MAS, 65 (10%) were given High Frequency Oscillatory Ventilation (HFOV). 44 (6.7%) received Nitric Oxide Therapy.

[10] American Academy of Pediatrics Committee of Fetus and Newborn and the Canadian Pediatric Society Newborn and Fetus Committee, Postnatal Corticosteroids to treat or prevent chronic lung disease in preterm babies *Paediatrics & Child Health* 2002; 7(1): 20-28

One hundred and nineteen (119 - 18.2%) cases of MAS were complicated by Persistent Pulmonary Hypertension of the Newborn (PPHN). Of this subgroup, 26 (22%) had received Nitric Oxide therapy.

Fig. 30 Modalities of Ventilatory Management in MAS

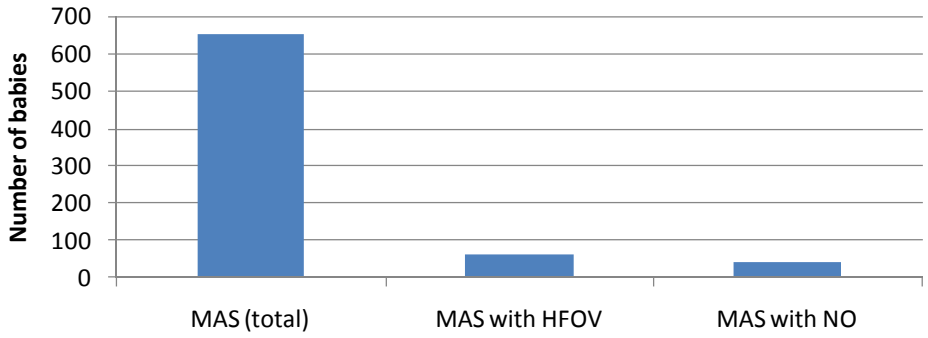


Figure 30. Modalities of Ventilatory Management in MAS

Mortality associated with MAS

The overall mortality rate among the babies who had MAS was 15.7%. It was significantly higher in the group receiving high frequency oscillatory ventilation (HFOV) (see Figure 30); this may be due to various reasons, including the greater severity of patients in this group, and possibly the learning curve in using this modality.

In the group receiving nitric oxide (NO), the mortality was 25% i.e. a reduction in the expected high 100% mortality in this group, without NO treatment (see Figure 31).

Fig. 31 Mortality in MAS according to ventilatory support

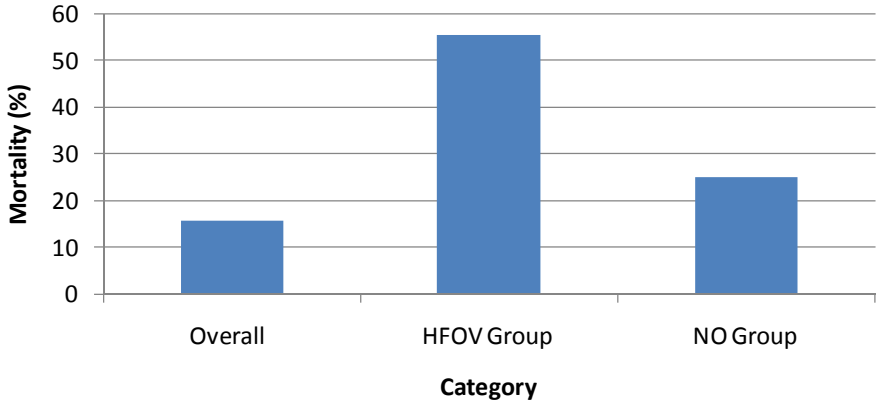


Figure 31. Mortality in MAS according to ventilatory support

3.7.1.6 Pneumothorax (PTX)

Of the 10835 babies in the MNNR hospitals, 443 (4.1%) of them were reported to have developed pneumothorax.
Excluding babies of gestational age group <24 weeks, all other gestational age groups were affected, with the highest incidence in the term babies, as almost half of the babies with pneumothorax were term babies of gestation between 37 and 41 weeks. Babies in all birthweight groups were affected, the highest incidence being in babies with birth weight 2500g and above.

When compared with babies without pneumothorax in the MNNR, babies with pneumothorax were of a significantly higher gestational age and a significantly higher proportion of them were singletons, outborns, had meconium aspiration syndrome, pneumonia, sepsis, patent ductus arteriosus, received surfactant therapy, developed PPHN and have had pulmonary hemorrhage. A significantly lower proportion of babies with pneumothorax received nasal CPAP therapy and a significantly higher proportion of them were on ventilatory support of various types and nitric oxide therapy. The duration of hospital stay among babies with pneumothorax was significantly shorter (median duration 9 days, IQR: 2-22) as a high number of them died.

Mortality was high among babies of all birthweight and gestational age when pneumothorax occurred, as 40% or more of the babies died. As the birthweight and gestational age fell, mortality increased steadily to more than 60%.

The main limitation of the 2007 database on pneumothorax was that information on the temporal relationship between onset of pneumothorax and the commencement of ventilatory support was not collected. As a consequence, it is not certain whether ventilatory support was given as a treatment for pneumothorax or as a risk factor associated with pneumothorax. To reduce the incidence of pneumothorax, this type of information is crucial.

Based on the results of the 2007 data, **nasal CPAP should be actively promoted as its use was associated with a significantly lower incidence of pneumothorax.**

3.7.2 Hypoxic ischaemic encephalopathy (HIE)

Ten thousand eight hundred and thirty five (10835) babies in 2007 were recruited into the MNNR. They constituted only 14.9% of the participating NICUs' total admission. Nine percent (n=944) of the babies recruited in the MNNR were diagnosed to have hypoxicischaemic encephalopathy (HIE). Eighty three percent (83%, n=779) of them were inborn. Twenty four percent (24%, n=222) of the babies with HIE recruited in the MNNR were of severe grade and

the remaining cases were of moderate or mild grade requiring ventilatory support. Babies with mild HIE not on ventilatory support, were not recruited into the study. Only 17.5 % (n=165) of the babies with HIE in the MNNR were outborn. Thirty six percent (36%, n=342) of these babies were delivered by LSCS. The majority (98%) were singletons. Mortality was high (19% or n=184)), particularly among the outborn as 26.7% of them died compared with 18% of the inborn with HIE, in the MNNR. Among babies with severe HIE, 59.9% (n=133) died while only 7.1% (n=51) of the babies with mild or moderate HIE recruited in the MNNR died.

In order to determine the actual incidence and risk factors associated with HIE of inborn babies in hospitals participating in the MNNR, all inborn babies with HIE should be included in the registry, irrespective of whether they required ventilatory support or whether they died during the first 28 days of life.

3.7.3 Causes of death

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

Fig. 32 Deaths associated with major morbidities

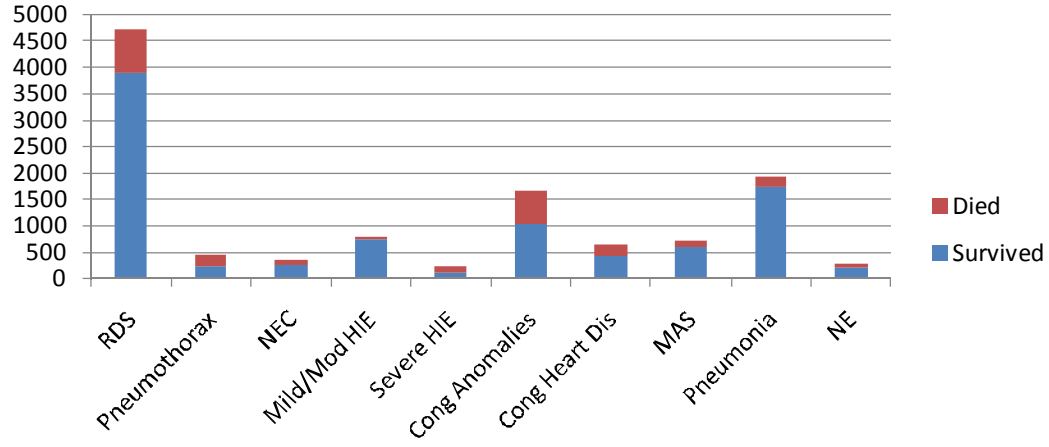


Figure 32. Deaths associated with major morbidities

3.7.4 Intraventricular haemorrhage

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 ultrasound 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.

Of the 3601 babies with BW 501-1500 g, 2549 (70%) of them had cranial ultrasound (CUS). This means an increase from the three previous years (60%, 67.4% and 68% for 2004, 2005 and 2006 respectively), see Figure 33), but it is still quite far from the targeted CUS for all babies in this weight category (The Vermont Oxford network achieved 91%). The rates of cerebral ultrasound scanning for various birth weight groups in the MNNR in 2007 are shown in Table 25.

Fig. 33 Ultrasound of brain in babies with birthweight <1500 g, Years 2004-2007

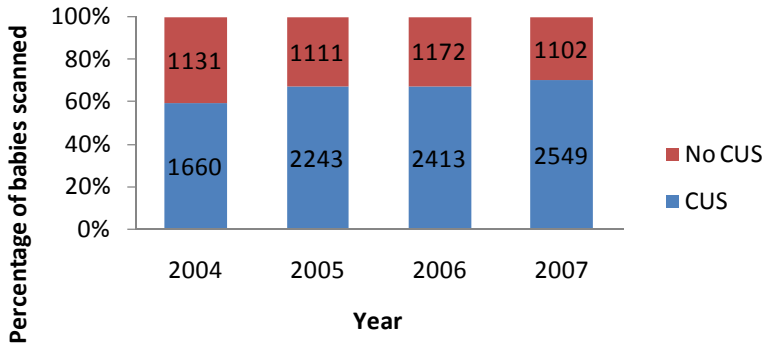


Figure 33. Ultrasound of brain in babies with birthweight < 1500g, Years 2004-2007

Among the babies in this birth weight group (501-1500g) who underwent CUS, 296 (11.6% versus 9% in the Vermont Oxford network) had Grade 3 or 4 IVH. The combined mortality rate from Grade 3 and 4 IVH was 51.7% (Table 33). The percentage of detecting grade 3 or grade 4 IVH was slightly lower than in the two previous years (12.1 % in each 2005 and 2006) but a higher proportion of babies in this cohort underwent cranial ultrasound. The mortality rate for this group of babies was lower in 2007 than in the two previous years (60.3% and 54.6% in 2005 and 2006 respectively). This reduction in mortality in babies with severe IVH could indicate an improvement in quality of neonatal intensive care but at the same time it will result in a higher number of babies surviving with a high likelihood of severe neuro-developmental disabilities.

In figure 34, the percentages of babies with grade 2 to grade 4 IVH are compared between 2007 and the previous years.

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

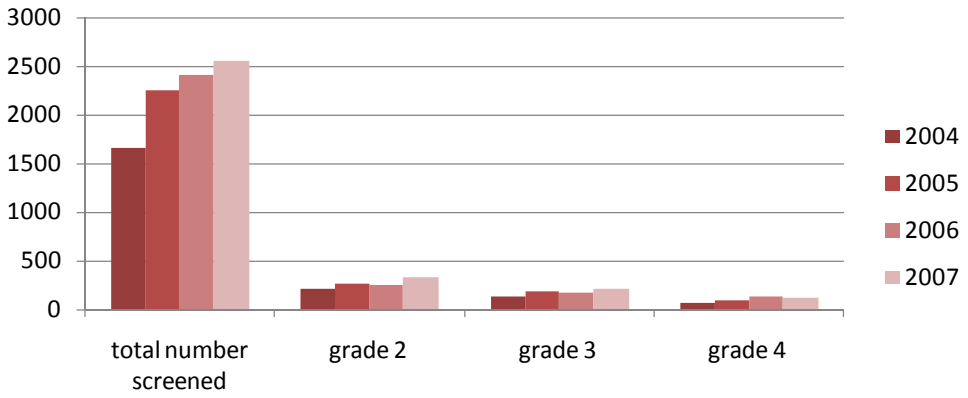


Figure 34. Percentage of babies screened according to IVH grade, and year

Figure 35 (for ELBW) and Figure 36 (for VLBW) show that the likelihood of finding IVH during a US screening of the brain has changed very little during the past few years. Considering that many hospitals are increasing their efforts to actively intervene for extremely low birth weight babies, it is reassuring that there is no significant increase in incidence of this complication, over the past four years. In 2007, 9.2 % of the ELBW babies and 2 % of the babies with a birth weight between 1001-1500 g had grade 4 IVH.

A further reduction of Grade 3 and Grade 4 IVH is still possible with improved neonatal services.

Fig. 35 Percentages of grades of IVH among screened ELBW babies

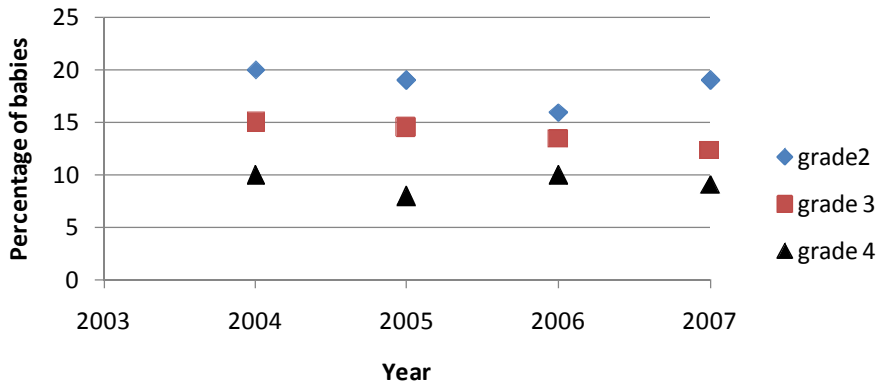


Figure 35. Percentages of grades of IVH among screened ELBW babies

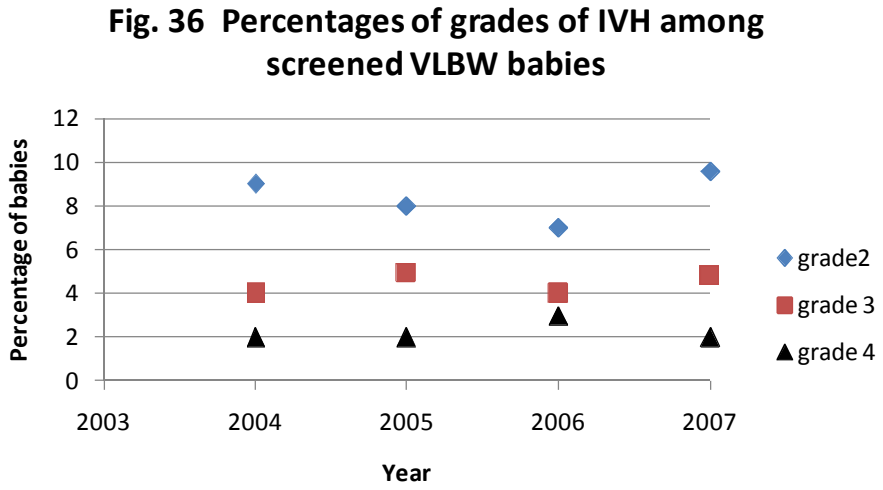


Figure 36. Percentages of grades of IVH among screened VLBW babies

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 necessitates 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. However, among the babies who survived, 1926 out of 2345 (82%) very preterm babies born with a gestational age < 32 weeks, and 2215 out of 2716 (81.5%) babies of BW < 1501 g had ROP screening. The rate of ROP screening for various gestation periods and BW groups are as shown in Tables 24 and 24a. Based on these tables, we found the percentage of screening much higher in the babies of <1250g (91%) than in the group with a birth weight of 1251-1500g (71%).

Some very preterm or VLBW babies had been discharged early without an ROP screening. The percentage of babies <32 weeks gestational age, who were screened before discharge had shown an decreasing trend between 2004 and 2006 but the data for 2007 showed a better screening percentage than any of the previous years of data collection (Figure 38). The babies that were not screened were likely to be screened as outpatients but this information was not captured in this study.

Fig. 37 ROP screening in survivors with GA of <32weeks, according to year

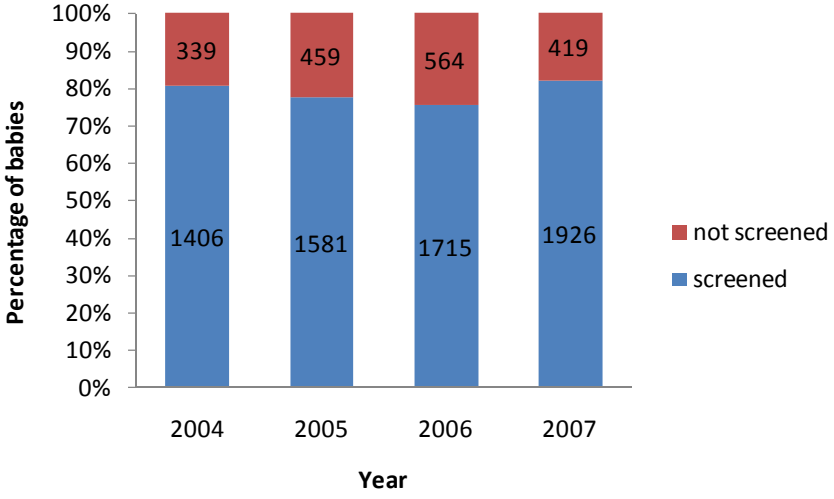


Figure 37. ROP screening in survivors with gestational age < 32 weeks, according to year

Seventy babies (5.9%) with BW 501-1000 g and 31 (1.3%) of those between 1000-1500 g birth weight developed Grade 3, 4 or 5 ROP (Table 33). This is comparable with previous years.

Fig. 38 Number of babies with ROP stage 3 and 4 & percentage of ROP 3 in screened survivors, according to centres

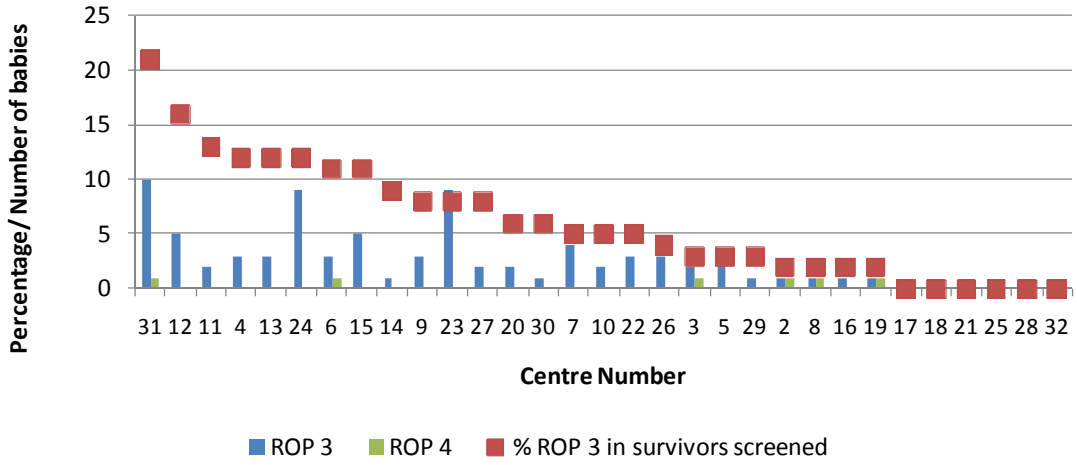


Figure 38. Number of babies with ROP stages 3&4 and percentage of ROP 3 in screened survivors, according to centres

There are outliers for the incidence of ROP as shown in Figure 38 – there could be proportionately more ELBW babies as in centre 31, a small denominator as in centre 11 but

presently **overall, centres with more than 5% incidence of ROP 3 in babies screened or with ROP stage 4 and 5, should review the process of ROP screening in their centres.**

For the severe ROP the main treatment given was laser treatment (40 or 3% and 14 or 0.6% in the groups with BW 501-1000 g and 1001-1500 g respectively). A very small number of babies still received cryotherapy. Since some of these therapies were given after discharge from the NICU, there may be an underreporting of babies undergoing treatment for ROP.

3.7.6 Necrotising enterocolitis

Necrotising enterocolitis (NEC) is a disease, usually of the preterm baby, which affects the intestines. It is associated with high morbidity and mortality in preterm babies and occasionally in term babies. It is generally associated with factors such as low gestational age, hypoxic events and infections.

Extremely low birth weight (ELBW) babies had the highest incidence of NEC. In the group with a birth weight of 501-1000 g, 8% had NEC, treated medically and 1 % needed surgery (Table 33). Among babies with a birth weight of 1001-1500 g, 4% had NEC treated medically and also 1% needed surgery. These data were very similar to those of the past three years. The rates of NEC overall are (already) low. Individual centres with higher rates have to take corrective measures.

3.8 Congenital anomalies

All babies with significant congenital anomalies were included in the study. For the 2007 cohort, 15.1% (1634/10835) of babies had congenital anomalies. The incidence of congenital anomaly is 152/1000 births. Of this, 32.5% (531/1634) had syndromic diagnoses. There was a total of 1103 patients with non-syndromic anomalies (isolated or multiple congenital anomalies). Some babies may havehad more than one congenital anomaly, see Table 33a.

The number of babies with syndromic diagnoses were as follows: 194 (11.9%) Down syndrome, 114 (7.0%) Edward syndrome, 49 (3.0%) Patau syndrome and 174 (10.7%) other syndromes. Based on these figures, the incidence of Down syndrome was 0.8/1000 livebirths, Edward syndrome was 0.5/1000 livebirths and Patau syndrome was 0.2/1000 livebirths.

The most common organ system affected was the cardiovascular system (CVS) (636 cases), followed by cleft lip and palate (286 cases), GIT anomalies (226), CNS anomalies (non-neural tube defects) (167) and neural tube defects (114). Amongst the congenital heart disease, 232 (36%) and 404 (64%) were cyanotic and acyanotic lesions respectively. The incidence of CVS anomaly is 2.6/1000 livebirths. Amongst the cleft anomalies were 24 cases of cleft lip , 65 cases of cleft palate and 197 cases of cleft lip and palate . The incidence of cleft anomaly is 1.2/1000 livebirths. For neural tube defects (NTDs), there were 35 patients with spina bifida, 49 with anencephaly and 30 with other NTDs. The incidence of NTDs is 0.5/1000 livebirths (see Table 33b).

Amongst babies with congenital anomalies, the overall mortality rate in those of birthweight between 501-1500g was 58.4% (150/257). The mortality rate was 78.1% (57/73) for babies between 501-1000 g birthweight, and 50.5% (93/184) for babies of 1001-1500 g birthweight . For babies <32 weeks' gestation, the mortality rate was 59.3% (105/177).

The total number of babies with inborn errors of metabolism was 32, giving an incidence of 0.13/1000 livebirths (see Table 33c).

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).

A total of 8805 cases of "infection" were reported in 2007, this constituting 19.2 % of the total cohort of 10385. Only 8% (912) were confirmed by culture or positive antigen test. The majority (58%) were 'Presumed Sepsis' where the patients were treated only based on risk factors, but no objective signs of infection were present. 'Clinical Sepsis' constituted 16% of the total.

Fig. 39 Categories of Infection

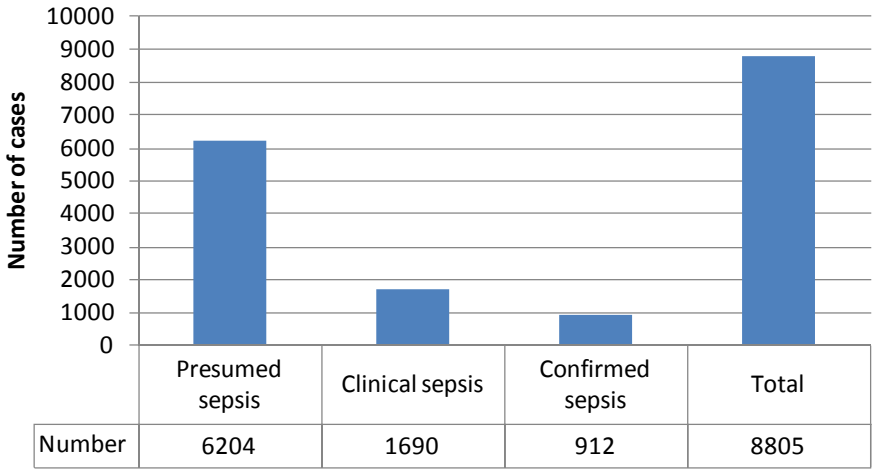


Figure 39. Categories of Infection

The incidence of confirmed sepsis among the VLBW babies varied from centre to centre, from 0% to 32%. The overall incidence was 14%.

Fig. 40 Incidence of Confirmed Sepsis, by Centre

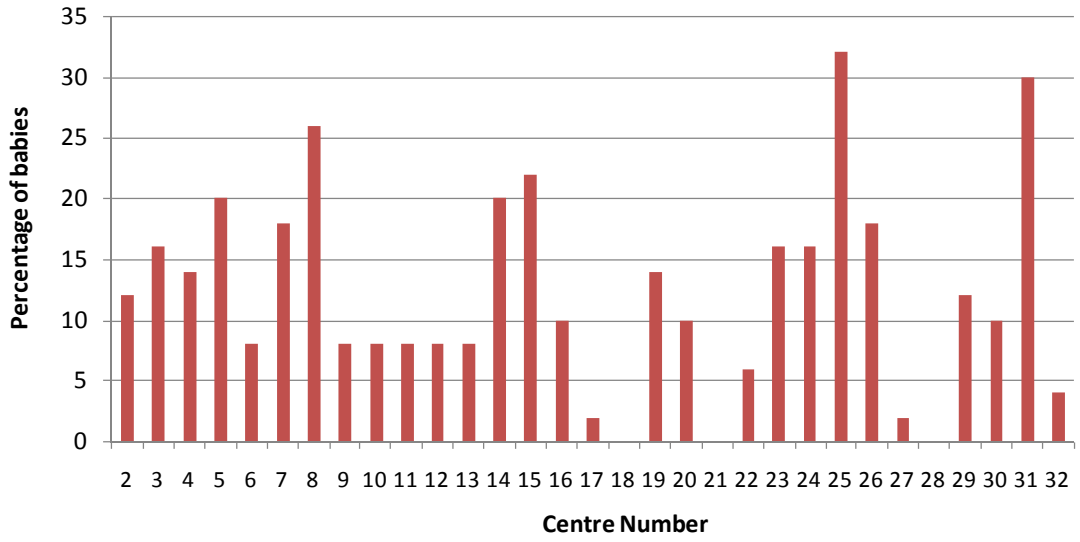


Figure 40. Incidence of Confirmed Sepsis, by Centre

The overall mortality rate from confirmed sepsis was 22%, with a range of 6% to 58% between centres (see Figure 41)

Fig. 41 Mortality associated with confirmed sepsis in VLBW, according to centres

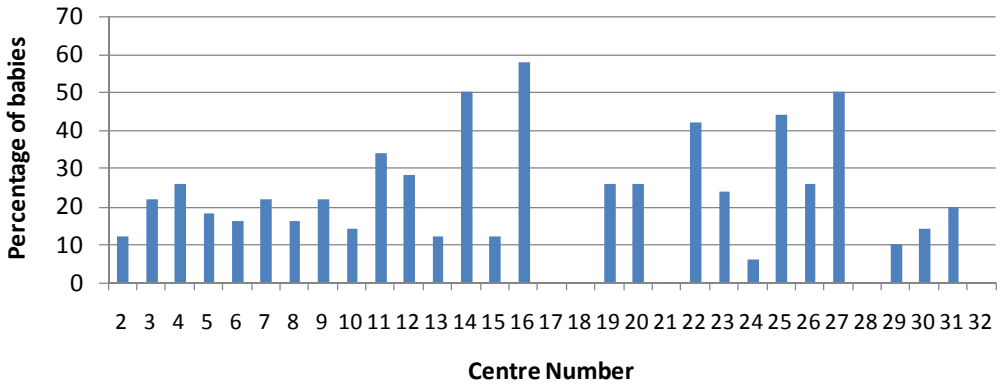


Figure 41. Mortality associated with confirmed sepsis in VLBW, according to centres

3.9.2. Infection vs. Gestational age

The incidence of confirmed sepsis is highest at 34% in the gestation group 28-31 weeks. The rate is very low (2%) in the 22-24 weeks group because these babies do not survive long enough for sepsis to be a problem.

Fig. 42 Percentage of babies with confirmed sepsis according to gestational age

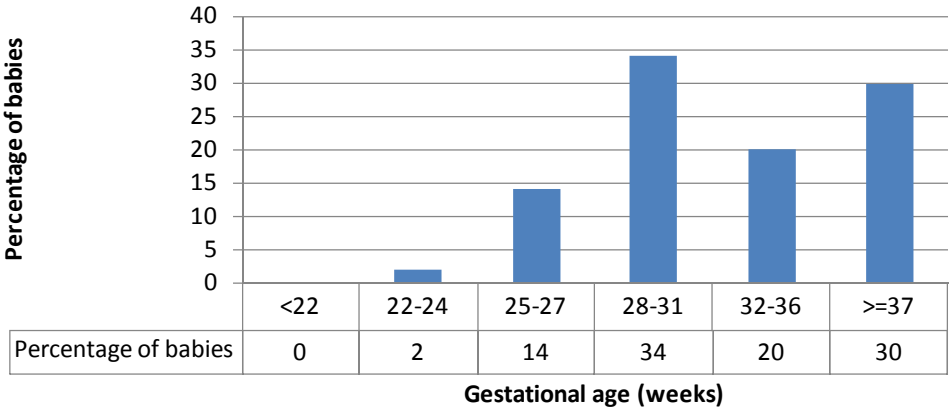


Figure 42. Percentage of babies with confirmed sepsis according to gestational age

3.9.3 Infection vs. Birthweight

In terms of confirmed sepsis vs. birthweight, the majority occurred in babies of more than 1.5 kg birthweight.

Fig. 43 Percentage of babies with confirmed sepsis according to birthweight

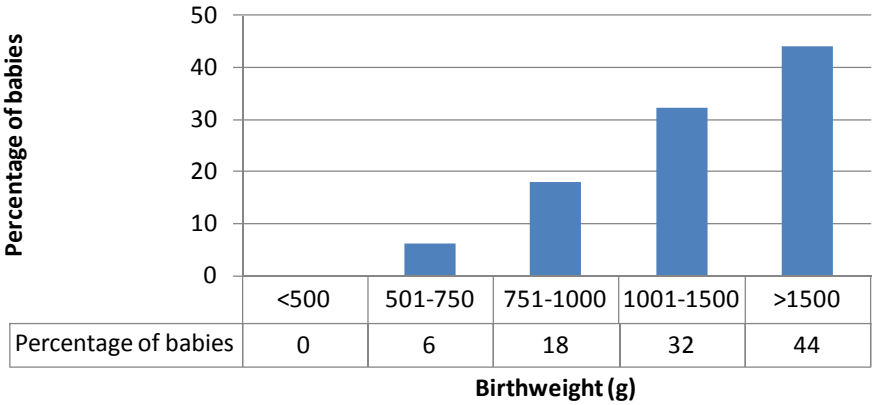


Figure 43. Percentage of babies with confirmed sepsis according to birthweight

3.9.4 Types of Infecting Organism

The most common infecting organism identified was Coagulase Negative Staphylococcus(CoNS), constituting 24% of all identified organisms. This has increased from the figure of 17.5% in 2006. Fungal infections constituted 5.8% of all infections, dropping from the 6.3% in 2006. Of note is that ESBL in 2007 constituted 5.9% of all the infections, showing a sustained downward trend from 14.0% in 2005 and 6.6% in 2006.
Group B Streptococcal infection however rose from 6.5% of babies in 2005 to 9.8% in 2006 to the present 12.4% of babies in 2007.

Fig. 44 Percentage of babies vs. type of infecting organism

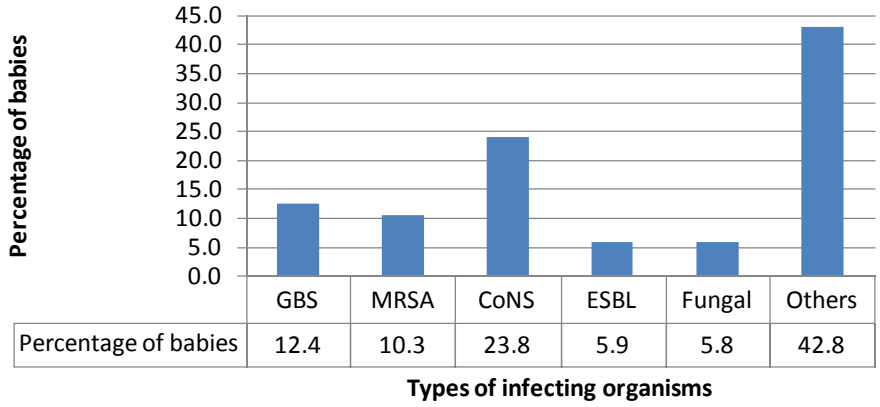


Figure 44. Percentage of babies vs. type of infecting organism

Among the babies with birthweight <1.5kg the percentage of CONS goes up to 30.5% and Fungal infections to 6.9%. The percentage of Group B Streptococcal infection drops to 6.4%.

Fig. 45 Percentage of babies of birthweight < 1500g vs. type of infecting organism

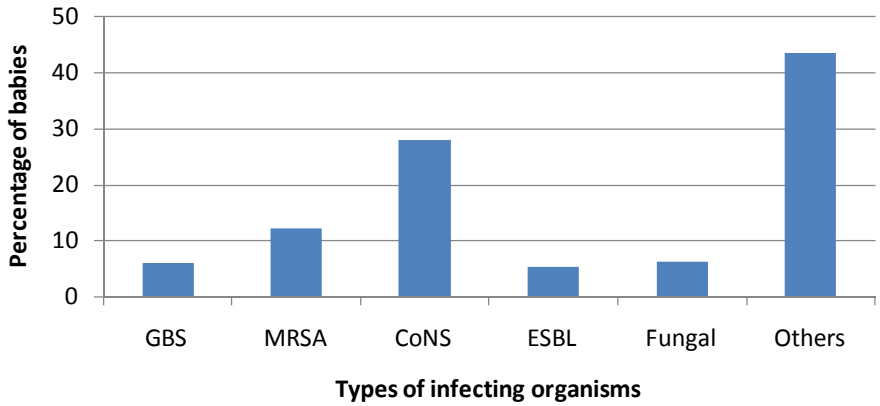


Figure 45. Percentage of babies of birthweight < 1500g vs. type of infecting organism

CoNS infection occurs proportionally more in babies < 1.5kg birthweight, a trend also seen though less prominently
with MRSA. In babies of more than 1500 g birthweight,.Group B Streptococcal infection was the more frequent infection (Figure 46).

Fig. 46 Infecting organisms according to birthweight

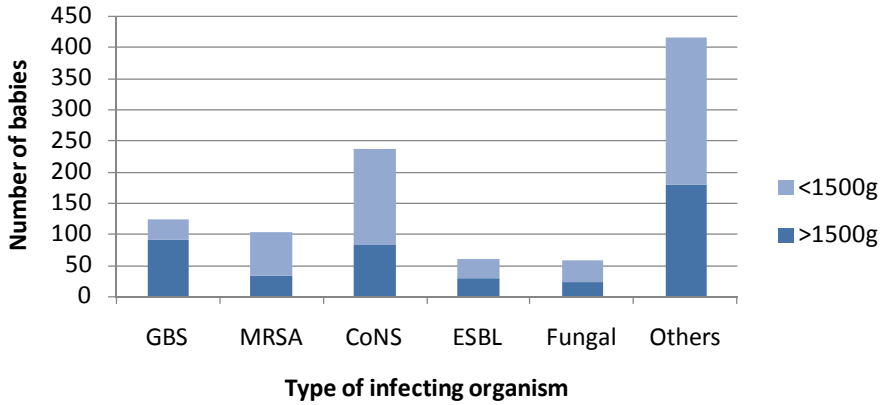
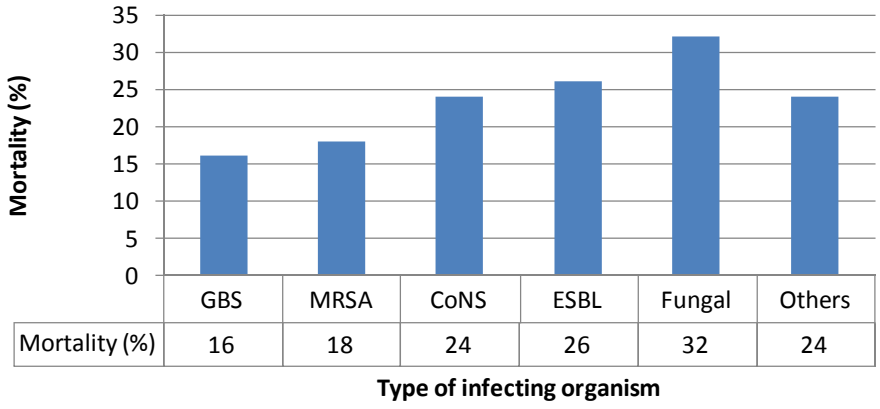


Figure 46. Infecting organisms according to birthweight

The mortality rate was highest (32%) among babies with fungal sepsis compared to any other organism. Babies in the overall cohort without fungal sepsis had a mortality rate of only 17.9%. The second highest mortality was 26% in the group with ESBL infection, with the third highest being 24% in CoNS infections (Figure 47).

Fig. 47 Mortality according to infecting organism



	GBS	MRSA	CoNS	ESBL	Fungal	Others
Mortality (%)	16	18	24	26	32	24

Figure 47. Mortality according to infecting organism

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 8886 survivors out of 10385 i.e. 82%, compared to a survival rate of 80% (in 2006), 78% (in 2005) and 77% (in 2004) (Table 29 and 29a). Survival is dependant on many factors including gestational age and birthweight. Five babies of birthweight <500 g survived. 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 20% survival rate at 601-700 g birthweight group to 45% survival rate at 701-800 gbirthweight (Figure 48). This may be a reflection of the NICU policies in terms of conservative management in the lower birthweight group. Survival rate for the 1001-1110 g birthweight group had increased to above 80% in 2007.

Fig. 48 Survival rate according to birth weight

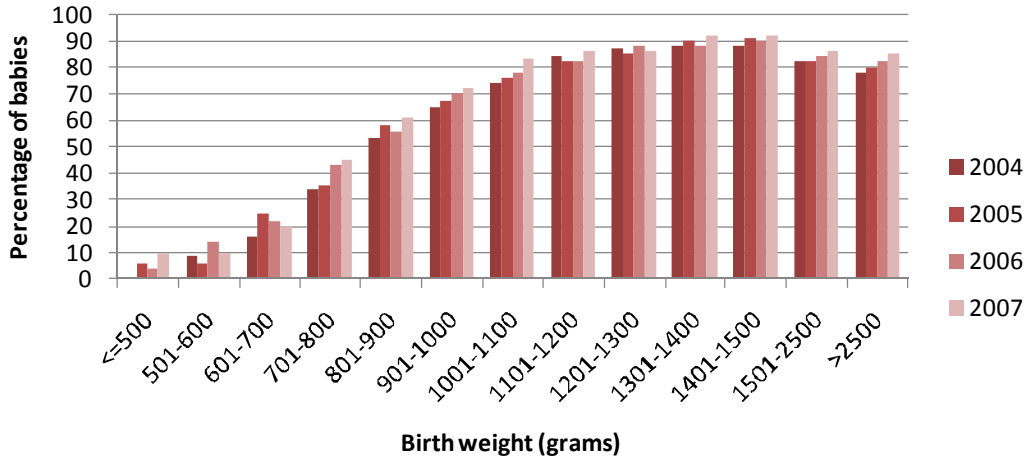


Figure 48. Survival rate according to birth weight

Less than half (44%) of babies of 26 weeks' gestation survived while survival was better at 68% for 27 weeks' gestation (Figure 47). 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 49).

Fig. 49 Survival rate according to gestational age

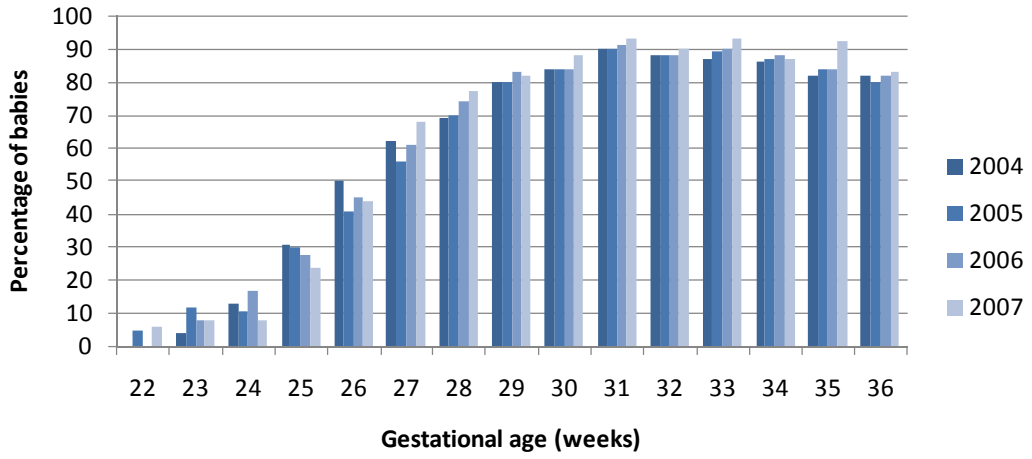


Figure 49. Survival rate according to gestational age

3.10.2 Survival rate according to centres

3.10.2.1 Survival rate of babies of birth weight between 1001-1500 g

The survival rate of babies between 1001-1500 g birth weight in 24 out of the 30(31?) centres were above 85%, the key performance index for Level III NICUs. The variation in survival rate varies across centres, varying from 71-96% (Figure 50– the spokes of the 'wheel' refer to the centre number, Table 55). 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 total number of babies admitted to the SDP centre (Figure 51).

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

Fig. 50 Survival of babies of 1001-1500 g birth weight & KPI for years 2006 and 2007

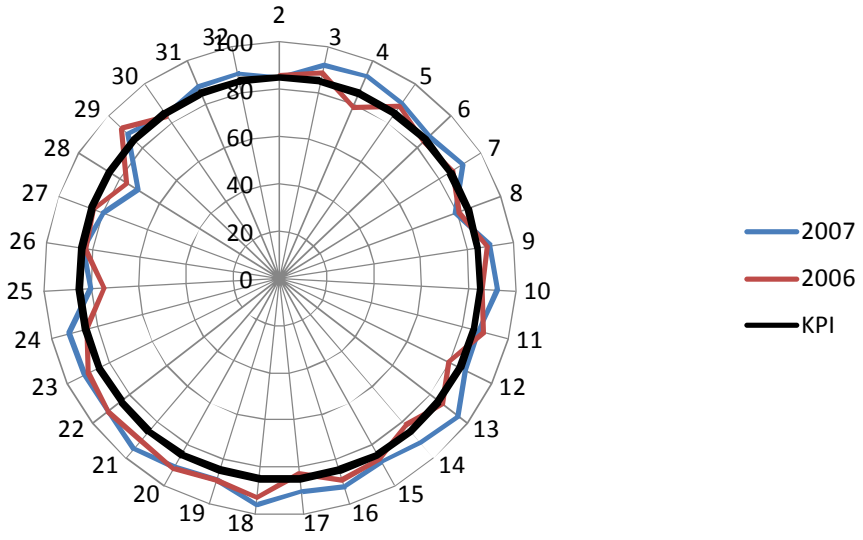


Figure 50. Survival of babies of 1001-1500 g birth weight & KPI for years 2006 and 2007

Fig. 51 Number of babies between 1001-1500 g birth weight admitted to each centre compared to number of survivors

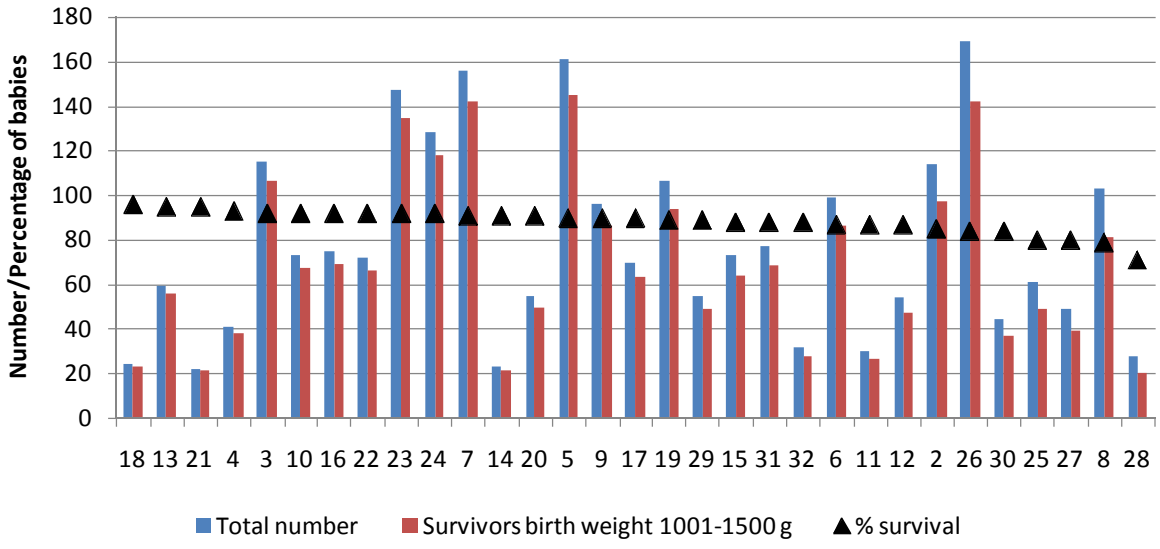


Figure 51. Number of babies between 1001-1500 g birth weight admitted to each centre compared to number of survivors

Fig. 52 Survival rate in preterm 28-31 weeks gestational age according to centres

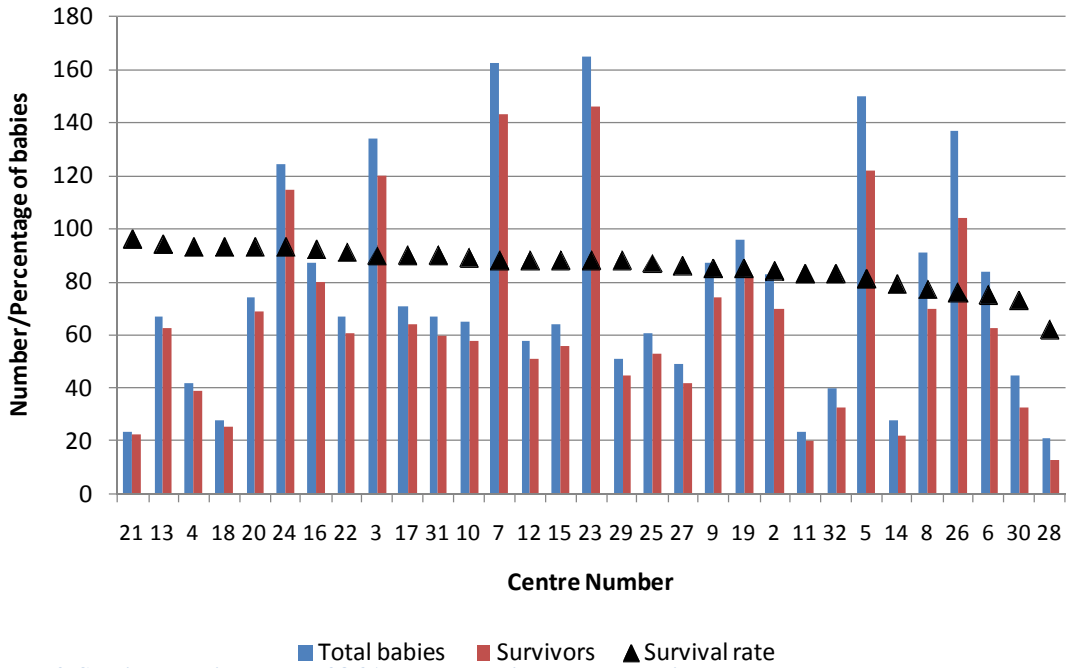


Figure 52. Survival rate in preterm 28-31 weeks gestational age according to centres

3.10.2.2 Survival rate of babies of birth weight between 501-1000 g

The survival rate of babies between 501-1000 g birth weight showed a wider variation from 23-70% (Figure 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 53 shows the relative distribution of babies in this birth weight category and the number of survivors.

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

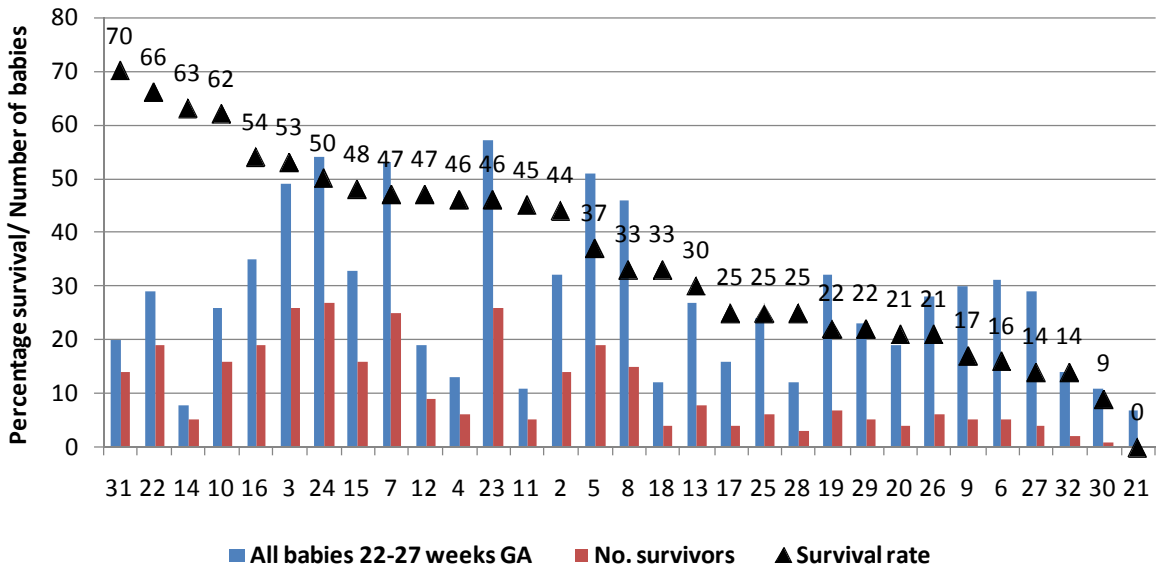


Figure 53. Number and survival rate of babies 22-27 weeks GA according to centres

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 2007 perinatal, early neonatal and neonatal mortality rates were calculated to be 13.14 per 1000 TBs, 4.8 and 6.05 per 1000 LBs respectively, for our SDP group.

Total births, neonatal deaths and mortality rates, 2007

Total Births	249489
No. Stillbirths	2102
No. Livebirths	247387
Inborn deaths <7 days (early neonatal deaths)	1,176
Inborn deaths < 28 days (neonatal deaths)	1,497
Stillbirth rate	8.4 per 1000 TBs
Perinatal mortality rate (PMR)	13.14 per 1000TBs
Early neonatal mortality rate (Early NMR)	4.8 per 1000 LBs
Neonatal mortality rate (NMR)	6.05 per 1000 LBs

Fig. 54 Centre Mortality rates

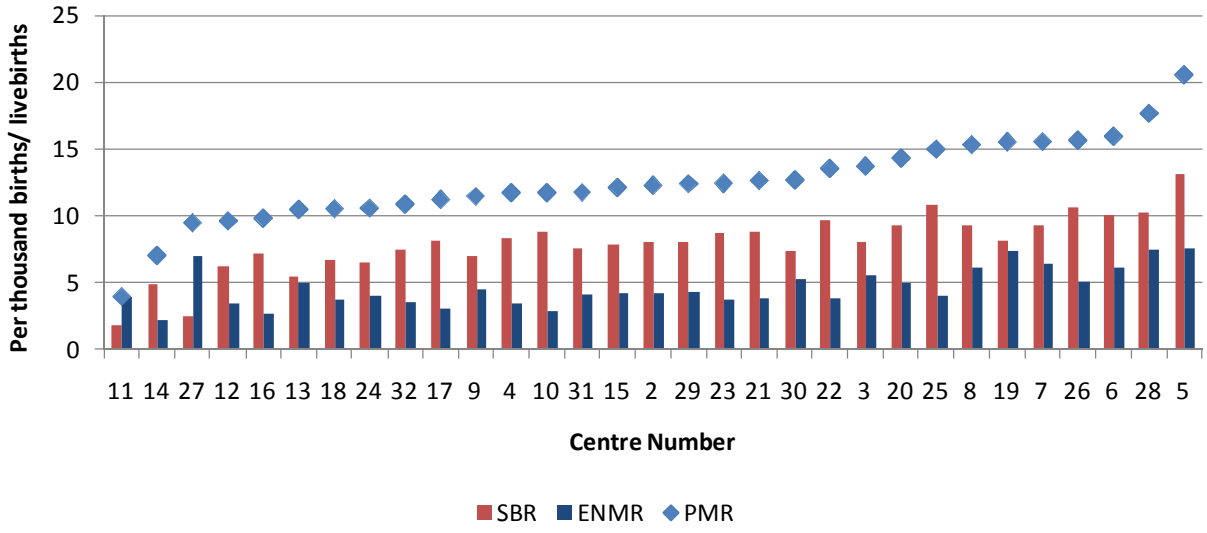


Figure 54. Centre Mortality rates

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 54).[11] 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 57 and 57a-e and Figure 55. The shorter stay of babies 500 g birth weight or below was related to their lower survival rate.

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

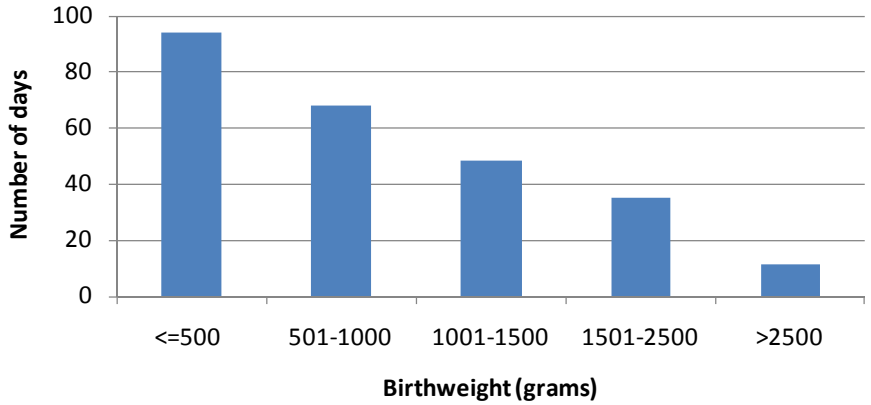


Figure 55. Duration of hospital stay of survivors according to birthweight category

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).

[11] Perinatal, Stillbirth and Neonatal Mortality Report MOH, 2003-2006

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

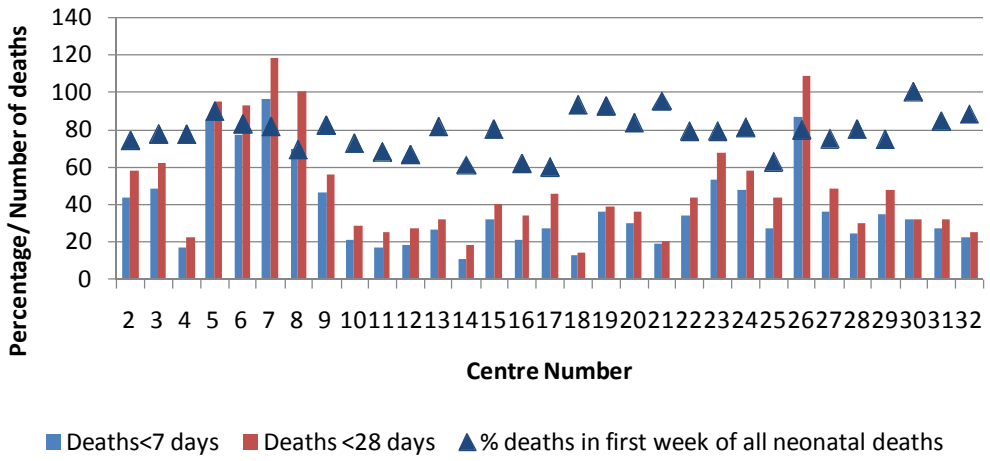


Figure 56. Number and percentage of deaths according to gestational age and centre

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 MNNR.
f. to continuously improve infection control measures.

5.0 References

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10. American Academy of Pediatrics Committee of Fetus and Newborn and the Canadian Pediatric Society Newborn and Fetus Committee. Postnatal Corticosteroids to treat or prevent chronic lung disease in preterm babies. Paediatrics & Child Health 2002; 7(1): 20-28.

11. Perinatal, Stillbirth and Neonatal Mortality Report MOH, 2003-2006 (*in press*)

MNNR

DATA TABLES

Table 1. Admissions to each NICU, by year

Centre	No. of babies admitted to the Neonatal Unit				No. of babies included in the study			
	2004	**2005**	**2006**	**2007**	**2004**	**2005**	**2006**	**2007**
All Centres	45557	54671	64106	72777	7350	9023	10387	10835
2	2923	3069	3151	3576	452	509	566	401
3	941	1620	2799	2943	369	446	494	594
4	1020	1539	1357	1367	252	248	265	242
5	1251	1463	2281	2838	402	481	633	661
6	2135	2553	2674	2850	343	349	438	454
7	5074	4657	4488	4804	674	671	862	847
8	3566	4373	4458	5850	403	463	548	557
9	3486	3862	3963	4405	350	390	380	360
10	1131	1913	2921	3218	146	213	329	308
11	2182	2327	2421	2716	82	114	104	114
12	2023	2402	2273	2502	251	211	199	194
13	1602	1572	1516	1635	262	276	280	310
14	887	841	852	875	163	157	106	158
15	1187	1369	1233	1322	208	183	241	264
16	1266	1492	1727	1580	384	368	413	355
17	1469	1759	2199	3586	312	433	368	433
18	565	643	554	699	71	72	108	106
19	812	827	1387	1470	270	295	364	336
20	1993	1993	2371	2241	228	218	309	264
21	1535	1558	1351	1199	139	162	119	131
22	2477	3316	2705	2933	372	428	437	472
23	2597	2351	2509	2746	714	665	627	645
24	2543	2483	2686	2335	312	386	456	436
25	892	1408	1791	2071	191	309	293	294
26	0	2638	2930	3029	0	784	779	625
27	0	468	746	978	0	156	179	179
28	0	175	1003	1066	0	36	84	96
29	0	0	3192	3014	0	0	266	305
30	0	0	517	1123	0	0	113	260
31	0	0	51	677	0	0	27	276
32	0	0	0	1129	0	0	0	158

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

Gestational age group (weeks)	All Babies in study	2004		2005		2006		2007	
		No. of Cases	%	No. of Cases	%	No. of Cases	%	No. of Cases	%
<22	36	9	0	5	0	16	0	6	0
22-24	748	168	2	173	2	190	2	217	2
25-27	2452	601	8	607	7	610	6	634	6
28-31	8540	1744	24	2116	23	2334	22	2346	22
32-36	12058	2328	32	2956	33	3329	32	3445	32
>=37	13761	2500	34	3166	35	3908	38	4187	39
Total	37595	7350	100	9023	100	10387	100	10835	100

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

Birth weight group (grams)	All Babies in study	2004		2005		2006		2007	
		No. of Cases	%	No. of Cases	%	No. of Cases	%	No. of Cases	%
<=500	169	38	1	32	0	49	0	50	0
501-750	1447	299	4	360	4	370	4	418	4
751-1000	2885	608	8	738	8	767	7	772	7
1001-1500	8880	1846	25	2224	25	2399	23	2411	22
1501-2500	12012	2315	31	2899	32	3390	33	3408	31
>2500	12202	2244	31	2770	31	3412	33	3776	35
Total	37595	7350	100	9023	100	10387	100	10835	100

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

Ethnic group	All Babies in study				<22(weeks								22-24 weeks							
	2004	2005	2006	2007	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	No.	No.	No.	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	4731	5850	6579	6812	4	0	2	0	11	0	4	0	104	2	103	2	104	2	119	2
Chinese	778	1057	1108	1162	2	0	0	0	0	0	0	0	22	3	28	3	31	3	34	3
Indian	643	683	761	759	0	0	1	0	1	0	1	0	16	2	16	2	13	2	14	2
Orang Asli	101	130	143	158	0	0	0	0	0	0	0	0	1	1	2	2	2	1	3	2
Bumiputra Sabah	296	385	527	556	2	1	1	0	2	0	0	0	8	3	6	2	12	2	9	2
Bumiputra Sarawak	327	463	577	560	1	0	0	0	0	0	0	0	8	2	9	2	11	2	12	2
Other Malaysians	35	47	83	81	0	0	0	0	0	0	0	0	3	9	2	4	2	2	0	0
Foreigner	439	407	605	745	0	0	1	0	2	0	1	0	6	1	7	2	15	2	25	3
Total	7350	9022	10383	10833	9	0	5	0	16	0	6	0	168	2	173	2	190	2	216	2

Ethnic group	25-27 weeks								28-31 weeks							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	347	7	377	6	349	5	398	6	1093	23	1320	23	1464	22	1445	21
Chinese	77	10	92	9	86	8	70	6	215	28	265	25	253	23	267	23
Indian	66	10	44	6	51	7	40	5	155	24	147	22	145	19	143	19
Orang Asli	5	5	11	8	8	6	9	6	20	20	29	22	33	23	30	19
Bumiputra Sabah	26	9	27	7	38	7	34	6	78	26	92	24	128	24	133	24
Bumiputra Sarawak	31	9	37	8	39	7	50	9	88	27	152	33	169	29	163	29
Other Malaysians	5	14	2	4	6	7	6	7	4	11	11	23	15	18	22	27
Foreigner	44	10	17	4	33	5	27	4	91	21	100	25	126	21	143	19
Total	601	8	607	7	610	6	634	6	1744	24	2116	23	2333	22	2346	22

Ethnic group	32-26 weeks								37 weeks and above							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	1471	31	1914	33	2102	32	2197	32	1712	36	2134	36	2549	39	2649	39
Chinese	252	32	334	32	353	32	382	33	210	27	338	32	385	35	409	35
Indian	223	35	246	36	270	35	250	33	183	28	229	34	281	37	311	41
Orang Asli	45	45	49	38	53	37	64	41	30	30	39	30	47	33	52	33
Bumiputra Sabah	95	32	114	30	163	31	159	29	87	29	145	38	184	35	221	40
Bumiputra Sarawak	111	34	155	33	182	32	168	30	88	27	110	24	176	31	167	30
Other Malaysians	8	23	13	28	27	33	25	31	15	43	19	40	33	40	28	35
Foreigner	123	28	130	32	177	29	199	27	175	40	152	37	252	42	350	47
Total	2328	32	2955	33	3327	32	3444	32	2500	34	3166	35	3907	38	4187	39

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

Ethnic group	All Babies in study				BW < 501 g								BW 501-750 g							
	2004	2005	2006	2007	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	No.	No.	No.	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	4731	5850	6579	6812	14	0	17	0	18	0	12	0	178	4	220	4	227	3	246	4
Chinese	778	1057	1108	1162	1	0	2	0	8	1	6	1	32	4	46	4	42	4	50	4
Indian	643	683	761	759	2	0	2	0	3	0	1	0	34	5	36	5	31	4	28	4
Orang Asli	101	130	143	158	1	1	0	0	0	0	0	0	4	4	5	4	3	2	6	4
Bumiputra Sabah	296	385	527	556	0	0	1	0	1	0	2	0	13	4	15	4	21	4	22	4
Bumiputra Sarawak	327	463	577	560	1	0	0	0	0	0	0	0	16	5	19	4	19	3	31	6
Other Malaysians	35	47	83	81	0	0	0	0	1	1	0	0	3	9	6	13	1	1	4	5
Foreigner	439	407	605	745	1	0	0	0	0	0	2	0	19	4	13	3	26	4	30	4
Total	7350	9022	10383	10833	20	0	22	0	31	0	23	0	299	4	360	4	370	4	417	4

Ethnic group	BW 751-1000 g								BW 1001-1500 g							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	383	8	457	8	461	7	475	7	1082	23	1373	23	1467	22	1502	22
Chinese	67	9	109	10	105	9	80	7	217	28	265	25	253	23	263	23
Indian	78	12	65	10	58	8	64	8	180	28	168	25	176	23	146	19
Orang Asli	3	3	8	6	14	10	9	6	29	29	42	32	41	29	30	19
Bumiputra Sabah	26	9	27	7	42	8	56	10	102	34	107	28	140	27	133	24
Bumiputra Sarawak	25	8	43	9	40	7	41	7	117	36	153	33	171	30	179	32
Other Malaysians	4	11	1	2	5	6	6	7	6	17	13	28	21	25	20	25
Foreigner	22	5	28	7	41	7	41	6	113	26	102	25	129	21	137	18
Total	608	8	738	8	766	7	772	7	1846	25	2223	25	2398	23	2410	22

Ethnic group	BW 1501-2500 g								BW > 2500 g							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	1528	32	1877	32	2153	33	2129	31	1538	33	1899	32	2244	34	2435	36
Chinese	253	33	340	32	336	30	372	32	206	26	295	28	362	33	388	33
Indian	190	30	219	32	255	34	242	32	154	24	191	28	235	31	273	36
Orang Asli	45	45	50	38	51	36	79	50	19	19	25	19	34	24	33	21
Bumiputra Sabah	80	27	117	30	160	30	174	31	74	25	118	31	159	30	169	30
Bumiputra Sarawak	87	27	161	35	210	36	163	29	80	24	86	19	137	24	144	26
Other Malaysians	10	29	11	23	28	34	24	30	12	34	16	34	27	33	27	33
Foreigner	122	28	124	30	195	32	225	30	161	37	140	34	214	35	307	41
Total	2315	31	2899	32	3388	33	3408	31	2244	31	2770	31	3412	33	3776	35

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

Gestational age group (weeks)	All Babies in study				Antenatal steroids given							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	0	0	0	0	0	0	1	17
22-24	168	173	190	217	48	29	52	30	61	32	76	35
25-27	601	607	610	634	354	59	320	53	337	55	360	57
28-31	1744	2116	2334	2346	1117	64	1273	60	1434	61	1518	65
<32	2522	2901	3150	3203	1519	60	1645	57	1832	58	1955	61
32-33	1107	1376	1528	1567	700	63	765	56	889	58	946	60
<34	3629	4277	4678	4770	2219	61	2410	56	2721	58	2901	61
>=34	3721	4746	5709	6065	462	12	599	13	648	11	731	12
Total	7350	9023	10387	10835	2681	36	3009	33	3369	32	3632	34

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

Gestational age group (weeks)	2004			2005			2006			2007		
	No. of Cases	Mean Maternal Age	SD	No. of Cases	Mean Maternal Age	SD	No. of Cases	Mean Maternal Age	SD	No. of Cases	Mean Maternal Age	SD
<22	9	28	5	5	27	8	16	30	5	6	25	8
22-24	168	30	7	173	29	6	190	29	6	217	28	7
25-27	601	29	6	606	29	7	610	29	7	634	28	7
28-31	1744	29	7	2113	30	7	2334	29	7	2346	29	7
32-36	2328	30	7	2946	30	7	3329	29	7	3445	30	7
>=37	2500	31	6	3155	31	6	3908	30	6	4187	30	6
Total	7350	30	7	8998	30	7	10387	29	7	10835	29	6

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

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

Gestational age group (weeks)	All Babies in study				SGA							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	2	22	1	20	4	25	3	50
22-24	168	173	190	217	40	24	31	18	53	28	54	25
25-27	601	607	610	634	95	16	104	17	107	18	107	17
28-31	1744	2116	2334	2346	239	14	373	18	412	18	412	18
32-36	2328	2956	3329	3445	539	23	744	25	1062	32	1016	29
>=37	2500	3166	3908	4187	362	14	494	16	962	25	1023	24
Total	7350	9023	10387	10835	1277	17	1747	19	2600	25	2615	24

Gestational age group (weeks)	AGA								LGA							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	7	78	3	60	10	63	3	50	0	0	1	20	2	13	0	0
22-24	126	75	141	82	130	68	155	71	2	1	1	1	7	4	8	4
25-27	501	83	493	81	470	77	501	79	5	1	10	2	33	5	26	4
28-31	1456	83	1681	79	1804	77	1835	78	49	3	61	3	118	5	98	4
32-36	1740	75	2153	73	2141	64	2299	67	49	2	59	2	126	4	129	4
>=37	1989	80	2461	78	2748	70	2955	71	149	6	210	7	198	5	209	5
Total	5819	79	6932	77	7303	70	7748	72	254	3	342	4	484	5	470	4

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

Birthweight group (grams)	All Babies in study				SGA							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	25	66	19	59	34	69	27	54
501-750	299	360	370	418	94	31	122	34	131	35	140	33
751-1000	608	738	767	772	189	31	248	34	274	36	265	34
1001-1500	1846	2224	2399	2411	479	26	709	32	866	36	851	35
1501-2500	2315	2899	3390	3408	461	20	597	21	1037	31	986	29
>2500	2244	2770	3412	3776	29	1	52	2	258	8	346	9
Total	7350	9023	10387	10835	1277	17	1747	19	2600	25	2615	24

Birthweight group (grams)	AGA								LGA							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	12	32	12	38	15	31	21	42	1	3	1	3	0	0	2	4
501-750	204	68	234	65	235	64	275	66	1	0	4	1	4	1	3	1
751-1000	418	69	489	66	488	64	497	64	1	0	1	0	5	1	10	1
1001-1500	1361	74	1500	67	1492	62	1527	63	6	0	14	1	41	2	32	1
1501-2500	1800	78	2239	77	2221	66	2312	68	54	2	63	2	132	4	109	3
>2500	2024	90	2458	89	2852	84	3116	83	191	9	259	9	302	9	314	8
Total	5819	79	6932	77	7303	70	7748	72	254	3	342	4	484	5	470	4

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

Gestational age group (weeks)	All Babies in study				Male							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	4	44	4	80	9	56	4	67
22-24	168	173	190	217	91	54	109	63	113	59	117	54
25-27	601	607	610	634	327	54	331	55	345	57	343	54
28-31	1744	2116	2334	2346	985	56	1183	56	1293	55	1298	55
32-36	2328	2956	3329	3445	1345	58	1666	56	1860	56	1931	56
>=37	2500	3166	3908	4187	1507	60	1948	62	2350	60	2501	60
Total	7350	9023	10387	10835	4259	58	5241	58	5970	57	6194	57

Gestational age group (weeks)	Female								Indeterminate							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	5	56	1	20	7	44	2	33	0	0	0	0	0	0	0	0
22-24	77	46	63	36	77	41	99	46	0	0	1	1	0	0	1	0
25-27	271	45	275	45	261	43	287	45	3	0	1	0	4	1	3	0
28-31	754	43	926	44	1035	44	1044	45	5	0	6	0	6	0	4	0
32-36	973	42	1277	43	1453	44	1497	43	10	0	13	0	16	0	17	0
>=37	984	39	1206	38	1537	39	1663	40	9	0	12	0	21	1	23	1
Total	3064	42	3748	42	4370	42	4592	42	27	0	33	0	47	0	48	0

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

Birthweight group (grams)	All Babies in study				Male							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	11	29	14	44	22	45	20	40
501-750	299	360	370	418	148	49	183	51	190	51	206	49
751-1000	608	738	767	772	322	53	377	51	421	55	396	51
1001-1500	1846	2224	2399	2411	1010	55	1144	51	1247	52	1274	53
1501-2500	2315	2899	3390	3408	1375	59	1737	60	1960	58	1953	57
>2500	2244	2770	3412	3776	1393	62	1786	64	2130	62	2345	62
Total	7350	9023	10387	10835	4259	58	5241	58	5970	57	6194	57

Birthweight group (grams)	Female								Indeterminate							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	26	68	18	56	26	53	29	58	1	3	0	0	1	2	1	2
501-750	151	51	173	48	178	48	211	50	0	0	3	1	2	1	1	0
751-1000	283	47	360	49	343	45	374	48	3	0	1	0	3	0	1	0
1001-1500	829	45	1072	48	1144	48	1123	47	7	0	8	0	8	0	14	1
1501-2500	930	40	1146	40	1408	42	1434	42	10	0	16	1	22	1	21	1
>2500	845	38	979	35	1271	37	1421	38	6	0	5	0	11	0	10	0
Total	3064	42	3748	42	4370	42	4592	42	27	0	33	0	47	0	48	0

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

Gestational age group (weeks)	All Babies in study				University Hospital								General Hospital							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2006	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	0	0	0	0	0	0	0	0	7	78	2	40	14	88	5	83
22-24	168	173	190	217	5	3	6	3	2	1	6	3	108	64	110	64	125	66	122	56
25-27	601	607	610	634	12	2	7	1	26	4	17	3	370	62	387	64	362	59	403	64
28-31	1744	2116	2334	2346	24	1	51	2	45	2	57	2	1103	63	1334	63	1484	64	1459	62
32-36	2328	2956	3329	3445	41	2	57	2	62	2	78	2	1436	62	1900	64	2014	60	2143	62
>=37	2500	3166	3908	4187	55	2	97	3	106	3	93	2	1459	58	1885	60	2275	58	2419	58
Total	7350	9023	10387	10835	137	2	218	2	241	2	251	2	4483	61	5618	62	6274	60	6551	60

Gestational age group (weeks)	Private Hospital								District Hospital with Specialist								District Hospital without Specialist							
	2004		2005		2006		2007		2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	0	0	0	0	0	0	0	0	2	22	3	60	2	13	0	0	0	0	0	0	0	0	0	0
22-24	2	1	4	2	5	3	5	2	38	23	49	28	42	22	74	34	7	4	2	1	8	4	3	1
25-27	19	3	16	3	23	4	13	2	117	19	129	21	136	22	151	24	39	6	30	5	26	4	21	3
28-31	49	3	65	3	37	2	34	1	345	20	448	21	541	23	591	25	117	7	112	5	127	5	97	4
32-36	64	3	71	2	104	3	78	2	525	23	630	21	869	26	892	26	119	5	154	5	146	4	119	3
>=37	89	4	110	3	131	3	150	4	516	21	627	20	885	23	1046	25	217	9	264	8	287	7	268	6
Total	223	3	266	3	300	3	280	3	1543	21	1886	21	2475	24	2754	25	499	7	562	6	594	6	508	5

Gestational age group (weeks)	Private Maternity Home								Home								Others							
	2004		2005		2006		2007		2004		2005		2006		2007		2004		2005		2006		2007	
	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	1	17	0	0	0	0	0	0	0	0
22-24	0	0	1	1	1	1	0	0	6	4	0	0	3	2	5	2	2	1	1	1	4	2	1	0
25-27	9	1	2	0	4	1	3	0	17	3	22	4	24	4	11	2	18	3	14	2	9	1	15	2
28-31	15	1	16	1	9	0	17	1	47	3	52	2	48	2	51	2	44	3	38	2	42	2	40	2
32-36	55	2	54	2	37	1	34	1	57	2	41	1	51	2	63	2	31	1	48	2	45	1	38	1
>=37	91	4	114	4	122	3	110	3	46	2	40	1	54	1	59	1	27	1	29	1	48	1	42	1
Total	170	2	187	2	173	2	164	2	173	2	155	2	180	2	190	2	122	2	130	1	148	1	136	1

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

Birthweight group (grams)	All Babies in study				University Hospital								General Hospital							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	0	0	1	3	0	0	1	2	29	76	25	78	34	69	35	70
501-750	299	360	370	418	8	3	7	2	8	2	9	2	195	65	253	70	249	67	255	61
751-1000	608	738	767	772	14	2	16	2	29	4	20	3	384	63	473	64	474	62	502	65
1001-1500	1846	2224	2399	2411	28	2	43	2	53	2	57	2	1153	62	1428	64	1506	63	1509	63
1501-2500	2315	2899	3390	3408	34	1	72	2	61	2	72	2	1426	62	1789	62	2028	60	2086	61
>2500	2244	2770	3412	3776	53	2	79	3	90	3	92	2	1296	58	1650	60	1983	58	2164	57
Total	7350	9023	10387	10835	137	2	218	2	241	2	251	2	4483	61	5618	62	6274	60	6551	60

Birthweight group (grams)	Private Hospital								District Hospital with Specialist								District Hospital without Specialist							
	2004		2005		2006		2007		2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	1	3	0	0	0	0	0	0	6	16	6	19	12	24	13	26	0	0	0	0	1	2	0	0
501-750	3	1	6	2	12	3	6	1	65	22	77	21	84	23	128	31	8	3	4	1	9	2	5	1
751-1000	20	3	25	3	20	3	11	1	125	21	154	21	173	23	183	24	34	6	26	4	40	5	21	3
1001-1500	42	2	60	3	41	2	48	2	366	20	451	20	549	23	574	24	122	7	135	6	117	5	96	4
1501-2500	62	3	68	2	87	3	70	2	522	23	634	22	868	26	896	26	134	6	179	6	188	6	149	4
>2500	95	4	107	4	140	4	145	4	459	20	564	20	789	23	960	25	201	9	218	8	239	7	237	6
Total	223	3	266	3	300	3	280	3	1543	21	1886	21	2475	24	2754	25	499	7	562	6	594	6	508	5

Birth weight group (grams)	Private Maternity Home								Home								Others							
	2004		2005		2006		2007		2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	0	0	0	0	0	0	0	0	1	3	0	0	1	2	1	2	1	3	0	0	1	2	0	0
501-750	6	2	2	1	1	0	1	0	8	3	9	3	6	2	10	2	6	2	2	1	1	0	3	1
751-1000	5	1	3	0	3	0	4	1	10	2	23	3	18	2	13	2	16	3	18	2	10	1	18	2
1001-1500	19	1	14	1	11	0	17	1	71	4	50	2	71	3	66	3	45	2	42	2	50	2	44	2
1501-2500	51	2	60	2	58	2	36	1	54	2	53	2	50	1	58	2	32	1	44	2	49	1	41	1
>2500	89	4	108	4	100	3	106	3	29	1	20	1	34	1	42	1	22	1	24	1	37	1	30	1
Total	170	2	187	2	173	2	164	2	173	2	155	2	180	2	190	2	122	2	130	1	148	1	136	1

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

Gestational age group (weeks)	All Babies in study				Inborn								Outborn							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	9	100	5	100	15	94	4	67	0	0	0	0	1	6	2	33
22-24	168	173	190	217	151	90	161	93	170	89	198	91	17	10	12	7	20	11	19	9
25-27	601	607	610	634	473	79	495	82	517	85	559	88	128	21	112	18	93	15	75	12
28-31	1744	2116	2334	2346	1424	82	1765	83	2014	86	2041	87	320	18	351	17	320	14	305	13
32-36	2328	2956	3329	3445	1883	81	2488	84	2836	85	3008	87	445	19	468	16	493	15	437	13
>=37	2500	3166	3908	4187	1879	75	2392	76	3031	78	3335	80	621	25	774	24	877	22	852	20
Total	7350	9023	10387	10835	5819	79	7306	81	8583	83	9145	84	1531	21	1717	19	1804	17	1690	16

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

Birth weight group (grams)	All Babies in study				Inborn								Outborn							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	36	95	32	100	45	92	49	98	2	5	0	0	4	8	1	2
501-750	299	360	370	418	263	88	325	90	340	92	388	93	36	12	35	10	30	8	30	7
751-1000	608	738	767	772	487	80	617	84	643	84	684	89	121	20	121	16	124	16	88	11
1001-1500	1846	2224	2399	2411	1502	81	1851	83	2059	86	2073	86	344	19	373	17	340	14	338	14
1501-2500	2315	2899	3390	3408	1856	80	2365	82	2829	83	2930	86	459	20	534	18	561	17	478	14
>2500	2244	2770	3412	3776	1675	75	2116	76	2667	78	3021	80	569	25	654	24	745	22	755	20
Total	7350	9023	10387	10835	5819	79	7306	81	8583	83	9145	84	1531	21	1717	19	1804	17	1690	16

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

Gestational age group (weeks)	All Babies in study				Singletons								Twins							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	9	100	5	100	13	81	6	100	0	0	0	0	3	19	0	0
22-24	168	173	190	217	144	86	151	87	170	89	183	84	19	11	22	13	20	11	33	15
25-27	601	607	610	634	504	84	489	81	533	87	537	85	90	15	111	18	65	11	87	14
28-31	1744	2116	2334	2346	1488	85	1829	86	2029	87	1992	85	234	13	266	13	287	12	327	14
32-36	2328	2956	3329	3445	2096	90	2667	90	2956	89	3066	89	212	9	275	9	333	10	351	10
>=37	2500	3166	3908	4187	2455	98	3102	98	3819	98	4111	98	44	2	63	2	87	2	71	2
Total	7350	9023	10387	10835	6696	91	8243	91	9520	92	9895	91	599	8	737	8	795	8	869	8

Gestational age group (weeks)	Triplets								Others							
	2004		2005		2006		2007		2004		2005		2006		2007	
	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	5	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0
25-27	7	1	7	1	7	1	6	1	0	0	0	0	5	1	4	1
28-31	22	1	20	1	18	1	27	1	0	0	1	0	0	0	0	0
32-36	19	1	12	0	39	1	25	1	1	0	1	0	0	0	3	0
>=37	1	0	0	0	0	0	2	0	0	0	1	0	1	0	3	0
Total	54	1	39	0	64	1	61	1	1	0	3	0	6	0	10	0

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

Birthweight group (grams)	All Babies in study				Singletons								Twins							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	28	74	24	75	41	84	41	82	10	26	7	22	7	14	9	18
501-750	299	360	370	418	250	84	289	80	314	85	346	83	43	14	67	19	51	14	65	16
751-1000	608	738	767	772	504	83	622	84	663	86	638	83	94	15	111	15	97	13	124	16
1001-1500	1846	2224	2399	2411	1583	86	1901	85	2039	85	2002	83	237	13	299	13	328	14	375	16
1501-2500	2315	2899	3390	3408	2104	91	2661	92	3087	91	3125	92	198	9	230	8	276	8	266	8
>2500	2244	2770	3412	3776	2227	99	2746	99	3376	99	3743	99	17	1	23	1	36	1	30	1
Total	7350	9023	10387	10835	6696	91	8243	91	9520	92	9895	91	599	8	737	8	795	8	869	8

Birth weight group (grams)	Triplets								Others							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	0	0	1	3	1	2	0	0	0	0	0	0	0	0	0	0
501-750	6	2	3	1	1	0	7	2	0	0	1	0	4	1	0	0
751-1000	10	2	5	1	6	1	6	1	0	0	0	0	1	0	4	1
1001-1500	25	1	22	1	31	1	32	1	1	0	1	0	1	0	2	0
1501-2500	13	1	8	0	25	1	16	0	0	0	0	0	0	0	1	0
>2500	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0
Total	54	1	39	0	64	1	61	1	1	0	3	0	6	0	10	0

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

Gestational age group (weeks)	All Babies in study				SVD								Breech							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	8	89	4	80	14	88	6	100	1	11	0	0	1	6	0	0
22-24	168	173	190	217	136	81	129	75	154	81	178	82	20	12	23	13	25	13	26	12
25-27	601	607	610	634	406	68	396	65	403	66	401	63	57	9	64	11	44	7	53	8
28-31	1744	2116	2334	2346	934	54	1099	52	1192	51	1156	49	88	5	95	4	86	4	96	4
32-36	2328	2956	3329	3445	1086	47	1355	46	1494	45	1468	43	67	3	76	3	80	2	61	2
>=37	2500	3166	3908	4187	1391	56	1705	54	2141	55	2174	52	52	2	45	1	59	2	48	1
Total	7350	9023	10387	10835	3961	54	4688	52	5398	52	5383	50	285	4	303	3	295	3	284	3

Gestational age group (weeks)	Forceps								Ventouse							
	2004		2005		2006		2007		2004		2005		2006		2007	
	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	1	0	0	0	0	0	1	0	0	0	3	0	0	0	1	0
28-31	2	0	3	0	4	0	7	0	0	0	4	0	3	0	1	0
32-36	9	0	11	0	16	0	8	0	17	1	18	1	20	1	23	1
>=37	35	1	54	2	26	1	34	1	101	4	158	5	221	6	274	7
Total	47	1	68	1	46	0	50	0	118	2	183	2	244	2	299	3

Gestational age group (weeks)	Caesarean Section								Unknown							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	0	0	1	20	1	6	0	0	0	0	0	0	0	0	0	0
22-24	12	7	21	12	11	6	13	6	0	0	0	0	0	0	0	0
25-27	137	23	143	24	163	27	178	28	0	0	1	0	0	0	0	0
28-31	720	41	915	43	1048	45	1085	46	0	0	0	0	1	0	1	0
32-36	1149	49	1495	51	1718	52	1883	55	0	0	1	0	1	0	2	0
>=37	921	37	1202	38	1459	37	1654	40	0	0	2	0	2	0	3	0
Total	2939	40	3777	42	4400	42	4813	44	0	0	4	0	4	0	6	0

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

Birth weight group (grams)	All Babies in study				SVD								Breech							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No	%
<=500	38	32	49	50	27	71	21	66	34	69	37	74	2	5	3	9	6	12	3	6
501-750	299	360	370	418	207	69	225	63	246	66	266	64	33	11	41	11	30	8	46	11
751-1001	608	738	767	772	348	57	368	50	410	53	388	50	51	8	61	8	44	6	49	6
1001-1500	1846	2224	2399	2411	918	50	1086	49	1137	47	1077	45	89	5	90	4	87	4	79	3
1501-2500	2315	2899	3390	3408	1212	52	1518	52	1711	50	1678	49	73	3	78	3	81	2	65	2
>2500	2244	2770	3412	3776	1249	56	1470	53	1860	55	1937	51	37	2	30	1	47	1	42	1
Total	7350	9023	10387	10835	3961	54	4688	52	5398	52	5383	50	285	4	303	3	295	3	284	3

Birth weight group (grams)	Forceps								Ventouse							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0
501-750	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
751-1500	1	0	1	0	0	0	1	0	0	0	4	1	0	0	1	0
1001-1500	2	0	2	0	4	0	4	0	0	0	2	0	1	0	2	0
1501-2500	10	0	14	0	14	0	12	0	20	1	23	1	30	1	34	1
>2500	34	2	51	2	28	1	33	1	98	4	153	6	213	6	262	7
Total	47	1	68	1	46	0	50	0	118	2	183	2	244	2	299	3

Birth weight group (grams)	Caesarean Section								Unknown							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	9	24	7	22	9	18	10	20	0	0	0	0	0	0	0	0
501-750	59	20	94	26	94	25	106	25	0	0	0	0	0	0	0	0
751-1500	208	34	303	41	312	41	333	43	0	0	1	0	1	0	0	0
1001-1500	837	45	1043	47	1169	49	1247	52	0	0	1	0	1	0	2	0
1501-2500	1000	43	1266	44	1552	46	1618	47	0	0	0	0	2	0	1	0
>2500	826	37	1064	38	1264	37	1499	40	0	0	2	0	0	0	3	0
Total	2939	40	3777	42	4400	42	4813	44	0	0	4	0	4	0	6	0

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

Gestational age group (weeks)	All Babies in study				Babies with Ventilatory support							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	1	11	0	0	3	19	1	17
22-24	168	173	190	217	74	44	72	42	81	43	97	45
25-27	601	607	610	634	493	82	506	83	504	83	530	84
28-31	1744	2116	2334	2346	1416	81	1720	81	1962	84	2033	87
32-36	2328	2956	3329	3445	1967	84	2489	84	2705	81	2878	84
>=37	2500	3166	3908	4187	2359	94	2985	94	3309	85	3523	84
Total	7350	9023	10387	10835	6310	86	7772	86	8564	82	9062	84

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

Birth weight group (grams)	All Babies in study				Babies with Ventilatory support							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	10	26	8	25	7	14	16	32
501-750	299	360	370	418	161	54	208	58	224	61	257	61
751-1000	608	738	767	772	525	86	649	88	670	87	681	88
1001-1500	1846	2224	2399	2411	1315	71	1553	70	1730	72	1825	76
1501-2500	2315	2899	3390	3408	2121	92	2653	92	2973	88	3016	88
>2500	2244	2770	3412	3776	2178	97	2701	98	2960	87	3267	87
Total	7350	9023	10387	10835	6310	86	7772	86	8564	82	9062	84

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 other modes of VS							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	1	33	1	100
22-24	74	72	81	97	10	14	9	13	3	4	4	4	10	14	15	21	16	20	16	16
25-27	493	506	504	530	56	11	31	6	33	7	39	7	169	34	187	37	223	44	233	44
28-31	1416	1720	1962	2033	232	16	301	18	329	17	386	19	507	36	637	37	887	45	990	49
32-36	1967	2489	2705	2878	508	26	693	28	782	29	952	33	451	23	576	23	776	29	827	29
>=37	2359	2985	3309	3523	341	14	466	16	528	16	735	21	253	11	414	14	530	16	573	16
Total	6310	7772	8564	9062	1147	18	1500	19	1675	20	2116	23	1390	22	1829	24	2433	28	2640	29

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

Birth weight group (grams)	All Babies on VS				Babies with CPAP alone								Babies with CPAP in combination with any other modes of VS							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	10	8	7	16	3	30	2	25	0	0	4	25	1	10	1	13	3	43	2	13
501-750	161	208	224	257	25	16	26	13	21	9	25	10	27	17	56	27	66	29	86	33
751-1000	525	649	670	681	65	12	62	10	53	8	65	10	188	36	261	40	340	51	334	49
1001-1500	1315	1553	1730	1825	230	17	318	20	339	20	402	22	478	36	542	35	732	42	848	46
1501-2500	2121	2653	2973	3016	493	23	653	25	767	26	923	31	462	22	600	23	815	27	835	28
>2500	2178	2701	2960	3267	331	15	439	16	495	17	697	21	234	11	369	14	477	16	535	16
Total	6310	7772	8564	9062	1147	18	1500	19	1675	20	2116	23	1390	22	1829	24	2433	28	2640	29

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 other modes of VS							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	1	0	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
22-24	74	72	81	97	3	4	2	3	2	2	3	3	3	4	5	7	4	5	9	9
25-27	493	506	504	530	7	1	9	2	9	2	13	2	21	4	20	4	48	10	47	9
28-31	1416	1720	1962	2033	4	0	13	1	14	1	6	0	28	2	40	2	74	4	73	4
32-36	1967	2489	2705	2878	5	0	11	0	11	0	17	1	20	1	35	1	41	2	61	2
>=37	2359	2985	3309	3523	25	1	34	1	33	1	25	1	30	1	81	3	138	4	135	4
Total	6310	7772	8564	9062	44	1	69	1	69	1	64	1	102	2	181	2	305	4	325	4

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

Birth weight group (grams)	All Babies on VS				Babies with HFOV alone								Babies with HFOV in combination with any other modes of VS							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No..	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	10	8	7	16	0	0	1	13	0	0	0	0	0	0	1	13	0	0	1	6
501-750	161	208	224	257	5	3	5	2	2	1	5	2	7	4	10	5	19	8	22	9
751-1000	525	649	670	681	4	1	7	1	12	2	9	1	25	5	23	4	48	7	49	7
1001-1500	1315	1553	1730	1825	4	0	10	1	9	1	12	1	17	1	30	2	59	3	54	3
1501-2500	2121	2653	2973	3016	4	0	15	1	18	1	14	0	23	1	42	2	54	2	71	2
>2500	2178	2701	2960	3267	27	1	31	1	28	1	24	1	30	1	75	3	125	4	128	4
Total	6310	7772	8564	9062	44	1	69	1	69	1	64	1	102	2	181	2	305	4	325	4

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

Gestational age group (weeks)	All Babies on VS				Babies with Nitric Oxide							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<22	1	0	3	1	0	0	0	0	0	0	0	0
22-24	74	72	81	97	0	0	0	0	0	0	0	0
25-27	493	506	504	530	1	0	1	0	2	0	1	0
28-31	1416	1720	1962	2033	2	0	5	0	6	0	8	0
32-36	1967	2489	2705	2878	5	0	8	0	7	0	12	0
>=37	2359	2985	3309	3523	17	1	32	1	60	2	77	2
Total	6310	7772	8564	9062	25	0	46	1	75	1	98	1

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

Birth weight group (grams)	All Babies on VS				Babies with Nitric Oxide							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	10	8	7	16	0	0	0	0	0	0	0	0
501-750	161	208	224	257	0	0	0	0	1	0	0	0
751-1000	525	649	670	681	1	0	1	0	0	0	1	0
1001-1500	1315	1553	1730	1825	2	0	3	0	4	0	5	0
1501-2500	2121	2653	2973	3016	3	0	10	0	19	1	28	1
>2500	2178	2701	2960	3267	19	1	32	1	51	2	64	2
Total	6310	7772	8564	9062	25	0	46	1	75	1	98	1

Table 17. Use of patient-trigger ventilation according to gestational age group, by year

Gestational age group (weeks)	All Babies on VS				Babies with IMV +PTV							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<22	1	0	3	1	0	0	0	0	0	0	0	0
22-24	74	72	81	97	13	18	10	14	18	22	18	19
25-27	493	506	504	530	62	13	62	12	54	11	119	22
28-31	1416	1720	1962	2033	151	11	200	12	208	11	324	16
32-36	1967	2489	2705	2878	128	7	182	7	173	6	344	12
>=37	2359	2985	3309	3523	261	11	295	10	294	9	526	15
Total	6310	7772	8564	9062	615	10	749	10	747	9	1331	15

Table 17a. Use of patient-trigger ventilation according to birthweight group, by year

Birth weight group (grams)	All Babies on VS				Babies with IMV +PTV							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	10	8	7	16	2	20	1	13	0	0	2	13
501-750	161	208	224	257	27	17	20	10	33	15	55	21
751-1000	525	649	670	681	67	13	75	12	72	11	119	17
1001-1500	1315	1553	1730	1825	108	8	173	11	159	9	283	16
1501-2500	2121	2653	2973	3016	184	9	217	8	223	8	376	12
>2500	2178	2701	2960	3267	227	10	263	10	260	9	496	15
Total	6310	7772	8564	9062	615	10	749	10	747	9	1331	15

Table 18. 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							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2006	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	0	0	0	0	1	6	0	0	0	0	0	0	15	0	0	0
22-24	168	173	190	217	12	7	18	10	23	12	17	8	35	26	32	26	32	26	32	32
25-27	601	607	610	634	281	47	274	45	289	47	309	49	19	21	20	20	23	20	24	21
28-31	1744	2116	2334	2346	1150	66	1748	83	1964	84	2020	86	7	12	6	10	8	11	9	12
32-36	2328	2956	3329	3445	1710	73	2540	86	2895	87	3068	89	4	7	3	6	4	6	4	6
>=37	2500	3166	3908	4187	1865	75	2433	77	3099	79	3472	83	4	5	4	8	5	9	4	5
Total	7350	9023	10387	10835	5018	68	7013	78	8271	80	8886	82	6	10	5	9	6	10	6	10

Table 18a. Mean total duration of ventilatory support according to birthweight group, by year

Birth weight group (grams)	All Babies in study				Babies who survived								For survivors, total duration of ventilatory support, in days							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2006	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	0	0	2	6	2	4	5	10	0	0	3	1	8	9	18	21
501-750	299	360	370	418	42	14	71	20	80	22	86	21	31	26	23	23	26	22	30	25
751-1000	608	738	767	772	309	51	438	59	470	61	493	64	16	21	14	16	19	19	19	18
1001-1500	1846	2224	2399	2411	1095	59	1904	86	2068	86	2133	88	7	10	5	10	8	10	8	10
1501-2500	2315	2899	3390	3408	1815	78	2381	82	2864	84	2943	86	4	7	4	7	4	8	4	5
>2500	2244	2770	3412	3776	1757	78	2217	80	2787	82	3226	85	4	5	4	7	4	6	4	6
Total	7350	9023	10387	10835	5018	68	7013	78	8271	80	8886	82	6	10	5	9	6	10	6	10

Table 19. Use of antibiotics according to birthweight group, by year

Birthweight group (grams)	All Babies in study				No to antibiotics							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	25	66	25	78	40	82	38	76
501-750	299	360	370	418	117	39	138	38	146	39	169	40
751-1000	608	738	767	772	55	9	49	7	74	10	88	11
1001-1500	1846	2224	2399	2411	193	10	264	12	254	11	255	11
1501-2500	2315	2899	3390	3408	212	9	292	10	465	14	520	15
>2500	2244	2770	3412	3776	139	6	209	8	564	17	679	18
Total	7350	9023	10387	10835	741	10	977	11	1543	15	1749	16

Birthweight group (grams)	Yes to antibiotics								Penicillin							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	12	32	7	22	9	18	12	24	12	100	7	100	9	100	12	100
501-750	182	61	221	61	224	61	249	60	179	98	216	98	217	97	239	96
751-1000	553	91	689	93	693	90	684	89	533	96	669	97	672	97	662	97
1001-1500	1651	89	1959	88	2145	89	2155	89	1594	97	1891	97	2071	97	2097	97
1501-2500	2100	91	2607	90	2922	86	2888	85	2018	96	2510	96	2819	96	2798	97
>2500	2097	93	2561	92	2848	83	3097	82	2020	96	2460	96	2731	96	2971	96
Total	6595	90	8044	89	8841	85	9085	84	6356	96	7753	96	8519	96	8779	97

Birthweight group (grams)	Aminoglycoside								2nd generation Cephalosporin							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	11	92	6	86	9	100	10	83	0	0	0	0	0	0	0	0
501-750	164	90	213	96	202	90	223	90	13	7	7	3	16	7	24	10
751-1000	502	91	636	92	630	91	613	90	33	6	41	6	44	6	77	11
1001-1500	1504	91	1804	92	1945	91	1960	91	102	6	83	4	155	7	218	10
1501-2500	1903	91	2400	92	2584	88	2570	89	147	7	111	4	171	6	179	6
>2500	1857	89	2318	91	2471	87	2743	89	130	6	106	4	149	5	180	6
Total	5941	90	7377	92	7841	89	8119	89	425	6	348	4	535	6	678	7

Birthweight group (grams)	3rd generation Cephalosporin								4th generation Cephalosporin							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	0	0	2	29	1	11	3	25	0	0	0	0	0	0	0	0
501-750	31	17	42	19	65	29	71	29	5	3	13	6	20	9	10	4
751-1000	119	22	161	23	179	26	185	27	30	5	50	7	56	8	55	8
1001-1500	299	18	344	18	404	19	413	19	57	3	94	5	123	6	102	5
1501-2500	311	15	364	14	434	15	434	15	39	2	66	3	116	4	80	3
>2500	313	15	386	15	471	17	490	16	36	2	61	2	88	3	76	2
Total	1073	16	1299	16	1554	18	1596	18	167	3	284	4	403	5	323	4

Birthweight group (grams)	Vancomycin								Carbapenem							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	1	8	1	14	0	0	1	8	2	17	1	14	1	11	1	8
501-750	38	21	49	22	63	28	70	28	49	27	63	29	87	39	93	37
751-1000	168	30	162	24	206	30	183	27	210	38	229	33	248	36	246	36
1001-1500	277	17	264	13	300	14	306	14	347	21	373	19	389	18	423	20
1501-2500	209	10	158	6	236	8	189	7	232	11	285	11	328	11	310	11
>2500	165	8	167	7	201	7	195	6	196	9	223	9	246	9	212	7
Total	858	13	801	10	1006	11	944	10	1036	16	1174	15	1299	15	1285	14

Birth weight group (grams)	Others							
	2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%
<=500	1	8	0	0	0	0	0	0
501-750	38	21	37	17	29	13	13	5
751-1000	104	19	118	17	103	15	44	6
1001-1500	256	16	235	12	216	10	121	6
1501-2500	254	12	231	9	234	8	104	4
>2500	207	10	204	8	217	8	117	4
Total	860	13	825	10	799	9	399	4

Table 20. Use of surfactant according to birthweight group, by year

Birthweight group (grams)	All Babies in study				Babies given surfactant							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No*	%	No	%	No	%	No	%
<=500	38	32	49	50	6	16	3	9	3	6	5	10
501-750	299	360	370	418	106	35	142	39	145	39	196	47
751-1000	608	738	767	772	364	60	434	59	485	63	514	67
1001-1500	1846	2224	2399	2411	696	38	823	37	934	39	1056	44
1501-2500	2315	2899	3390	3408	549	24	698	24	856	25	940	28
>2500	2244	2770	3412	3776	143	6	171	6	229	7	202	5
Total	7350	9023	10387	10835	1864	25	2271	25	2652	26	2913	27

Birthweight group (grams)	Babies given surfactant, those ≤ 2 hours						Babies given surfactant, those > 2 hours					
	2005		2006		2007		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	2	67	0	0	2	40	1	33	3	100	3	60
501-750	87	61	93	64	127	65	54	38	52	36	67	34
751-1000	248	57	295	61	340	66	185	43	190	39	162	32
1001-1500	396	48	518	55	653	62	427	52	416	45	384	36
1501-2500	239	34	360	42	458	49	457	65	496	58	477	51
>2500	48	28	84	37	88	44	123	72	145	63	114	56
Total	1020	45	1350	51	1668	57	1247	55	1302	49	1207	41

Table 21. Use of postnatal steroids for CLD according to birthweight group, by year

Birth weight group (grams)	All Babies in study				Babies given postnatal steroids for CLD							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	0	0	0	0	0	0	2	4
501-750	299	360	370	418	17	6	24	7	28	8	32	8
751-1000	608	738	767	772	94	15	98	13	99	13	91	12
1001-1500	1846	2224	2399	2411	92	5	96	4	106	4	112	5
1501-2500	2315	2899	3390	3408	31	1	47	2	53	2	62	2
>2500	2244	2770	3412	3776	45	2	68	2	69	2	83	2
Total	7350	9023	10387	10835	279	4	333	4	355	3	382	4

Table 22. Use of parenteral nutrition according to birthweight group, by year

Birth weight group (grams)	All Babies in study				Babies given parenteral nutrition							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	5	13	4	13	2	4	6	12
501-750	299	360	370	418	76	25	104	29	124	34	144	34
751-1000	608	738	767	772	327	54	371	50	441	57	484	63
1001-1500	1846	2224	2399	2411	655	35	654	29	715	30	917	38
<1501	2791	3354	3585	3651	1063	38	1133	34	1282	36	1551	42
1501-2500	2315	2899	3390	3408	346	15	336	12	405	12	464	14
>2500	2244	2770	3412	3776	260	12	203	7	265	8	274	7
Total	7350	9023	10387	10835	1669	23	1672	19	1952	19	2289	21

Table 23. Enteral nutrition feeding on discharge according to birthweight group, by year

Birth weight group (grams)	All Babies in study				No Enteral nutrition								Exclusive breastfeeding / breast milk feeds							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	36	95	29	91	47	96	45	90	0	0	2	6	2	4	1	2
501-750	299	360	370	418	213	71	262	73	267	72	313	75	0	0	23	6	29	8	26	6
751-1000	608	738	767	772	174	29	249	34	264	34	256	33	0	0	115	16	148	19	161	21
1001-1500	1846	2224	2399	2411	203	11	272	12	296	12	272	11	0	0	546	25	714	30	689	29
1501-2500	2315	2899	3390	3408	326	14	459	16	488	14	457	13	0	0	883	30	1167	34	1223	36
>2500	2244	2770	3412	3776	396	18	499	18	601	18	567	15	0	0	806	29	1225	36	1410	37
Total	7350	9023	10387	10835	1348	18	1770	20	1963	19	1910	18	0	0	2375	26	3285	32	3510	32

Birthweight group (grams)	Mixed feeds								Exclusive formula feeds							
	2004		2005		2006		2007		2004		2005		2006		2007	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	0	0	1	3	0	0	4	8	0	0	0	0	0	0	0	0
501-750	0	0	50	14	48	13	64	15	0	0	24	7	26	7	15	4
751-1000	0	0	305	41	258	34	277	36	0	0	67	9	97	13	78	10
1001-1500	0	0	1186	53	1132	47	1191	49	0	0	220	10	257	11	258	11
1501-2500	0	0	1367	47	1439	42	1446	42	0	0	188	6	293	9	282	8
>2500	0	0	1281	46	1251	37	1484	39	0	0	184	7	335	10	314	8
Total	0	0	4190	46	4128	40	4466	41	0	0	683	8	1008	10	947	9

Table 24. 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							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	0	0	0	0	1	6	0	0	0	0	0	0	1	100	0	0
22-24	168	173	190	217	14	8	18	10	23	12	17	8	12	86	17	94	21	91	15	88
25-27	601	607	610	634	307	51	274	45	289	47	309	49	271	88	257	94	270	93	290	94
28-31	1744	2116	2334	2346	1424	82	1748	83	1964	84	2020	86	1123	79	1307	75	1423	72	1622	80
<32	2522	2901	3150	3203	1745	69	2040	70	2277	72	2345	73	1406	81	1581	78	1715	75	1926	82
32-36	2328	2956	3329	3445	1989	85	2540	86	2895	87	3068	89	780	39	784	31	835	29	966	31
>=37	2500	3166	3908	4187	1890	76	2433	77	3099	79	3472	83	39	2	40	2	39	1	52	1
Total	7350	9023	10387	10835	5624	77	7013	78	8271	80	8886	82	2225	40	2405	34	2589	31	2945	33

Table 24a. ROP screening according to birthweight group, by year

Birth weight group (grams)	All Babies in study				Babies who survived on discharge								Babies who survived and had ROP screening							
					2004		2005		2006		2007		2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	0	0	2	6	2	4	5	10	0	0	0	0	1	50	3	60
501-750	299	360	370	418	48	16	71	20	80	22	86	21	43	90	71	100	76	95	82	95
751-1000	608	738	767	772	344	57	438	59	470	61	493	64	304	88	410	94	444	94	464	94
1001-1500	747	886	923	997	599	80	709	80	755	82	846	85	513	86	591	83	621	82	748	88
<1251	1692	2016	2109	2237	991	59	1220	61	1307	62	1430	64	860	87	1072	88	1142	87	1297	91
1251-1500	1099	1338	1476	1414	968	88	1195	89	1313	89	1287	91	653	67	706	59	819	62	919	71
1501-2500	2315	2899	3390	3408	1907	82	2381	82	2864	84	2943	86	673	35	599	25	593	21	690	23
>2500	2244	2770	3412	3776	1758	78	2217	80	2787	82	3226	85	39	2	28	1	35	1	39	1
Total	7350	9023	10387	10835	5624	77	7013	78	8271	80	8886	82	2225	40	2405	34	2589	31	2945	33

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Table 25. Cerebral ultrasound scanning according to birthweight group, by year

Birth weight group (grams)	All Babies in study				Babies with ultrasound brain							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	5	13	4	13	3	6	8	16
501-750	299	360	370	418	109	36	150	42	179	48	197	47
751-1000	608	738	767	772	413	68	564	76	602	78	623	81
1001-1500	1846	2224	2399	2411	1133	61	1525	69	1629	68	1721	71
<1501	2791	3354	3585	3651	1660	59	2243	67	2413	67	2549	70
1501-2500	2315	2899	3390	3408	794	34	1060	37	1235	36	1264	37
>2500	2244	2770	3412	3776	474	21	642	23	729	21	816	22
Total	7350	9023	10387	10835	2928	40	3945	44	4377	42	4629	43

Table 26. Mean Discharge weight according to gestational age group, by year

Gestational age group (weeks)	All Babies in study				Babies who survived							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	0	0	0	0	1	6	0	0
22-24	168	173	190	217	14	8	18	10	23	12	17	8
25-27	601	607	610	634	307	51	274	45	289	47	309	49
28-31	1742	2116	2334	2346	1422	82	1748	83	1964	84	2020	86
32-36	2322	2956	3329	3445	1985	85	2540	86	2895	87	3068	89
>=37	2498	3165	3908	4187	1888	76	2432	77	3099	79	3472	83
Total	7340	9022	10387	10835	5616	77	7012	78	8271	80	8886	82

Gestational age group (weeks)	For survivors, total discharge weight, in grams							
	2004		2005		2006		2007	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<22	0	0	0	0	1700	0	0	0
22-24	2041	473	2012	465	2142	835	2128	630
25-27	1915	687	2019	641	1922	456	1932	479
28-31	1848	741	1879	500	1839	320	1848	373
32-36	2076	949	2024	473	2031	452	2038	468
>=37	3048	801	3013	623	3001	605	3014	594
Total	2336	982	2331	738	2345	710	2373	723

Table 27 Mean Discharge weight according to birthweight group, by year

Birth weight group (grams)	All Babies in study				Babies who survived							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	0	0	2	6	2	4	5	10
501-750	299	360	370	418	48	16	71	20	80	22	86	21
751-1000	607	738	767	772	343	57	438	59	470	61	493	64
1001-1500	1844	2224	2399	2411	1566	85	1904	86	2068	86	2133	88
1501-2500	2310	2899	3390	3408	1903	82	2381	82	2864	84	2943	86
>2500	2242	2769	3412	3776	1756	78	2216	80	2787	82	3226	85
Total	7340	9022	10387	10835	5616	77	7012	78	8271	80	8886	82

Birthweight group (grams)	For survivors, total discharge weight, in grams							
	2004		2005		2006		2007	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<=500	0	0	2715	403	2065	191	2554	1176
501-750	1827	482	1953	456	1818	540	1930	416
751-1000	1844	548	1915	643	1871	414	1864	468
1001-1500	1848	905	1820	429	1804	302	1812	362
1501-2500	2052	765	2053	407	2045	351	2038	346
>2500	3190	755	3162	513	3151	511	3137	515
Total	2336	982	2331	738	2345	710	2373	723

Table 28. Mean total duration of hospital stay according to gestational age group, by year

Gestational age group (weeks)	All Babies in study				Babies who survived							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	0	0	0	0	1	6	0	0
22-24	167	173	190	217	14	8	18	10	23	12	17	8
25-27	599	606	610	634	307	51	273	45	289	47	309	49
28-31	1741	2116	2334	2346	1424	82	1748	83	1964	84	2020	86
32-36	2327	2956	3329	3445	1989	85	2540	86	2895	87	3068	89
>=37	2500	3166	3908	4187	1890	76	2433	77	3099	79	3472	83
Total	7343	9022	10387	10835	5624	77	7012	78	8271	80	8886	82

Gestational age group (weeks)	For survivors, total duration of hospital stay, in days							
	2004		2005		2006		2007	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<22	0	0	0	0	42	0	0	0
22-24	86	40	91	40	102	69	95	50
25-27	67	41	75	42	73	30	73	33
28-31	39	24	43	27	42	24	42	24
32-36	22	18	23	22	23	23	20	18
>=37	13	14	14	19	14	22	12	16
Total	26	25	27	28	26	27	24	24

Table 28a. Mean total duration of hospital stay according to birthweight group, by year

Birthweight group (grams)	All Babies in study				Babies who survived							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	0	0	2	6	2	4	5	10
501-750	296	360	370	418	48	16	71	20	80	22	86	21
751-1000	608	738	767	772	344	57	438	59	470	61	493	64
1001-1500	1846	2223	2399	2411	1567	85	1903	86	2068	86	2133	88
1501-2500	2311	2899	3390	3408	1907	83	2381	82	2864	84	2943	86
>2500	2244	2770	3412	3776	1758	78	2217	80	2787	82	3226	85
Total	7343	9022	10387	10835	5624	77	7012	78	8271	80	8886	82

Birthweight group (grams)	For survivors, total duration of hospital stay, in days							
	2004		2005		2006		2007	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<=500	0	0	8	1	33	29	64	68
501-750	83	35	95	33	91	43	94	30
751-1000	66	36	71	33	72	26	68	30
1001-1500	39	23	40	24	41	21	40	21
1501-2500	19	16	19	19	19	21	16	13
>2500	13	14	13	20	13	21	11	15
Total	26	25	27	28	26	27	24	24

Table 29.Survival according to gestation (gestational age group), by year

Gestational age group (weeks)	All Babies in study				Babies who survived							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<22	9	5	16	6	0	0	0	0	1	6	0	0
22	25	22	29	17	0	0	1	5	0	0	1	6
23	47	51	51	71	2	4	6	12	4	8	6	8
24	96	100	110	129	12	13	11	11	19	17	10	8
25	122	120	143	156	38	31	36	30	40	28	38	24
26	218	231	223	226	108	50	95	41	101	45	99	44
27	261	256	244	252	161	62	143	56	148	61	172	68
28	373	393	429	454	259	69	277	70	317	74	351	77
29	349	414	472	462	278	80	332	80	391	83	377	82
30	496	670	704	683	416	84	562	84	594	84	598	88
31	526	639	729	747	471	90	577	90	662	91	694	93
32	589	812	836	891	519	88	714	88	737	88	803	90
33	518	564	692	676	453	87	504	89	626	90	628	93
34	471	639	727	757	403	86	554	87	643	88	662	87
35	354	426	501	543	291	82	357	84	422	84	497	92
36	396	515	573	578	323	82	411	80	467	82	478	83
>=37	2500	3166	3908	4187	1890	76	2433	77	3099	79	3472	83
Total	7350	9023	10387	10835	5624	77	7013	78	8271	80	8886	82
22-24	168	173	190	217	14	8	18	10	23	12	17	8
25-27	601	607	610	634	307	51	274	45	289	47	309	49
28-31	1744	2116	2334	2346	1424	82	1748	83	1964	84	2020	86
22-31	2513	2896	3134	3197	1745	69	2040	70	2276	73	2345	73
32-36	2328	2956	3329	3445	1989	85	2540	86	2895	87	3068	89
>=37	2500	3166	3908	4187	1890	76	2433	77	3099	79	3472	83

Table 29a. Survival according to birthweight group, by year

Birthweight group (grams)	All Babies in study				Babies who survived							
					2004		2005		2006		2007	
	2004	2005	2006	2007	No.	%	No.	%	No.	%	No.	%
<=500	38	32	49	50	0	0	2	6	2	4	5	10
501-600	107	115	114	141	10	9	7	6	16	14	14	10
601-700	116	155	170	183	18	16	38	25	37	22	36	20
701-800	177	208	232	237	60	34	72	35	99	43	106	45
801-900	207	277	256	280	110	53	162	58	143	56	171	61
901-1000	300	343	365	349	194	65	230	67	255	70	252	72
1001-1000	284	365	324	354	209	74	279	76	254	78	295	83
1101-1200	332	370	404	451	278	84	305	82	331	82	389	86
1201-1300	373	441	513	493	324	87	374	85	450	88	424	86
1301-1400	419	489	538	536	370	88	440	90	474	88	495	92
1401-1500	438	559	620	577	386	88	506	91	559	90	530	92
1501-2500	2315	2899	3390	3408	1907	82	2381	82	2864	84	2943	86
>2500	2244	2770	3412	3776	1758	78	2217	80	2787	82	3226	85
Total	7350	9023	10387	10835	5624	77	7013	78	8271	80	8886	82
501-1000	907	1098	1137	1190	392	43	509	46	550	48	579	49
1001-1500	1846	2224	2399	2411	1567	85	1904	86	2068	86	2133	88
501-1500	2753	3322	3536	3601	1959	71	2413	73	2618	74	2711	75

Table 30. Place of discharge, if child alive, according to birthweight group, 2007

Birthweight group (grams)	Home	Other Non-Paeds Wards	Transfer to other hospitals	Social welfare home	Still hospitalised as of first birthday
< 500	4	0	1	0	0
501-750	82	1	3	0	0
751-1000	446	0	46	1	0
1001-1500	2011	0	119	3	0
1501-2500	2798	1	139	5	0
>2500	3080	1	141	4	0
Total	8421	3	449	13	0

Table 31. Reasons for transfer to other hospitals according to centres, 2007

Reason for transfer	No.	%
Lack of NICU bed	26	6
For stepdown care	106	24
For chronic care	6	1
For surgery/diagnostic services	169	38
Due to social/logistic reason	116	26
Due to other reasons	26	6
Total (number of)Cases	449	100

Table 32. Post-transfer disposition

Place of disposition	No.	%
Home	354	79
Transferred again to another hospital	17	4
Death	33	7
Readmitted to same hospital	42	9
Still hospitalised as of first birthday	2	0
Total number of Cases	449	100

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Table 33. Specific morbidities according to birthweight group, 2007

	501-1000 g		1001-1500 g		1501-2500 g		>2500 g		Total
	No.	%	No.	%	No.	%	No.	%	No.
RDS Yes	986	83	1614	67	1664	49	423	11	4713
RDS No	202	17	795	33	1744	51	3353	89	6117
No PDA	641	54	1665	69	2636	77	3011	80	7980
Indomethacin/ibuprofen >24hr	202	17	248	10	107	3	14	0	572
Ligation	3	0	5	0	4	0	6	0	18
Not treated	103	9	166	7	125	4	152	4	547
NA/Unkown	231	19	298	12	501	15	546	14	1597
Pneumothorax Yes	84	7	70	3	98	3	191	5	443
Pneumothorax No	1106	93	2340	97	3309	97	3585	95	10389
NEC None	909	76	2084	86	3049	89	3394	90	9471
Medical Rx	100	8	97	4	56	2	45	1	298
Surgical Rx	10	1	15	1	13	0	10	0	48
NA/Unknown	171	14	215	9	290	9	327	9	1018
Supplemental oxygen at 28 days Yes	265	22	242	10	97	3	101	3	707
Supplemental oxygen at 28 days No	924	78	2168	90	3310	97	3674	97	10124
Supplemental oxygen at 36 weeks corrected gestational age Yes	128	11	152	6	123	4	185	5	589
Supplemental oxygen at 36 weeks corrected gestationalage No	1060	89	2256	94	3268	96	3563	94	10196
Seizures None	983	83	2146	89	2977	87	2921	77	9063
Seizures suspected	12	1	11	0	37	1	103	3	163
Seizures definite	56	5	55	2	170	5	554	15	835
Seizures NA/Unknown	139	12	199	8	224	7	198	5	774
Infection None	249	21	314	13	611	18	821	22	2030
Presumed sepsis	542	46	1458	60	2172	64	2231	59	6416
Clinical sepsis	252	21	497	21	503	15	540	14	1794
Confirmed sepsis	215	18	286	12	177	5	233	6	912
For confirmed sepsis Group B strep	12	1	19	1	31	1	60	2	123
MRSA	28	2	39	2	10	0	25	1	102
CoNS	76	6	77	3	35	1	48	1	236
ESBL organisms	15	1	15	1	14	0	15	0	59
Fungal	19	2	16	1	10	0	13	0	58

	501-1000 g		1001-1500 g		1501-2500 g		>2500		Total
	No.	%	No.	%	No.	%	No.	%	No.
Others	93	8	144	6	87	3	91	2	415
IVH None	390	33	1281	53	1114	33	841	22	3629
Grade 1 IVH	117	10	188	8	102	3	22	1	431
Grade 2 IVH	158	13	166	7	62	2	15	0	403
Grade 3 IVH	102	9	82	3	16	0	9	0	210
Grade 4 IVH	75	6	37	2	13	0	7	0	132
IVH not applicable/not checked	388	33	682	28	2109	62	2874	76	6095
VP shunt/reservoir inserted	3	0	3	0	1	0	10	0	17
ROP none	374	31	1480	61	703	21	171	5	2731
Stage 1 ROP	86	7	104	4	18	1	0	0	209
Stage 2 ROP	64	5	52	2	6	0	0	0	122
Stage 3 ROP	66	6	25	1	3	0	0	0	94
Stage 4 ROP	3	0	4	0	0	0	0	0	7
Stage 5 ROP	1	0	2	0	2	0	2	0	7
Not applicable/Not Checked	605	51	751	31	2677	79	3601	95	7679
Laser for ROP	40	3	14	1	1	0	2	0	58
Cryotherapy for ROP	4	0	2	0	0	0	0	0	6
Other diagnosis									
Meconium aspiration syndrome	0	0	3	0	106	3	586	16	696
Transient tachypnoea of newborn	10	1	54	2	178	5	225	6	467
Pulmonary haemorrhage	114	10	75	3	55	2	66	2	310
Pulmonary interstitial emphysema	15	1	9	0	1	0	9	0	34
Pneumonia	144	12	301	12	600	18	869	23	1915
Neonatal encephalopathy	7	1	8	0	61	2	199	5	275
Neonatal meninigitis	5	0	19	1	24	1	30	1	78
Bruises, superficial	19	2	15	1	8	0	9	0	51
Cephalhaematoma	0	0	1	0	5	0	28	1	34
Subaponeurotic haemorrhage	1	0	2	0	14	0	132	3	149
Erb's palsy	0	0	0	0	0	0	14	0	14
Renal failure due to any cause	56	5	38	2	47	1	57	2	198
DIVC	62	5	35	1	46	1	67	2	211
Polycythaemia	5	0	34	1	35	1	20	1	94
Anaemia of prematurity	343	29	461	19	141	4	17	0	963
Persistent foetal circulation	9	1	12	0	68	2	198	5	287
Inquinal hernia	33	3	17	1	1	0	2	0	53
Congenital intrauterine infection	1	0	6	0	1	0	5	0	13
Other diagnosis	24	2	58	2	72	2	43	1	199

*Total in Table 33 excludes the small number of babies of birthweight < 500 g

Table 33a. Specific morbidities according to birthweight group, 2007

	501-1000 g		1001-1500 g		1501-2500 g		>2500 g		Total
	No.	%	No.	%	No.	%	No.	%	No.
No congenital anomalies	73	6	184	8	577	17	809	21	1644
With congenital anomalies	1117	94	2227	92	2831	83	2967	79	9191
Down syndrome	2	0	10	0	68	2	114	3	194
Edward syndrome	14	1	35	1	53	2	12	0	114
Patau syndrome	0	0	3	0	32	1	14	0	49
Other syndromes	4	0	21	1	70	2	79	2	174
Total syndromes	20	1	69	2	223	7	219	5	531

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

Table 33b. Specific morbidities according to birthweight group, 2007

	<500 g		501-1000 g		1001-1500 g		1501-2500 g		>2500 g		Total
	No.	%	No.	%	No.	%	No.	%	No.	%	No.
Infants with no congenital anomalies	49	98	1117	94	2227	92	2831	83	2967	79	9191
Infants with syndromes	0	0	20	2	69	3	224	7	218	6	531
Infants with non-(no)syndromes (single or multiple anomalies)	1	2	53	4	113	5	349	10	587	16	1103
CVS cyanotic	0	0	9	1	20	1	66	2	137	4	232
CVS acyanotic	1	2	29	2	70	3	124	4	180	5	404
CNS hydrocephalus	1	2	15	1	16	1	29	1	58	2	119
CNS others	0	0	3	0	0	0	21	1	24	1	48
Spina bifida	0	0	2	0	3	0	11	0	19	1	35
Anencephaly	0	0	6	1	3	0	27	1	13	0	49
Others	0	0	0	0	1	0	11	0	18	0	30
Skeletal dysplasia	1	2	1	0	9	0	33	1	20	1	64
Respiratory anomalies	0	0	7	1	13	1	40	1	50	1	110
GIT anomalies	1	2	7	1	26	1	91	3	101	3	226
Hydrops	0	0	0	0	6	0	9	0	10	0	25
Renal	0	0	5	0	13	1	40	1	29	1	87
Cleft lip	0	0	1	0	1	0	6	0	16	0	24
Cleft palate	0	0	1	0	8	0	18	1	38	1	65
Cleft lip and palate	0	0	5	0	10	0	61	2	121	3	197
Other isolated anomalies	0	0	8	1	17	1	60	2	65	2	150

*Total in Table 33b does not include the number of babies with birthweight of <500 g

Table 33c. Specific morbidities according to birthweight group, 2007

	<500 g		501-1000 g		1001-1500 g		1501-2500 g		>2500 g		Total
	No*	%	No	%	No	%	No	%	No	%	No
Inborn errors of metabolism	0	0	2	0	1	0	15	0	14	0	32

*Total in Table 33c does not include the number of babies of birthweight < 500g

Table 34. HIE according to birthweight group, 2007

Birthweight group (grams)	None	Mild/Moderate	Severe	NA/Unknown	Not applicable
<=500	0	0	0	0	50
501-750	0	0	0	0	418
751-1000	0	0	0	0	772
1001-1500	0	0	0	0	2411
1501-2000	0	0	0	0	1867
2001-2500	1310	130	48	53	0
2501-3000	1410	305	88	46	0
3001-3500	969	240	82	28	0
3501-4000	345	91	22	5	0
4001-4500	82	18	5	3	0
4501-5000	23	3	1	0	0
>5000	9	1	0	0	0
Total	4148	788	246	135	5518

Table 35. Mean highest total serum bilirubin according to birthweight group, 2007

Birthweight group (grams)	All Babies in study	Highest total serum bilirubin in umol/L	
		mean	SD
<=500	50	170.33	73.05
501-750	418	162.77	63.59
751-1000	772	178.77	74.63
1001-1500	2411	192.02	65.93
1501-2500	3408	212.74	103.04
>2500	3776	201.79	91.84
Overall	10835	200.36	88.96

Table 36. Episodes of confirmed bacterial sepsis according to birthweight group and survival status, 2007

Birth weight 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	50	1	2	0	0	5	10	0	0
501-750	418	57	14	7	2	86	21	31	7
751-1000	772	167	22	12	2	493	64	129	17
1001-1500	2411	294	12	16	1	2133	88	250	10
1501-2500	3408	177	5	10	0	2943	86	133	4
>2500	3776	239	6	13	0	3226	85	182	5
Overall	10835	935	9	58	1	8886	82	725	7

Table 37. Mortality rate of confirmed bacterial sepsis according to birthweight group, 2007

Birth weight 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	50	1	2	1	2	49	98	44	88
501-750	418	52	12	25	6	366	88	307	73
751-1000	772	154	20	35	5	618	80	244	32
1001-1500	2411	278	12	43	2	2133	88	235	10
1501-2500	3408	168	5	40	1	3240	95	425	12
>2500	3776	225	6	52	1	3551	94	498	13
Overall	10835	878	8	196	2	9957	92	1753	16

Table 38. Mortality rate of confirmed fungal sepsis according to birthweight group, 2007

Birth weight 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	50	0	0	0	0	50	100	45	90
501-750	418	7	2	2	0	411	98	330	79
751-1000	772	12	2	4	1	760	98	275	36
1001-1500	2411	16	1	4	0	2395	99	274	11
1501-2500	3408	10	0	5	0	3398	100	460	13
>2500	3776	13	0	4	0	3763	100	546	14
Overall	10835	58	1	19	0	10777	99	1930	18

Table 39. Supplemental oxygen use according to survival status of birthweight group, 2007

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 age		Babies who died		Babies who died and on oxygen at Day 28		Babies who died and on oxygen at 36 weeks corrected gestational age	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	50	5	10	2	40	1	20	45	90	0	0	0	0
501-750	418	86	21	47	55	21	24	332	79	12	4	3	1
751-1000	772	493	64	188	38	97	20	279	36	18	6	7	3
1001-1500	2411	2133	88	222	10	136	6	278	12	20	7	16	6
1501-2500	3408	2943	86	64	2	99	3	465	14	33	7	24	5
>2500	3776	3226	85	79	2	159	5	550	15	22	4	26	5
Overall	10835	8886	82	602	7	513	6	1949	18	105	5	76	4

Table 39a. Supplemental oxygen use according to survival status of gestational age group, 2007

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 age		Babies who died		Babies who died and on oxygen at Day 28		Babies who died and on oxygen at 36 weeks corrected gestational age	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	6	0	0	0	0	0	0	6	100	0	0	0	0
22-24	217	17	8	10	59	4	24	200	92	5	3	0	0
25-27	634	309	49	144	47	63	20	325	51	15	5	5	2
28-31	2346	2020	86	290	14	157	8	326	14	20	6	13	4
32-36	3445	3068	89	75	2	132	4	377	11	31	8	26	7
>=37	4187	3472	83	83	2	157	5	715	17	34	5	32	4
Overall	10835	8886	82	602	7	513	6	1949	18	105	5	76	4

Table 40. Use of antenatal steroids according to centres, 2007 (Inborn)

Centres	Babies < 32 weeks' gestation	Babies < 32 weeks' gestation given antenatal steroids		Inborn babies < 32 weeks' gestation	Inborn babies < 32 weeks' gestation given antenatal steroids	
		No.	%		No.	%
All centres	3203	1955	61	2802	1848	66
2	115	83	72	104	79	76
3	183	147	80	156	134	86
4	55	40	73	51	38	75
5	201	114	57	168	106	63
6	115	38	33	86	33	38
7	216	147	68	201	143	71
8	138	67	49	122	61	50
9	117	82	70	104	80	77
10	91	46	51	84	46	55
11	36	25	69	34	23	68
12	77	47	61	72	45	63
13	94	63	67	75	55	73
14	36	23	64	32	22	69
15	97	63	65	89	60	67
16	122	61	50	107	59	55
17	88	39	44	79	39	49
18	40	28	70	35	25	71
19	128	76	59	89	67	75
20	93	73	78	81	66	81
21	31	9	29	29	8	28
22	97	68	70	91	67	74
23	222	175	79	193	164	85
24	178	113	63	158	110	70
25	85	53	62	69	51	74
26	166	36	22	140	33	24
27	78	54	69	72	53	74
28	33	4	12	28	2	7
29	74	35	47	72	35	49
30	56	47	84	52	47	90
31	87	64	74	77	62	81
32	54	35	65	52	35	67

Table 40a. Use of antenatal steroids according to centres, 2007 (Outborn)

Centres	Babies < 32 weeks' gestation	Babies < 32 weeks' gestation given antenatal steroids		Outborn babies < 32 weeks' gestation	Outborn babies < 32 weeks' gestation given antenatal steroids	
		No.	%		No.	%
All centres	3203	1955	61	401	107	27
2	115	83	72	11	4	36
3	183	147	80	27	13	48
4	55	40	73	4	2	50
5	201	114	57	33	8	24
6	115	38	33	29	5	17
7	216	147	68	15	4	27
8	138	67	49	16	6	38
9	117	82	70	13	2	15
10	91	46	51	7	0	0
11	36	25	69	2	2	100
12	77	47	61	5	2	40
13	94	63	67	19	8	42
14	36	23	64	4	1	25
15	97	63	65	8	3	38
16	122	61	50	15	2	13
17	88	39	44	9	0	0
18	40	28	70	5	3	60
19	128	76	59	39	9	23
20	93	73	78	12	7	58
21	31	9	29	2	1	50
22	97	68	70	6	1	17
23	222	175	79	29	11	38
24	178	113	63	20	3	15
25	85	53	62	16	2	13
26	166	36	22	26	3	12
27	78	54	69	6	1	17
28	33	4	12	5	2	40
29	74	35	47	2	0	0
30	56	47	84	4	0	0
31	87	64	74	10	2	20
32	54	35	65	2	0	0

Table 41. Use of surfactant in Respiratory Distress Syndrome (RDS) according to centres, 2007

Centres	All Babies in study	Babies with RDS		Babies with RDS requiring VS		Babies with RDS requiring VS given surfactant	
	No.	No.	%	No.	%	No.	%
All centres	10835	3651	34	2626	72	1496	57
2	401	153	38	109	71	61	56
3	594	181	30	143	79	121	85
4	242	61	25	38	62	26	68
5	661	250	38	165	66	104	63
6	454	147	32	107	73	52	49
7	847	233	28	114	49	64	56
8	557	156	28	116	74	86	74
9	360	144	40	98	68	53	54
10	308	106	34	56	53	39	70
11	114	44	39	32	73	3	9
12	194	85	44	81	95	44	54
13	310	98	32	72	73	62	86
14	158	33	21	26	79	13	50
15	264	116	44	95	82	59	62
16	355	120	34	101	84	49	49
17	433	92	21	46	50	24	52
18	106	39	37	24	62	14	58
19	336	149	44	107	72	63	59
20	264	87	33	73	84	58	79
21	131	32	24	27	84	15	56
22	472	113	24	88	78	61	69
23	645	246	38	210	85	112	53
24	436	187	43	130	70	22	17
25	294	87	30	72	83	11	15
26	625	246	39	169	69	117	69
27	179	86	48	67	78	24	36
28	96	43	45	17	40	0	0
29	305	89	29	58	65	20	34
30	260	69	27	59	86	35	59
31	276	106	38	79	75	63	80
32	158	53	34	47	89	21	45

Table 42. Use of Parenteral Nutrition (PN) according to centres, 2007

Centres	All Babies in study	Babies with BW 501-1500 g		Babies with BW 501-1500 g given PN		Babies with VS		Babies with VS given PN	
	No.	No.	%	No.	%	No.	%	No.	%
All centres	10835	3601	33	1545	43	9062	84	2164	24
2	401	152	38	93	61	348	87	118	34
3	594	178	30	131	74	459	77	209	46
4	242	60	25	22	37	221	91	34	15
5	661	249	38	95	38	436	66	97	22
6	454	146	32	30	21	373	82	65	17
7	847	229	27	102	45	749	88	124	17
8	557	152	27	99	65	521	94	197	38
9	360	139	39	34	24	233	65	40	17
10	308	106	34	45	42	252	82	51	20
11	114	41	36	9	22	99	87	10	10
12	194	84	43	37	44	186	96	44	24
13	310	98	32	54	55	287	93	74	26
14	158	32	20	12	38	143	91	17	12
15	264	115	44	74	64	190	72	84	44
16	355	120	34	71	59	319	90	87	27
17	433	92	21	40	43	425	98	65	15
18	106	39	37	22	56	70	66	40	57
19	336	147	44	64	44	254	76	65	26
20	264	86	33	58	67	225	85	75	33
21	131	29	22	17	59	113	86	42	37
22	472	112	24	57	51	414	88	63	15
23	645	240	37	96	40	562	87	101	18
24	436	186	43	18	10	336	77	35	10
25	294	87	30	73	84	254	86	177	70
26	625	243	39	65	27	543	87	80	15
27	179	84	47	12	14	139	78	17	12
28	96	40	42	1	3	56	58	1	2
29	305	88	29	0	0	259	85	1	0
30	260	68	26	14	21	211	81	24	11
31	276	106	38	83	78	244	88	107	44
32	158	53	34	17	32	141	89	20	14

Table 43. Pneumothorax according to centres, 2007

Centres	All Babies in study	Babies with VS		Babies with VS and (having) pneumothorax		Babies with VS and (having) pnuemothorax who died	
	No.	No.	%	No.	%	No.	%
All centres	10835	9062	84	434	5	204	47
2	401	348	87	13	4	8	62
3	594	459	77	16	3	8	50
4	242	221	91	15	7	3	20
5	661	436	66	27	6	7	26
6	454	373	82	27	7	21	78
7	847	749	88	22	3	12	55
8	557	521	94	11	2	5	45
9	360	233	65	12	5	7	58
10	308	252	82	12	5	7	58
11	114	99	87	1	1	0	0
12	194	186	96	10	5	3	30
13	310	287	93	9	3	4	44
14	158	143	91	6	4	2	33
15	264	190	72	10	5	3	30
16	355	319	90	22	7	10	45
17	433	425	98	27	6	12	44
18	106	70	66	4	6	0	0
19	336	254	76	15	6	6	40
20	264	225	85	6	3	4	67
21	131	113	86	1	1	0	0
22	472	414	88	13	3	3	23
23	645	562	87	24	4	12	50
24	436	336	77	30	9	16	53
25	294	254	86	14	6	8	57
26	625	543	87	30	6	17	57
27	179	139	78	8	6	5	63
28	96	56	58	2	4	1	50
29	305	259	85	8	3	2	25
30	260	211	81	14	7	6	43
31	276	244	88	10	4	4	40
32	158	141	89	15	11	8	53

Table 44. Use of supplemental oxygen on day 28 for VLBW babies according to centres, 2007

Centres	Babies with BW 501-1000 g	Babies with BW 501-1000 g who survived		Babies with BW 501-1000 g who survived with use of oxygen on day 28		Babies with BW 1001-1500 g	Babies with BW 1001-1500 g who survived		Babies with BW 1001-1500 g who survived with use of oxygen on day 28	
	No.	No.	%	No.	%	No.	No.	%	No.	%
All centres	1190	579	49	235	41	2411	2133	88	222	10
2	38	16	42	9	56	114	97	85	6	6
3	63	35	56	6	17	115	106	92	8	8
4	19	13	68	6	46	41	38	93	3	8
5	88	38	43	11	29	161	145	90	6	4
6	47	11	23	6	55	99	86	87	5	6
7	73	37	51	14	38	156	142	91	12	8
8	49	17	35	4	24	103	81	79	5	6
9	43	18	42	6	33	96	86	90	6	7
10	33	22	67	13	59	73	67	92	10	15
11	11	6	55	0	0	30	26	87	3	12
12	30	19	63	7	37	54	47	87	5	11
13	39	20	51	8	40	59	56	95	4	7
14	9	3	33	2	67	23	21	91	3	14
15	42	24	57	12	50	73	64	88	10	16
16	45	28	62	12	43	75	69	92	12	17
17	22	7	32	3	43	70	63	90	9	14
18	15	6	40	3	50	24	23	96	3	13
19	41	15	37	13	87	106	94	89	43	46
20	31	13	42	4	31	55	50	91	5	10
21	7	3	43	1	33	22	21	95	1	5
22	40	28	70	10	36	72	66	92	6	9
23	93	60	65	23	38	147	135	92	15	11
24	58	33	57	22	67	128	118	92	18	15
25	26	11	42	3	27	61	49	80	1	2
26	74	28	38	10	36	169	142	84	6	4
27	35	11	31	6	55	49	39	80	2	5
28	12	3	25	0	0	28	20	71	0	0
29	33	14	42	2	14	55	49	89	5	10
30	24	10	42	3	30	44	37	84	4	11
31	29	23	79	15	65	77	68	88	4	6
32	21	7	33	1	14	32	28	88	2	7

Table 44a. Use of supplemental oxygen at 36 weeks corrected gestation for VLBW babies according to centres, 2007

Centres	Babies with BW 501-1000 g	Babies with BW 501-1000 g who survived		Babies with BW 501-1000 g who survived with use of oxygen at 36 weeks		Babies with BW 1001-1500 g	Babies with BW 1001-1500 g who survived		Babies with BW 1001-1500 g who survived with use of oxygen at 36 weeks	
	No.	No.	%	No.	%	No.	No.	%	No.	%
All centres	1190	579	49	118	20	2411	2133	88	136	6
2	38	16	42	2	13	114	97	85	3	3
3	63	35	56	4	11	115	106	92	3	3
4	19	13	68	2	15	41	38	93	4	11
5	88	38	43	4	11	161	145	90	1	1
6	47	11	23	5	45	99	86	87	2	2
7	73	37	51	8	22	156	142	91	9	6
8	49	17	35	2	12	103	81	79	3	4
9	43	18	42	3	17	96	86	90	1	1
10	33	22	67	9	41	73	67	92	6	9
11	11	6	55	0	0	30	26	87	2	8
12	30	19	63	4	21	54	47	87	2	4
13	39	20	51	2	10	59	56	95	2	4
14	9	3	33	0	0	23	21	91	2	10
15	42	24	57	10	42	73	64	88	11	17
16	45	28	62	4	14	75	69	92	3	4
17	22	7	32	1	14	70	63	90	1	2
18	15	6	40	0	0	24	23	96	0	0
19	41	15	37	11	73	106	94	89	34	36
20	31	13	42	2	15	55	50	91	0	0
21	7	3	43	0	0	22	21	95	1	5
22	40	28	70	1	4	72	66	92	3	5
23	93	60	65	1	2	147	135	92	0	0
24	58	33	57	8	24	128	118	92	3	3
25	26	11	42	0	0	61	49	80	1	2
26	74	28	38	10	36	169	142	84	6	4
27	35	11	31	2	18	49	39	80	1	3
28	12	3	25	0	0	28	20	71	0	0
29	33	14	42	10	71	55	49	89	26	53
30	24	10	42	2	20	44	37	84	3	8
31	29	23	79	11	48	77	68	88	1	1
32	21	7	33	0	0	32	28	88	2	7

Table 45 Cerebral ultrasound scanning (CUS) & intraventricular haemorrhage(IVH) in babies of BW 501-1500g

Centres	All Babies in study	Babies with CUS		Babies with CUS who had Grade 1 IVH		Babies with CUS who had Grade 2 IVH		Babies with CUS who had Grade 3 IVH		Babies with CUS who had Grade 4 IVH		Babies with Grade 3 or 4 IVH who died	
	No.	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All centres	3601	2541	71	304	12	321	13	180	7	111	4	153	6
2	152	131	86	5	4	9	7	4	3	2	2	3	2
3	178	140	79	25	18	16	11	6	4	3	2	6	4
4	60	47	78	6	13	3	6	7	15	4	9	2	4
5	249	177	71	18	10	29	16	16	9	12	7	11	6
6	146	85	58	10	12	10	12	9	11	5	6	9	11
7	229	171	75	35	20	14	8	9	5	3	2	7	4
8	152	51	34	5	10	9	18	5	10	3	6	6	12
9	139	110	79	4	4	8	7	4	4	5	5	6	5
10	106	76	72	11	14	11	14	2	3	4	5	4	5
11	41	34	83	0	0	1	3	2	6	1	3	2	6
12	84	62	74	6	10	4	6	3	5	1	2	1	2
13	98	58	59	3	5	20	34	4	7	2	3	4	7
14	32	23	72	2	9	9	39	5	22	0	0	3	13
15	115	95	83	4	4	7	7	8	8	12	13	10	11
16	120	100	83	31	31	14	14	7	7	8	8	7	7
17	92	82	89	29	35	28	34	6	7	0	0	3	4
18	39	22	56	2	9	1	5	3	14	0	0	0	0
19	147	90	61	9	10	6	7	6	7	4	4	6	7
20	86	60	70	1	2	2	3	2	3	2	3	3	5
21	29	22	76	5	23	2	9	0	0	0	0	0	0
22	112	92	82	4	4	4	4	1	1	0	0	0	0
23	240	191	80	10	5	14	7	8	4	5	3	11	6
24	186	171	92	29	17	45	26	21	12	8	5	8	5
25	87	78	90	10	13	2	3	6	8	6	8	9	12
26	243	99	41	6	6	19	19	16	16	11	11	16	16
27	84	39	46	4	10	4	10	11	28	3	8	8	21
28	40	24	60	0	0	0	0	0	0	0	0	0	0
29	88	63	72	5	8	2	3	1	2	1	2	2	3
30	68	22	32	2	9	3	14	1	5	0	0	0	0
31	106	82	77	18	22	17	21	5	6	1	1	2	2
32	53	44	83	5	11	8	18	2	5	5	11	4	9

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Table 46. Retinopathy of prematurity (ROP) (Babies < 32 weeks' gestation) according to centres, 2007

Centres	All 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 3 or 4 ROP	
	No.	No.	%	No.	%	No.	%	No.	%	No.	%
All centres	3203	2346	73	1927	82	85	4	6	0	89	5
2	115	84	73	81	96	1	1	1	1	2	2
3	183	146	80	114	78	2	2	1	1	3	3
4	55	45	82	33	73	3	9	0	0	3	9
5	201	141	70	124	88	4	3	0	0	4	3
6	115	68	59	49	72	4	8	0	0	4	8
7	216	168	78	125	74	3	2	0	0	3	2
8	138	85	62	80	94	2	3	1	1	3	4
9	117	79	68	70	89	3	4	0	0	3	4
10	91	74	81	56	76	3	5	0	0	3	5
11	36	25	69	23	92	2	9	0	0	2	9
12	77	60	78	45	75	5	11	0	0	5	11
13	94	71	76	45	63	3	7	0	0	3	7
14	36	27	75	17	63	1	6	0	0	1	6
15	97	72	74	56	78	5	9	0	0	5	9
16	122	99	81	81	82	1	1	0	0	1	1
17	88	68	77	54	79	1	2	1	2	1	2
18	40	30	75	26	87	0	0	0	0	0	0
19	128	89	70	81	91	1	1	1	1	2	2
20	93	73	78	58	79	2	3	0	0	2	3
21	31	23	74	21	91	0	0	0	0	0	0
22	97	80	82	77	96	3	4	0	0	3	4
23	222	172	77	144	84	9	6	0	0	9	6
24	178	142	80	119	84	10	8	0	0	10	8
25	85	60	71	56	93	0	0	0	0	0	0
26	166	110	66	83	75	3	4	0	0	3	4
27	78	46	59	33	72	2	6	0	0	2	6
28	33	16	48	15	94	0	0	0	0	0	0
29	74	50	68	47	94	1	2	0	0	1	2
30	56	34	61	21	62	1	5	0	0	1	5
31	87	74	85	59	80	10	17	1	2	10	17
32	54	35	65	34	97	0	0	0	0	0	0

Table 47. Retinopathy of prematurity (ROP) (Babies with BW < 1250 g) according to centres, 2007

Centres	Babies with BW < 1250 g	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	
	No.	No.	%	No.	%	No.	%	No.	%
All centres	2166	1371	63	1249	91	80	6	6	0
2	82	51	62	50	98	1	2	1	2
3	113	75	66	61	81	2	3	1	2
4	35	27	77	25	93	3	12	0	0
5	145	90	62	86	96	3	3	0	0
6	75	32	43	27	84	3	11	1	4
7	136	91	67	83	91	4	5	0	0
8	92	46	50	45	98	1	2	1	2
9	77	43	56	40	93	3	8	0	0
10	59	43	73	41	95	2	5	0	0
11	24	16	67	16	100	2	13	0	0
12	51	38	75	32	84	5	16	0	0
13	59	37	63	25	68	3	12	0	0
14	18	12	67	11	92	1	9	0	0
15	74	49	66	47	96	5	11	0	0
16	77	58	75	47	81	1	2	0	0
17	48	28	58	26	93	0	0	0	0
18	23	14	61	11	79	0	0	0	0
19	89	52	58	50	96	1	2	1	2
20	60	39	65	33	85	2	6	0	0
21	13	6	46	6	100	0	0	0	0
22	72	58	81	55	95	3	5	0	0
23	152	108	71	108	100	9	8	0	0
24	111	79	71	74	94	9	12	0	0
25	51	28	55	27	96	0	0	0	0
26	150	86	57	79	92	3	4	0	0
27	64	32	50	24	75	2	8	0	0
28	28	11	39	9	82	0	0	0	0
29	56	34	61	33	97	1	3	0	0
30	39	22	56	16	73	1	6	0	0
31	62	51	82	47	92	10	21	1	2
32	31	15	48	15	100	0	0	0	0

Table 48. Cephalhaematoma, Sub-aponeurotic haemorrhage, Erb's palsy and Birth Trauma according to centres, 2007

Centres	All Babies in study	Babies with Cephalhaematoma		Babies with Sub-aponeurotic haemorrhage		Babies with Erb's palsy		Babies with Birth Trauma	
	No.	No.	%	No.	%	No.	%	No.	%
All centres	10835	34	0	149	1	14	0	259	2
2	401	1	0	4	1	0	0	10	2
3	594	2	0	2	0	0	0	6	1
4	242	1	0	7	3	1	0	12	5
5	661	1	0	2	0	1	0	4	1
6	454	0	0	7	2	0	0	7	2
7	847	3	0	2	0	1	0	14	2
8	557	3	1	47	8	1	0	49	9
9	360	0	0	0	0	0	0	1	0
10	308	0	0	3	1	0	0	7	2
11	114	0	0	2	2	0	0	2	2
12	194	0	0	2	1	1	1	3	2
13	310	0	0	3	1	0	0	6	2
14	158	1	1	5	3	0	0	11	7
15	264	1	0	0	0	0	0	1	0
16	355	0	0	4	1	0	0	6	2
17	433	4	1	9	2	1	0	18	4
18	106	0	0	0	0	0	0	0	0
19	336	0	0	0	0	0	0	2	1
20	264	0	0	1	0	1	0	3	1
21	131	0	0	0	0	0	0	0	0
22	472	0	0	2	0	0	0	2	0
23	645	3	0	5	1	2	0	17	3
24	436	0	0	13	3	1	0	18	4
25	294	0	0	2	1	2	1	6	2
26	625	4	1	6	1	0	0	11	2
27	179	2	1	2	1	0	0	11	6
28	96	0	0	0	0	0	0	0	0
29	305	4	1	12	4	2	1	18	6
30	260	2	1	3	1	0	0	4	2
31	276	2	1	1	0	0	0	5	2
32	158	0	0	3	2	0	0	5	3

Table 49. Necrotising enterocolitis (NEC) (babies with BW 501-1500 g) according to centres, 2007

Centres	Babies with BW 501-1500 g	No. of babies who died		Babies with NEC		No. of babies with NEC who died	
	No.	No.	%	No.	%	No.	%
All centres	3601	889	25	222	6	69	31
2	152	39	26	9	6	2	22
3	178	37	21	22	12	3	14
4	60	9	15	2	3	0	0
5	249	66	27	23	9	5	22
6	146	49	34	5	3	1	20
7	229	50	22	7	3	2	29
8	152	54	36	14	9	5	36
9	139	35	25	4	3	1	25
10	106	17	16	10	9	2	20
11	41	9	22	1	2	1	100
12	84	18	21	7	8	2	29
13	98	22	22	2	2	2	100
14	32	8	25	4	13	3	75
15	115	27	23	8	7	3	38
16	120	23	19	3	3	0	0
17	92	22	24	6	7	4	67
18	39	10	26	0	0	0	0
19	147	38	26	4	3	2	50
20	86	23	27	3	3	1	33
21	29	5	17	3	10	0	0
22	112	18	16	4	4	2	50
23	240	45	19	2	1	1	50
24	186	35	19	15	8	7	47
25	87	27	31	8	9	4	50
26	243	73	30	23	9	9	39
27	84	34	40	11	13	4	36
28	40	17	43	0	0	0	0
29	88	25	28	8	9	1	13
30	68	21	31	5	7	0	0
31	106	15	14	3	3	0	0
32	53	18	34	6	11	2	33

Table 50. Episodes of confirmed bacterial sepsis (excluding fungal sepsis) according to centres, 2007

Centres	Babies with BW 501-1500 g	No. of episodes of confirmed bacterial sepsis among babies with BW 501-1500 g		Babies with BW > 1500 g	No. of episodes of confirmed bacterial sepsis among babies with BW > 1500 g		Total no. of Babies with BW > 500 g	Total no. of episodes of confirmed bacterial sepsis among babies with BW > 500 g	
	No.	No.	%	No.	No.	%	No.	No.	%
All centres	3601	518	14	7184	416	6	10785	934	9
2	152	18	12	248	11	4	400	29	7
3	178	25	14	413	10	2	591	35	6
4	60	8	13	181	20	11	241	28	12
5	249	52	21	411	36	9	660	88	13
6	146	13	9	307	23	7	453	36	8
7	229	43	19	614	27	4	843	70	8
8	152	45	30	401	30	7	553	75	14
9	139	9	6	216	14	6	355	23	6
10	106	7	7	202	12	6	308	19	6
11	41	3	7	70	1	1	111	4	4
12	84	7	8	109	6	6	193	13	7
13	98	8	8	212	6	3	310	14	5
14	32	8	25	125	4	3	157	12	8
15	115	26	23	148	7	5	263	33	13
16	120	11	9	235	21	9	355	32	9
17	92	2	2	341	15	4	433	17	4
18	39	0	0	67	3	4	106	3	3
19	147	24	16	187	14	7	334	38	11
20	86	8	9	177	4	2	263	12	5
21	29	1	3	99	2	2	128	3	2
22	112	6	5	359	8	2	471	14	3
23	240	40	17	399	13	3	639	53	8
24	186	31	17	249	20	8	435	51	12
25	87	30	34	207	26	13	294	56	19
26	243	45	19	379	43	11	622	88	14
27	84	2	2	93	2	2	177	4	2
28	40	0	0	53	0	0	93	0	0
29	88	10	11	216	14	6	304	24	8
30	68	6	9	191	8	4	259	14	5
31	106	28	26	170	14	8	276	42	15
32	53	2	4	105	2	2	158	4	3

Table 50a. Confirmed bacterial sepsis (excluding fungal sepsis) according to centres, 2007

Centres	All Babies in study	No. of babies who died		Babies with confirmed bacterial sepsis		Babies with confirmed bacterial sepsis who died	
	No.	No.	%	No.	%	No.	%
All centres	10835	1949	18	935	9	210	22
2	401	84	21	29	7	3	10
3	594	74	12	35	6	8	23
4	242	23	10	28	12	3	11
5	661	137	21	88	13	15	17
6	454	133	29	36	8	11	31
7	847	141	17	71	8	18	25
8	557	128	23	75	13	16	21
9	360	69	19	23	6	10	43
10	308	41	13	19	6	2	11
11	114	27	24	4	4	1	25
12	194	33	17	13	7	3	23
13	310	42	14	14	5	2	14
14	158	20	13	12	8	4	33
15	264	49	19	33	13	5	15
16	355	44	12	32	9	15	47
17	433	55	13	17	4	2	12
18	106	18	17	3	3	0	0
19	336	60	18	38	11	6	16
20	264	45	17	12	5	2	17
21	131	20	15	3	2	1	33
22	472	53	11	14	3	5	36
23	645	100	16	53	8	13	25
24	436	74	17	51	12	6	12
25	294	69	23	56	19	27	48
26	625	146	23	88	14	18	20
27	179	62	35	4	2	2	50
28	96	41	43	0	0	0	0
29	305	53	17	24	8	2	8
30	260	39	15	14	5	0	0
31	276	40	14	42	15	8	19
32	158	29	18	4	3	2	50

Table 51. Confirmed bacterial sepsis in very low birthweight babies (501-1500 g) according to centres, 2007

Centres	Babies with BW 501-1000 g	Babies with BW 501-1000 g with confirmed bacterial sepsis		Babies with BW 1001-1500 g	Babies with BW 1001-1500 g with confirmed bacterial sepsis	
	No.	No.	%	No.	No.	%
All centres	1190	224	19	2411	294	12
2	38	5	13	114	13	11
3	63	8	13	115	17	15
4	19	4	21	41	4	10
5	88	27	31	161	25	16
6	47	5	11	99	8	8
7	73	22	30	156	21	13
8	49	13	27	103	32	31
9	43	4	9	96	5	5
10	33	3	9	73	4	5
11	11	2	18	30	1	3
12	30	3	10	54	4	7
13	39	4	10	59	4	7
14	9	4	44	23	4	17
15	42	14	33	73	12	16
16	45	6	13	75	5	7
17	22	0	0	70	2	3
18	15	0	0	24	0	0
19	41	3	7	106	21	20
20	31	5	16	55	3	5
21	7	0	0	22	1	5
22	40	1	3	72	5	7
23	93	21	23	147	19	13
24	58	16	28	128	15	12
25	26	12	46	61	18	30
26	74	20	27	169	25	15
27	35	1	3	49	1	2
28	12	0	0	28	0	0
29	33	3	9	55	7	13
30	24	2	8	44	4	9
31	29	15	52	77	13	17
32	21	1	5	32	1	3

Table 52. Fungal sepsis in very low birthweight babies (501-1500 g) according to centres, 2007

Centres	Babies with BW 501-1000 g	Babies with BW 501-1000 g with fungal sepsis		Babies with BW 1001-1500 g	Babies with BW 1001-1500 g with fungal sepsis	
	No.	No.	%	No.	No.	%
All centres	1190	19	2	2411	16	1
2	38	0	0	114	0	0
3	63	3	5	115	1	1
4	19	0	0	41	0	0
5	88	1	1	161	0	0
6	47	0	0	99	1	1
7	73	2	3	156	1	1
8	49	1	2	103	7	7
9	43	0	0	96	0	0
10	33	0	0	73	0	0
11	11	0	0	30	0	0
12	30	0	0	54	1	2
13	39	0	0	59	0	0
14	9	0	0	23	0	0
15	42	1	2	73	0	0
16	45	1	2	75	0	0
17	22	0	0	70	0	0
18	15	0	0	24	0	0
19	41	3	7	106	1	1
20	31	0	0	55	0	0
21	7	0	0	22	0	0
22	40	1	3	72	0	0
23	93	1	1	147	0	0
24	58	1	2	128	0	0
25	26	1	4	61	2	3
26	74	0	0	169	1	1
27	35	0	0	49	0	0
28	12	0	0	28	0	0
29	33	0	0	55	0	0
30	24	1	4	44	0	0
31	29	2	7	77	1	1
32	21	0	0	32	0	0

Table 53. Perinatal and neonatal deaths and mortality rates according to centres, 2007

Centres	No. of Stillbirths	No. of Livebirths	Total no. of Births	Inborn deaths < 7 days	Inborn deaths < 28 days	PMR per 1000 TBs	NMR per 1000 LBs
All centres	**2102**	**247387**	**249489**	**1176**	**1497**	**13.14**	**6.05**
2	82	10092	10174	43	58	12.29	5.75
3	74	9353	9427	48	62	12.94	6.63
4	42	4981	5023	17	22	11.75	4.42
5	147	11186	11333	85	95	20.47	8.49
6	128	12698	12826	77	93	15.98	7.32
7	141	15098	15239	96	118	15.55	7.82
8	107	11376	11483	69	100	15.33	8.79
9	71	10099	10170	46	56	11.50	5.55
10	64	7169	7233	21	29	11.75	4.05
11	21	4249	4270	17	25	8.90	5.88
12	33	5251	5284	18	27	9.65	5.14
13	29	5216	5245	26	32	10.49	6.13
14	24	4922	4946	11	18	7.08	3.66
15	59	7424	7483	32	40	12.16	5.39
16	56	7745	7801	21	34	9.87	4.39
17	72	8735	8807	27	45	11.24	5.15
18	23	3386	3409	13	14	10.56	4.13
19	40	4855	4895	36	39	15.53	8.03
20	56	5945	6001	30	36	14.33	6.06
21	43	4854	4897	19	20	12.66	4.12
22	85	8705	8790	34	43	13.54	4.94
23	124	14077	14201	53	67	12.46	4.76
24	74	11358	11432	47	58	10.58	5.11
25	73	6597	6670	27	43	14.99	6.52
26	182	17008	17190	87	109	15.65	6.41
27	13	5141	5154	36	48	9.51	9.34
28	33	3195	3228	24	30	17.66	9.39
29	64	7885	7949	35	47	12.45	5.96
30	45	6020	6065	32	32	12.70	5.32
31	49	6396	6445	27	32	11.79	5.00
32	48	6371	6419	22	25	10.91	3.92

Table 54. Survival of extremely preterm (22-27 weeks gestation) and very preterm (28-31 weeks gestation) babies according to centres, 2007

Centres	Extremely preterm babies (gestation 22-27 weeks)	Extremely preterm babies who survived		Very preterm babies (gestation 28-31 weeks)	Very preterm babies who survived		Extremely and Very preterm babies	Extremely and Very preterm babies who survived	
	No.	No.	%	No.	No.	%	No.	No.	%
All centres	851	326	38	2346	2020	86	3197	2346	73
2	32	14	44	83	70	84	115	84	73
3	49	26	53	134	120	90	183	146	80
4	13	6	46	42	39	93	55	45	82
5	51	19	37	150	122	81	201	141	70
6	31	5	16	84	63	75	115	68	59
7	53	25	47	162	143	88	215	168	78
8	46	15	33	91	70	77	137	85	62
9	30	5	17	87	74	85	117	79	68
10	26	16	62	65	58	89	91	74	81
11	11	5	45	24	20	83	35	25	71
12	19	9	47	58	51	88	77	60	78
13	27	8	30	67	63	94	94	71	76
14	8	5	63	28	22	79	36	27	75
15	33	16	48	64	56	88	97	72	74
16	35	19	54	87	80	92	122	99	81
17	16	4	25	71	64	90	87	68	78
18	12	4	33	28	26	93	40	30	75
19	32	7	22	96	82	85	128	89	70
20	19	4	21	74	69	93	93	73	78
21	7	0	0	24	23	96	31	23	74
22	29	19	66	67	61	91	96	80	83
23	57	26	46	165	146	88	222	172	77
24	54	27	50	124	115	93	178	142	80
25	24	7	29	61	53	87	85	60	71
26	28	6	21	137	104	76	165	110	67
27	29	4	14	49	42	86	78	46	59
28	12	3	25	21	13	62	33	16	48
29	23	5	22	51	45	88	74	50	68
30	11	1	9	45	33	73	56	34	61
31	20	14	70	67	60	90	87	74	85
32	14	2	14	40	33	83	54	35	65

Table 55. Survival of very low birthweight babies (VLBW) according to centres, 2007

Centres	Babies BW501 - 1000 g	Babies BW501 - 1000 g who survived		Babies of BW1001 - 1500 g	Babies of BW1001 - 1500 g who survived		VLBW babies	VLBW babies who survived	
	No.	No.	%	No.	No.	%	No.	No.	%
All centres	1190	579	49	2411	2133	88	3601	2712	75
2	38	16	42	114	97	85	152	113	74
3	63	35	56	115	106	92	178	141	79
4	19	13	68	41	38	93	60	51	85
5	88	38	43	161	145	90	249	183	73
6	47	11	23	99	86	87	146	97	66
7	73	37	51	156	142	91	229	179	78
8	49	17	35	103	81	79	152	98	64
9	43	18	42	96	86	90	139	104	75
10	33	22	67	73	67	92	106	89	84
11	11	6	55	30	26	87	41	32	78
12	30	19	63	54	47	87	84	66	79
13	39	20	51	59	56	95	98	76	78
14	9	3	33	23	21	91	32	24	75
15	42	24	57	73	64	88	115	88	77
16	45	28	62	75	69	92	120	97	81
17	22	7	32	70	63	90	92	70	76
18	15	6	40	24	23	96	39	29	74
19	41	15	37	106	94	89	147	109	74
20	31	13	42	55	50	91	86	63	73
21	7	3	43	22	21	95	29	24	83
22	40	28	70	72	66	92	112	94	84
23	93	60	65	147	135	92	240	195	81
24	58	33	57	128	118	92	186	151	81
25	26	11	42	61	49	80	87	60	69
26	74	28	38	169	142	84	243	170	70
27	35	11	31	49	39	80	84	50	60
28	12	3	25	28	20	71	40	23	57
29	33	14	42	55	49	89	88	63	72
30	24	10	42	44	37	84	68	47	69
31	29	23	79	77	68	88	106	91	86
32	21	7	33	32	28	88	53	35	66

Table 56. Survival of cases with ventilatory support (VS) according to centres, 2007

Centres	All Babies in study	No. of babies who survived		Babies with ventilatory support(VS)		Babies with VS who survived	
	No.	No.	%	No.	%	No.	%
All centres	10835	8886	82	9062	84	7607	84
2	401	317	79	348	87	277	80
3	594	520	88	459	77	414	90
4	242	219	90	221	91	203	92
5	661	524	79	436	66	371	85
6	454	321	71	373	82	267	72
7	847	706	83	749	88	633	85
8	557	429	77	521	94	413	79
9	360	291	81	233	65	186	80
10	308	267	87	252	82	219	87
11	114	87	76	99	87	78	79
12	194	161	83	186	96	158	85
13	310	268	86	287	93	256	89
14	158	138	87	143	91	124	87
15	264	215	81	190	72	157	83
16	355	311	88	319	90	277	87
17	433	378	87	425	98	375	88
18	106	88	83	70	66	66	94
19	336	276	82	254	76	218	86
20	264	219	83	225	85	197	88
21	131	111	85	113	86	106	94
22	472	419	89	414	88	378	91
23	645	545	84	562	87	472	84
24	436	362	83	336	77	271	81
25	294	225	77	254	86	197	78
26	625	479	77	543	87	430	79
27	179	117	65	139	78	91	65
28	96	55	57	56	58	34	61
29	305	252	83	259	85	227	88
30	260	221	85	211	81	184	87
31	276	236	86	244	88	208	85
32	158	129	82	141	89	120	85

Table 57. Duration of hospital stay for babies of BW 501-750 g according to centres, 2007

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay, in days		Babies who died		For those who died, duration of hospital stay, in days	
	No.	No.	%	Mean	SD	No.	%	Mean	SD
All centres	418	86	21	94	30	332	79	5	11
2	11	2	18	105	17	9	82	7	14
3	21	4	19	55	38	17	81	3	4
4	10	5	50	100	23	5	50	3	5
5	27	2	7	83	24	25	93	3	5
6	12	0	0	0	0	12	100	1	1
7	29	9	31	115	35	20	69	7	8
8	14	1	7	105	0	13	93	3	4
9	14	2	14	89	15	12	86	3	2
10	9	3	33	116	46	6	67	4	6
11	5	2	40	97	34	3	60	11	17
12	6	3	50	98	28	3	50	7	8
13	18	6	33	70	24	12	67	5	7
14	2	0	0	0	0	2	100	5	5
15	13	2	15	110	29	11	85	6	11
16	16	5	31	88	14	11	69	6	7
17	7	0	0	0	0	7	100	11	16
18	9	1	11	97	0	8	89	1	0
19	19	0	0	0	0	19	100	6	16
20	11	0	0	0	0	11	100	3	5
21	2	0	0	0	0	2	100	1	0
22	14	6	43	100	24	8	57	1	0
23	23	8	35	91	17	15	65	6	9
24	24	11	46	90	41	13	54	5	8
25	9	1	11	71	0	8	89	7	9
26	22	5	23	95	29	17	77	10	22
27	20	1	5	103	0	19	95	7	15
28	2	0	0	0	0	2	100	25	34
29	15	0	0	0	0	15	100	1	1
30	14	1	7	64	0	13	93	2	1
31	11	6	55	107	12	5	45	26	37
32	9	0	0	0	0	9	100	6	12

Table 57a. Duration of hospital stay for babies of BW 751-1000 g according to centres, 2007

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay, in days		Babies who died		For babies who died, duration of hospital stay, in days	
	No.	No.	%	Mean	SD	No.	%	Mean	SD
All centres	772	493	64	68	30	279	36	13	30
2	27	14	52	87	28	13	48	20	46
3	42	31	74	51	26	11	26	7	10
4	9	8	89	65	11	1	11	18	0
5	61	36	59	71	21	25	41	9	17
6	35	11	31	79	15	24	69	19	63
7	44	28	64	65	34	16	36	8	17
8	35	16	46	85	21	19	54	8	11
9	29	16	55	68	33	13	45	6	14
10	24	19	79	78	20	5	21	19	18
11	6	4	67	65	12	2	33	14	16
12	24	16	67	62	31	8	33	10	9
13	21	14	67	60	20	7	33	7	8
14	7	3	43	69	18	4	57	18	5
15	29	22	76	60	32	7	24	9	9
16	29	23	79	63	22	6	21	40	65
17	15	7	47	51	8	8	53	21	47
18	6	5	83	48	29	1	17	1	0
19	22	15	68	116	48	7	32	12	17
20	20	13	65	48	22	7	35	6	7
21	5	3	60	53	13	2	40	6	6
22	26	22	85	71	35	4	15	4	6
23	70	52	74	62	24	18	26	17	40
24	34	22	65	74	34	12	35	6	10
25	17	10	59	74	30	7	41	17	8
26	52	23	44	68	18	29	56	10	24
27	15	10	67	66	15	5	33	19	15
28	10	3	30	80	31	7	70	9	18
29	18	14	78	65	26	4	22	5	3
30	10	9	90	49	18	1	10	141	0
31	18	17	94	83	51	1	6	4	0
32	12	7	58	74	19	5	42	16	26

Table 57b. Duration of hospital stay for babies of BW 1001-1250 g according to centres, 2007

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay, in days		Babies who died		For babies who died, duration of hospital stay, in days	
	No.	No.	%	Mean	SD	No.	%	Mean	SD
All centres	997	846	85	48	21	151	15	16	41
2	44	36	82	60	28	8	18	25	33
3	47	40	85	38	19	7	15	14	21
4	15	14	93	49	20	1	7	10	0
5	65	58	89	48	18	7	11	10	14
6	32	25	78	47	10	7	22	2	1
7	63	57	90	51	21	6	10	3	3
8	42	30	71	55	16	12	29	24	26
9	31	27	87	52	22	4	13	18	33
10	26	21	81	54	15	5	19	9	12
11	15	14	93	50	19	1	7	9	0
12	23	20	87	45	18	3	13	98	123
13	21	18	86	32	15	3	14	1	0
14	9	9	100	45	25	0	0	0	0
15	34	27	79	46	26	7	21	13	31
16	35	33	94	44	30	2	6	3	3
17	28	23	82	46	12	5	18	10	9
18	9	9	100	48	23	0	0	0	0
19	47	38	81	60	21	9	19	65	122
20	29	27	93	39	18	2	7	2	1
21	3	3	100	44	13	0	0	0	0
22	31	29	94	60	25	2	6	8	0
23	63	56	89	49	22	7	11	2	1
24	59	53	90	45	19	6	10	15	20
25	28	20	71	43	14	8	29	15	16
26	74	59	80	40	15	15	20	15	34
27	27	21	78	52	25	6	22	4	4
28	13	7	54	65	10	6	46	15	20
29	24	22	92	51	15	2	8	1	0
30	16	13	81	36	13	3	19	3	3
31	34	29	85	43	18	5	15	5	4
32	10	8	80	56	14	2	20	8	8

Table 57c. Duration of hospital stay for babies of BW 1251-1500 g according to centres, 2007

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay, in days		Babies who died		For babies who died, duration of hospital stay, in days	
	No.	No.	%	Mean	SD	No.	%	Mean	SD
All centres	1414	1287	91	35	20	127	9	11	30
2	70	61	87	40	17	9	13	6	4
3	68	66	97	29	14	2	3	1	0
4	26	24	92	29	16	2	8	2	1
5	96	87	91	30	12	9	9	8	12
6	67	61	91	38	19	6	9	3	3
7	93	85	91	35	15	8	9	3	6
8	61	51	84	39	21	10	16	8	12
9	65	59	91	37	14	6	9	10	15
10	47	46	98	37	14	1	2	1	0
11	15	12	80	35	19	3	20	7	9
12	31	27	87	33	14	4	13	6	8
13	38	38	100	27	13	0	0	0	0
14	14	12	86	31	11	2	14	1	0
15	39	37	95	41	39	2	5	10	13
16	40	36	90	31	13	4	10	55	90
17	42	40	95	35	15	2	5	1	0
18	15	14	93	31	10	1	7	2	0
19	59	56	95	43	24	3	5	1	0
20	26	23	88	32	15	3	12	32	24
21	19	18	95	30	13	1	5	3	0
22	41	37	90	50	30	4	10	3	3
23	84	79	94	34	15	5	6	18	17
24	69	65	94	29	8	4	6	3	4
25	33	29	88	45	24	4	12	62	91
26	95	83	87	29	40	12	13	9	14
27	22	18	82	34	8	4	18	49	92
28	15	13	87	39	19	2	13	9	11
29	31	27	87	36	11	4	13	1	1
30	28	24	86	28	13	4	14	8	13
31	43	39	91	34	13	4	9	7	12
32	22	20	91	40	11	2	9	3	0

Table 57d. Duration of hospital stay for babies of BW 1501-2500 g according to centres, 2007

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay, in days		Babies who died		For babies who died, duration of hospital stay, in days	
	No.	No.	%	Mean	SD	No.	%	Mean	SD
All centres	3408	2943	86	16	13	465	14	12	28
2	126	105	83	20	17	21	17	7	12
3	221	203	92	12	15	18	8	6	7
4	66	63	95	16	13	3	5	1	1
5	205	175	85	16	15	30	15	6	11
6	123	93	76	20	14	30	24	17	24
7	300	258	86	17	13	42	14	10	19
8	162	136	84	14	12	26	16	14	24
9	110	91	83	20	15	19	17	26	38
10	99	86	87	15	12	13	13	3	4
11	28	23	82	17	8	5	18	9	9
12	66	55	83	14	9	11	17	7	9
13	105	95	90	14	9	10	10	21	61
14	41	39	95	17	12	2	5	4	6
15	81	68	84	19	14	13	16	3	4
16	103	96	93	17	10	7	7	9	12
17	147	128	87	13	9	19	13	10	11
18	32	28	88	19	9	4	13	5	7
19	104	92	88	23	15	12	12	10	22
20	108	101	94	14	11	7	6	9	15
21	56	51	91	17	11	5	9	1	0
22	150	135	90	19	14	15	10	15	27
23	196	168	86	16	13	28	14	11	25
24	114	97	85	17	17	17	15	20	72
25	87	71	82	19	12	16	18	15	45
26	183	149	81	16	13	34	19	5	8
27	45	35	78	20	14	10	22	33	71
28	17	10	59	22	12	7	41	9	10
29	103	90	87	16	14	13	13	19	34
30	78	71	91	12	7	7	9	8	17
31	89	75	84	16	12	14	16	14	23
32	63	56	89	19	16	7	11	22	54

Table 57e. Duration of hospital stay for babies of BW > 2500 g according to centres, 2007

Centres	Babies in study	Babies who survived		For survivors, duration of hospital stay, in days		Babies who died		For babies who died, duration of hospital stay, in days	
	No.	No.	%	Mean	SD	No.	%	Mean	SD
All centres	3776	3226	85	11	15	550	15	8	20
2	122	99	81	12	16	23	19	5	7
3	192	176	92	8	10	16	8	4	4
4	115	105	91	12	15	10	9	4	5
5	206	166	81	11	12	40	19	11	29
6	184	131	71	14	14	53	29	6	13
7	314	269	86	11	15	45	14	8	22
8	239	195	82	11	11	44	18	8	13
9	106	96	91	15	22	10	9	14	23
10	103	92	89	8	7	11	11	25	59
11	41	31	76	13	7	10	24	6	8
12	43	40	93	18	26	3	7	31	25
13	107	97	91	8	7	10	9	5	9
14	84	74	88	10	9	10	12	3	2
15	67	58	87	18	31	9	13	4	5
16	132	118	89	9	8	14	11	12	20
17	194	180	93	9	7	14	7	10	14
18	35	31	89	11	10	4	11	10	18
19	83	75	90	16	17	8	10	2	1
20	69	55	80	9	9	14	20	2	2
21	43	36	84	9	6	7	16	1	1
22	209	189	90	12	21	20	10	2	3
23	203	182	90	11	19	21	10	7	23
24	135	114	84	13	14	21	16	6	8
25	120	94	78	15	18	26	22	13	22
26	196	160	82	13	14	36	18	10	23
27	48	32	67	13	11	16	33	6	10
28	36	21	58	20	13	15	42	4	4
29	113	99	88	10	9	14	12	15	26
30	113	102	90	9	9	11	10	5	10
31	81	70	86	10	11	11	14	19	57
32	42	38	90	16	23	4	10	11	17

Table 58 Administration of antenatal steroids to mothers of babies born <32 weeks' gestation with RDS and respiratory support status according to centres, 2007

Centres	Preterm Babies	Preterm Babies with antenatal steroids		Preterm Babies with antenatal steroids and with 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 with 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	3203	1955	61	1637	84	1528	93	211	13	1139	36	829	73	732	88	107	13
2	115	83	72	75	90	71	95	8	11	28	24	25	89	24	96	2	8
3	183	147	80	123	84	118	96	22	18	23	13	14	61	11	79	0	0
4	55	40	73	30	75	27	90	7	23	15	27	10	67	9	90	3	30
5	201	114	57	91	80	70	77	5	5	85	42	57	67	45	79	12	21
6	115	38	33	34	89	31	91	5	15	76	66	62	82	54	87	8	13
7	216	147	68	89	61	86	97	9	10	64	30	35	55	35	100	5	14
8	138	67	49	58	87	56	97	7	12	62	45	48	77	47	98	1	2
9	117	82	70	64	78	54	84	7	11	30	26	25	83	16	64	0	0
10	91	46	51	29	63	28	97	5	17	37	41	19	51	15	79	2	11
11	36	25	69	22	88	22	100	0	0	10	28	8	80	8	100	1	13
12	77	47	61	44	94	43	98	5	11	26	34	23	88	22	96	7	30
13	94	63	67	51	81	49	96	16	31	23	24	16	70	16	100	3	19
14	36	23	64	22	96	18	82	4	18	11	31	7	64	7	100	1	14
15	97	63	65	56	89	52	93	11	20	32	33	24	75	22	92	6	25
16	122	61	50	56	92	48	86	12	21	53	43	48	91	45	94	14	29
17	88	39	44	22	56	22	100	5	23	45	51	24	53	23	96	2	8
18	40	28	70	23	82	20	87	3	13	8	20	3	38	2	67	0	0
19	128	76	59	66	87	66	100	7	11	51	40	42	82	34	81	2	5
20	93	73	78	68	93	66	97	8	12	17	18	12	71	9	75	1	8
21	31	9	29	9	100	7	78	3	33	22	71	19	86	15	79	2	11
22	97	68	70	61	90	61	100	3	5	29	30	25	86	18	72	2	8
23	222	175	79	162	93	154	95	6	4	46	21	38	83	34	89	2	5
24	178	113	63	88	78	84	95	9	10	65	37	44	68	40	91	3	7
25	85	53	62	51	96	49	96	4	8	31	36	27	87	25	93	0	0
26	166	36	22	31	86	30	97	12	39	120	72	91	76	89	98	24	26
27	78	54	69	45	83	38	84	6	13	20	26	17	85	16	94	1	6
28	33	4	12	3	75	3	100	0	0	27	82	12	44	5	42	0	0
29	74	35	47	34	97	32	94	4	12	39	53	20	51	16	80	0	0
30	56	47	84	44	94	40	91	8	18	6	11	2	33	2	100	0	0
31	87	64	74	54	84	53	98	7	13	20	23	17	85	17	100	3	18
32	54	35	65	32	91	30	94	3	9	18	33	15	83	11	73	0	0

Table 58a Administration of antenatal steroids to mothers of babies born ≤1500 g with RDS and respiratory support status according to centres, 2007

Centre	Babies ≤1500 g	Babies ≤1500 g with antenatal steroids		Babies ≤1500 g with antenatal steroids and with RDS		Babies ≤1500 g with antenatal steroids with RDS and ventilatory support		Babies ≤1500 g with antenatal steroids with RDS and CPAP only		Babies ≤1500 g without antenatal steroids		Babies ≤1500 g without antenatal steroids and with RDS		Babies ≤1500 gwithout antenatal steroids with RDS and ventilatory support		Babies ≤1500 g without antenatal steroids with RDS and CPAP only	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All centres	3651	2137	59	1652	77	1524	92	229	14	1382	38	876	63	763	87	120	14
2	153	105	69	79	75	75	95	11	14	42	27	25	60	23	92	2	8
3	181	140	77	114	81	109	96	15	13	26	14	15	58	12	80	1	7
4	61	41	67	28	68	24	86	7	25	18	30	9	50	7	78	2	22
5	250	140	56	99	71	77	78	4	4	108	43	65	60	53	82	12	18
6	147	57	39	42	74	38	90	6	14	87	59	62	71	54	87	8	13
7	233	158	68	79	50	74	94	10	13	69	30	34	49	34	100	6	18
8	156	69	44	57	83	56	98	9	16	79	51	51	65	50	98	1	2
9	144	103	72	70	68	58	83	8	11	37	26	26	70	15	58	0	0
10	106	50	47	29	58	28	97	7	24	44	42	21	48	19	90	2	10
11	44	31	70	23	74	23	100	1	4	12	27	8	67	8	100	1	13
12	85	53	62	50	94	48	96	8	16	27	32	26	96	23	88	7	27
13	98	63	64	50	79	48	96	16	32	26	27	16	62	16	100	4	25
14	33	20	61	19	95	16	84	2	11	10	30	6	60	6	100	0	0
15	116	71	61	62	87	52	84	13	21	41	35	30	73	26	87	8	27
16	120	56	47	50	89	44	88	12	24	57	48	45	79	42	93	10	22
17	92	34	37	19	56	19	100	4	21	53	58	24	45	23	96	2	8
18	39	25	64	20	80	18	90	2	10	11	28	2	18	1	50	0	0
19	149	85	57	65	76	64	98	7	11	63	42	41	65	32	78	2	5
20	87	69	79	61	88	59	97	8	13	16	18	10	63	7	70	0	0
21	32	10	31	9	90	7	78	4	44	22	69	18	82	14	78	1	6
22	113	78	69	64	82	64	100	3	5	35	31	24	69	17	71	1	4
23	246	187	76	162	87	152	94	7	4	58	24	47	81	41	87	5	11
24	187	116	62	86	74	81	94	8	9	71	38	44	62	38	86	4	9
25	87	51	59	48	94	46	96	7	15	36	41	24	67	22	92	0	0
26	246	56	23	47	84	44	94	14	30	172	70	109	63	105	96	32	29
27	86	57	66	45	79	36	80	6	13	25	29	18	72	16	89	1	6
28	43	2	5	1	50	1	100	0	0	39	91	14	36	6	43	0	0
29	89	43	48	35	81	33	94	6	17	46	52	23	50	18	78	1	4
30	69	59	86	52	88	48	92	12	23	8	12	5	63	5	100	2	40
31	106	76	72	58	76	56	97	9	16	24	23	17	71	17	100	3	18
32	53	32	60	29	91	26	90	3	10	20	38	17	85	13	76	2	12

Table 59. Babies with birth weight ≤1500 g with RDS requiring ventilatory support according to centres, 2007

Centre	All Babies in study	Babies with Birth weight ≤1500 g		Babies with Birth weight ≤1500 g and with RDS		Babies with Birth weight ≤1500 g and with RDS and Ventilatory support	
		No.	%	No.	%	No.	%
All centres	10835	3651	34	2626	72	2372	90
2	401	153	38	109	71	103	94
3	594	181	30	143	79	133	93
4	242	61	25	38	62	32	84
5	661	250	38	165	66	131	79
6	454	147	32	107	73	95	89
7	847	233	28	114	49	109	96
8	557	156	28	116	74	111	96
9	360	144	40	98	68	75	77
10	308	106	34	56	53	53	95
11	114	44	39	32	73	32	100
12	194	85	44	81	95	76	94
13	310	98	32	72	73	70	97
14	158	33	21	26	79	23	88
15	264	116	44	95	82	79	83
16	355	120	34	101	84	92	91
17	433	92	21	46	50	44	96
18	106	39	37	24	62	21	88
19	336	149	44	107	72	97	91
20	264	87	33	73	84	68	93
21	131	32	24	27	84	21	78
22	472	113	24	88	78	81	92
23	645	246	38	210	85	194	92
24	436	187	43	130	70	119	92
25	294	87	30	72	83	68	94
26	625	246	39	169	69	161	95
27	179	86	48	67	78	56	84
28	96	43	45	17	40	7	41
29	305	89	29	58	65	51	88
30	260	69	27	59	86	54	92
31	276	106	38	79	75	77	97
32	158	53	34	47	89	39	83

Table 59 Babies with birth weight ≤1500 g with RDS requiring CPAP only according to centres, 2007

Centre	All Babies In study	Babies with Birth weight ≤1500 g		Babies with Birth weight ≤1500 g and with RDS		Babies with Birth weight ≤1500 g and with RDS and CPAP only	
		No.	%	No.	%	No.	%
All centres	10835	3651	34	2626	72	363	14
2	401	153	38	109	71	14	13
3	594	181	30	143	79	18	13
4	242	61	25	38	62	10	26
5	661	250	38	165	66	16	10
6	454	147	32	107	73	14	13
7	847	233	28	114	49	16	14
8	557	156	28	116	74	11	9
9	360	144	40	98	68	8	8
10	308	106	34	56	53	10	18
11	114	44	39	32	73	2	6
12	194	85	44	81	95	17	21
13	310	98	32	72	73	23	32
14	158	33	21	26	79	2	8
15	264	116	44	95	82	22	23
16	355	120	34	101	84	22	22
17	433	92	21	46	50	6	13
18	106	39	37	24	62	2	8
19	336	149	44	107	72	9	8
20	264	87	33	73	84	8	11
21	131	32	24	27	84	5	19
22	472	113	24	88	78	4	5
23	645	246	38	210	85	12	6
24	436	187	43	130	70	12	9
25	294	87	30	72	83	7	10
26	625	246	39	169	69	46	27
27	179	86	48	67	78	8	12
28	96	43	45	17	40	0	0
29	305	89	29	58	65	7	12
30	260	69	27	59	86	14	24
31	276	106	38	79	75	13	16
32	158	53	34	47	89	5	11

Table 60. Babies with gestation <32 weeks with RDS requiring ventilatory support according to centres, 2007

Centre	All Babies in study	Babies <32 weeks' gestation		Babies <32 weeks' gestation and with RDS		Babies <32 weeks' gestation and with RDS and Ventilatory support	
		No.	%	No.	%	No.	%
All centres	10835	3203	30	2553	80	2335	91
2	401	115	29	103	90	98	95
3	594	183	31	150	82	140	93
4	242	55	23	40	73	36	90
5	661	201	30	149	74	116	78
6	454	115	25	97	84	86	89
7	847	216	26	125	58	122	98
8	557	138	25	115	83	109	95
9	360	117	33	91	78	72	79
10	308	91	30	53	58	48	91
11	114	36	32	31	86	31	100
12	194	77	40	71	92	69	97
13	310	94	30	73	78	71	97
14	158	36	23	30	83	26	87
15	264	97	37	82	85	75	91
16	355	122	34	111	91	100	90
17	433	88	20	49	56	47	96
18	106	40	38	30	75	26	87
19	336	128	38	109	85	101	93
20	264	93	35	82	88	77	94
21	131	31	24	28	90	22	79
22	472	97	21	86	89	79	92
23	645	222	34	200	90	188	94
24	436	178	41	132	74	124	94
25	294	85	29	79	93	75	95
26	625	166	27	130	78	126	97
27	179	78	44	66	85	58	88
28	96	33	34	17	52	8	47
29	305	74	24	54	73	48	89
30	260	56	22	48	86	43	90
31	276	87	32	74	85	73	99
32	158	54	34	48	89	41	85

Table 60a. Babies with gestation <32 weeks with RDS requiring CPAP only according to centres, 2007

Centre	All Babies in study	Babies <32 weeks' gestation		Babies <32 weeks' gestation and with RDS		Babies <32 weeks' gestation with RDS and with CPAP only	
		No.	%	No.	%	No.	%
All centres	10835	3203	30	2553	80	329	13
2	401	115	29	103	90	62	60
3	594	183	31	150	82	128	85
4	242	55	23	40	73	27	68
5	661	201	30	149	74	94	63
6	454	115	25	97	84	46	47
7	847	216	26	125	58	74	59
8	557	138	25	115	83	80	70
9	360	117	33	91	78	48	53
10	308	91	30	53	58	33	62
11	114	36	32	31	86	2	6
12	194	77	40	71	92	41	58
13	310	94	30	73	78	63	86
14	158	36	23	30	83	15	50
15	264	97	37	82	85	56	68
16	355	122	34	111	91	57	51
17	433	88	20	49	56	28	57
18	106	40	38	30	75	17	57
19	336	128	38	109	85	66	61
20	264	93	35	82	88	65	79
21	131	31	24	28	90	17	61
22	472	97	21	86	89	60	70
23	645	222	34	200	90	104	52
24	436	178	41	132	74	25	19
25	294	85	29	79	93	9	11
26	625	166	27	130	78	91	70
27	179	78	44	66	85	22	33
28	96	33	34	17	52	0	0
29	305	74	24	54	73	19	35
30	260	56	22	48	86	25	52
31	276	87	32	74	85	58	78
32	158	54	34	48	89	18	38

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 (≤1000 g and ≤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

Appendix 2 Data Definitions

DATA DEFINITIONS AND CRITERIA

Centre Name*:* Name of participating hospital

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

'Case Status'*:*
Inborn- born in the same hospital as the participating site. If born within the wards of the participating hospital to be considered as inborn. If born in the ambulance – considered as 'born before arrival' [BBA] and outborn).

Outborn**:** Born in another place (includes BBA, transfers after birth from another hospital or home to the NNU of the participating site, and those born in the NNU hospital compound).

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

SECTION 1: Patient Particulars

1. ***Name of patient***: Name as in hospital record
2. ***RN****:* Registration Number at participating hospital. If the baby dies in Labour room and has no RN, then use the mother's RN.
3. ***Mother's I/C Number****:* New IC or Passport number
4. ***Date of Birth****:* dd/mm/yy
5. ***Time of Birth*****:** am/pm
6. ***Ethnic group***: Malay / Chinese / Indian / Orang Asli / Bumiputra Sabah / Bumiputra Sarawak / Non-citizen / Other Malaysian / Foreigner: 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.
7. ***Maternal Age****:* Age in completed years.
8. ***GPA***: Gravida__Para__Abortion (of current pregnancy before delivery of this child).
9. State 'yes' or 'no' if mother has insulin-dependent diabetes (regardless of whether it is gestational or pre-gestational)

SECTION 2: Birth History

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

11. ***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, excluding topical antibiotics.

12. ***Birth weight (grams)****:* Weight in grams at birth hospital. If there are discrepant values, use the birth hospital value for outborn 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.

13. ***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 the Last Menstrual Period (LMP) date. Otherwise use LMP date 2) New expanded Ballard scoring. If there is no definite estimate but baby is referred to as term baby, enter 40.

14. ***Growth status****:* based on Intrauterine Growth Curves (Composite Male / Female) chart. Small for Gestational Age (SGA) <10th centile; Appropriate for Gestational Age (AGA) 10-90th centile; Large for Gestational Age (LGA) >90th centile.

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

16. ***Place of birth****:*
    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 refers to the availability of specialist post even if this post is not filled.

17. ***Multiplicity****:* To indicate as singleton, twins, triplets or others i.e. quadruplets, etc.

18. ***Mode of Delivery****:* Tick as relevant. Rarely more than 1 mode may apply. All caesarians are considered as such without differentiation into upper or lower segment.

19. ***CRIB (Clinical Risk Index for Babies) score***: Apply scoring sheet for all babies at less than 31 weeks gestation or birth weight 501 - 1500 g, add up the scores (obtained within 12 hours of birth) and state the total score. Indicate as NA if scoring was inadvertently not done and 'moribund' if case was in a very poor condition and resuscitation had failed or aggressive treatment was not attempted. In well babies score blood gas as normal if blood gas was not done.

SECTION 3: Neonatal Events

20. ***Ventilatory support***: 'Yes' or 'No'. If 'Yes' tick what type of support was given

    1. **CPAP** - Use of Continuous Positive Airway Pressure administered by a nasal prong or nasopharyngeal apparatus, or via an endotracheal tube. Nasal cannula oxygen labelled as 'prongs' does not count as CPAP, but should be counted as 'Supplemental oxygen'.
    2. Do not assume 'prongs' means nasal cannula, score as CPAP if there is pressure recorded, otherwise score as supplemental oxygen.
    3. **IMV** – Intermittent Mandatory Ventilation given via a mechanical ventilator. Excludes manual hand-bagging during resuscitation at birth.
    4. **IMV+PTV** – Patient–triggered ventilation is inclusive of synchronized mandatory ventilation (SIMV) and other Assist-Control modes.
    5. **HFPPV** – High frequency positive pressure ventilation of rate >120/min.
    6. **HFOV** – High frequency oscillatory ventilation as delivered by an oscillator
    7. **Nitric oxide** – Gas used as a pulmonary vasodilator and administered via a ventilator
    8. **Others** may include High Frequency Jet Ventilation (HFJV) or Liquid ventilation.

    Oxygen hood/head-box therapy and incubator oxygen therapy are not included as ventilatory support.

21. ***Total Duration of Ventilatory support***: Inclusive of CPAP (even if on air CPAP). State to next complete day i.e. < 24 hours is 1 day and 2 days 4 hours is 3 days.

22. ***Antibiotics***: May choose more than one answer. Indicate as relevant. Penicillin is meant only for Penicillin, and not other 'penicillin' group of drugs.

23. ***Surfactant***: Indicate whether given or not. If 'yes' state if given within 2 hours.

24. ***Post Natal Steroids for CLD***: Indicate given or not for chronic lung disease (CLD). Steroids given for other purposes e.g. hypotension and laryngeal oedema were not included.

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

26. ***Enteral Nutrition on Discharge****:* State 'yes' if any form of feeding was given through the gastrointestinal tract. For type of feeding choose one option i.e. 'Exclusive breastfeeding / Breast milk feeds', 'Exclusive formula feeds' or 'Mixed feeds'

27. ***Retinopathy of Prematurity (ROP) screening****:* Indicate whether screening for retinopathy of prematurity was done or not.

28. ***Ultrasound brain****:* Indicate whether procedure was done or not.

SECTION 4: Outcome

29. ***Date of discharge****:* Enter the exact date

30. ***Weight (grams) on 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.

31. ***Growth Status at Discharge****:* based on Intrauterine Growth Curves (Composite Male / Female) chart. SGA<10th centile; AGA 10-90th centile; LGA >90th centile.

32. ***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 11 days.

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

    If child alive, state Place of discharge to**:** Home, Other Non-Paeds Ward, Social Welfare home or 'Still hospitalised as of 1st birthday'. If transferred to other hospitals, specify the name of hospital and reason for transfer.

    Post- transfer disposition: If a case is transferred to another hospital in the MNNR network, complete the CRF up to current status and send form with the baby. The referral centre will 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 'outcome' and 'duration of stay' information** from the unit that the case was referred to.

    If child died, state Place of Death: Labour Room/OT, In Transit Neonatal Unit or 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 3. 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'.*

NA in the CRF means data is not applicable or not available. There should not be too many 'Not available' data

DEFINITIONS OF CERTAIN SPECIFIED DIAGNOSES
(Modified from ICD 10)

Diagnosis	Definition
Respiratory distress syndrome (RDS). Tick 'yes' or 'no'	Respiratory distress syndrome or hyaline membrane disease (presence of clinical respiratory distress in a premature infant with/without characteristic CXR picture after exclusion of other causes).
Patent ductus arteriosus (PDA). State if absent (No) or how treated. More than one response is acceptable.	As diagnosed clinically, i.e. murmur present with or without wide pulse pressure, or by echocardiography.
Pneumothorax Tick 'yes' or 'no'	As diagnosed by chest X-ray, thoracentesis with documented removal of air or autopsy report. While placement of a chest tube is a common response, it is not necessary for diagnosis.
Necrotising enterocolitis (NEC) (Stage 2 and above) Tick only one response. If no NEC or only stage 1 ticks 'none'. If managed medically only, tick 'Medical Rx'. If managed medically and surgically, tick 'Surgical Rx'	NEC according to Bell's criteria stage 2 or higher **Stage 1 :** Suspected (History of perinatal stress, systemic signs of ill health i.e. temperature instability, lethargy, apnoea, Gastro Intestinal Tract (GIT) manifestations i.e. poor feeding, increased volume of gastric aspirate, vomiting, mild abdominal distension, faecal occult blood with no anal fissure). **Stage 2 :** Confirmed (Any features of stage 1 plus persistent occult or gastrointestinal bleeding, marked abdominal distension, abdominal radiograph, intestinal distension, bowel wall oedema, unchanging bowel loops, pneumatosis intestinalis, portal vein gas). **Stage 3 :** Advanced (Any features of stages 1 or 2 plus: deterioration in vital signs, evidence of shock or severe sepsis, or marked gastrointestinal haemorrhage, or abdominal radiograph showing any features of stage 2 plus pneumoperitoneum).
Hypoxic ischaemic encephalopathy (HIE)	Applies only to infants >2000 g with 1) History of perinatal event consistent with injury (foetal distress, low apgar scores, need for resuscitation) ***and*** Abnormal neurologic exam over the first 2-3 days of life.

Highest total serum bilirubin (SB) If no jaundice or SB was not done tick 'NA'	Bilirubin level as determined on a blood sample.
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 counted unless it is the mode of oxygen administration used in a transport situation. Do not score oxygen given as part of a hyperoxia test.
Seizures	Confirmed as witnessed by two or more clinicians or diagnosed by EEG. Used synonymously with fits or convulsions.
Infections An individual case may have more than one episode of infection i.e. a confirmed bacterial sepsis (for which organism should be stated) and an episode of clinical sepsis. Tick both in this situation. If two episodes of confirmed sepsis, tick once, but indicate the organisms accordingly (may be once if they are the same in both infections)	***Presumed sepsis*** In the presence of risk factors for infection, for example, maternal pyrexia or preterm pre-labour rupture of membranes but subsequent clinical picture and investigations showed absence of infection ***Clinical sepsis*** One of the following clinical signs or symptoms with no other recognised cause: Fever (>38^{o}C), hypothermia (<37^{o}C), apnoea, bradycardia *and* all of the following: 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 ***Confirmed sepsis*** Clinical evidence of sepsis plus culture-proven infection e.g.: positive blood, urine, or CSF culture or positive bacterial antigen test. Includes congenital pneumonia if blood culture was positive. State organism as indicated or specify others.
Intraventricular haemorrhage (IVH) State if 'None' or Grade 1 to 4. If ultrasound is not done state 'Not	Definition of the grades: **Grade 1** : Isolated germinal matrix haemorrhage **Grade 2** : Intraventricular haemorrhage with normal ventricular size **Grade 3** : Intraventricular haemorrhage with acute

applicable /Not checked'. If present, state if VP shunt/reservoir was inserted	ventricular dilation **Grade 4 :** Intraventricular haemorrhage with parenchymal haemorrhage
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. If screening was not done tick 'Not Applicable/Not checked' State if laser or cryotherapy was done.	**Stage 1**: Demarcation Line **Stage 2**: Ridge **Stage 3**: Ridge with Extraretinal Fibrovascular Proliferation **Stage 4**: Retinal Detachment
Congenital anomalies are listed according to known 'syndromes', 'inborn error of metabolism', 'multiple congenital abnormalities' and 'important isolated anomaly'. For 'Others' please specify.	Please refer to WHO ICD 10 for definitions of various abnormalities.
Meconium aspiration syndrome	Occurs when born via meconium-stained liquor with clinical picture of respiratory distress and subsequent Chest X-Ray changes consistent with meconium aspiration.
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).
Pulmonary interstitial emphysema	X-ray findings of air-leak in the interstitium of the pulmonary system.

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.
Neonatal encephalopathy (NE)	Situation of disturbed neurological function in the infant at or near term during the first week after birth, manifested by difficulty in initiating and maintaining respiration, depression of tone and reflexes, altered consciousness, and often seizures but do not fulfill criteria for 'Birth Asphyxia' (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(al) findings).
Disseminated intravascular coagulation (DIVC)	Clinical bleeding and confirmed by prolonged Prothrombin Time (PT), Activated Partial Thromboblastin Time (APTT) and low platelet count.
Polycythaemia neonatorum	Venous or arterial haematocrit above 65%.
Anaemia of prematurity	Defined as Haemoglobin (Hb) <8 gm% in a growing preemie.
Renal failure	Renal failure (due to any cause). Diagnosis is made clinically and supported by results of blood urea and or serum creatinine. Abnormal results that are readily reversible with appropriate hydration is not considered as renal failure.
Congenital intrauterine infection	Diagnosis made clinically and supported by microbiological/serological results. State organism if known e.g. Rubella, CMV, herpes, and varicella or state 'unspecified'.

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				
TOTAL				

** 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				
TOTAL				

*** 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

MALAYSIAN NATIONAL NEONATAL REGISTRY (CRF 07)

Centre Name: _____

Date of Admission: ☐☐ ☐☐ ☐☐ (dd/mm/yy)

☐ Inborn ☐ Outborn
☐ Stillbirth ☐ Livebirth
☐ New Case ☐ Readmission
☐ Referral from, if relevant: .....

Office use: ☐☐ / ☐☐☐
Centre: ☐☐☐

SECTION 1 : PATIENT PARTICULARS

1. Name:		2. RN:	
3. Mother's I/C Number:	New IC:	Passport:	
4. Date of Birth:		(dd/mm/yy)	
5. Time of Birth:	: AM / PM		
6. Ethnic group:	☐ Malay ☐ Indian ☐ Bumiputra Sabah, specify: ..... ☐ Other M'sian ☐ Chinese ☐ Orang Asli ☐ Bumiputra Sarawak, specify: ..... ☐ Non-citizen		
7. Maternal Age:			
8. GPA:	G: P: A:		
9. Insulin dependent diabetes in mother:	☐ Yes ☐ No ☐ Not Available		

SECTION 2 : BIRTH HISTORY

Drugs Used in Labour	10. Antenatal Steroid:	☐ Yes	☐ No	☐ Unknown
	11. Intrapartum Antibiotic:	☐ Yes	☐ No	☐ Unknown
12. Birth Weight:	(grams)			
13. Gestation:	(weeks)			
14. Growth Status:	☐ SGA	☐ AGA	☐ LGA	
15. Gender:	☐ Male	☐ Female	☐ Indeterminate	
16. Place of Birth:	☐ University Hospital ☐ General Hospital ☐ Private Hospital	☐ District Hospital with Specialist ☐ District Hospital without Specialist ☐ Private Maternity Home	☐ Home ☐ Others, specify:	
17. Multiplicity:	☐ Singleton ☐ Twin ☐ Triplet ☐ Others, specify:			
18. Mode of Delivery:	☐ SVD ☐ Ventouse	☐ Breech ☐ Caesarean Section	☐ Forceps ☐ Unknown	
19. CRIB Score for birth weight 601-1600 gms:	☐ Score :	☐ NA	☐ Moribund	

SECTION 3 : NEONATAL EVENT

20. Ventilatory Support: (Check all that apply)	☐ Yes →	☐ CPAP	☐ IMV	☐ HFOV	☐ Others, specify: .....
	☐ No	☐ HFPPV	☐ IMV + PTV	☐ Nitric Oxide	
21. Total Duration of Ventilatory Support:	..... (in days)				
22. Antibiotics: (Check all that apply)	☐ Yes →	☐ Penicillin	☐ 3rd Cephalosporin	☐ Carbapenem	
	☐ No	☐ Aminoglycoside	☐ 4th Cephalosporin	☐ Others, specify:	
		☐ 2nd Cephalosporin	☐ Vancomycin		
23. Surfactant:	☐ Yes →	☐ ≤ 2 hrs	☐ > 2 hrs		
	☐ No				
24. Post Natal Steroid for CLD:	☐ Yes	☐ No			
25. Parenteral Nutrition:	☐ Yes	☐ No			
26. Enteral Nutrition on discharge:	☐ Yes →	☐ Exclusive breast feeding / breastmilk feeds	☐ Exclusive formula feeds	☐ Mixed feeds	
	☐ No				
27. ROP screening:	☐ Yes	☐ No			
28. Ultrasound Brain:	☐ Yes	☐ No			

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SECTION 4 : OUTCOME

29. Date of Discharge:	| | (dd/mm/yy)
30. Weight on Discharge / Death / Transfer out:	(grams)
31. Growth Status at discharge:	☐ SGA ☐ AGA ☐ LGA
32. Total Duration of hospital stay (Neonatal / Paeds Care):	..... (in completed days)

33. Outcome:

☐ **Alive** →

Place of Discharge:

- ☐ Home
- ☐ Social welfare home
- ☐ Other Non Paeds Ward
- ☐ Still hospitalized as of 1st birthday
- ☐ Transfer to Other Hospitals →

Name of Hospital:

Reasons of Transfer:
- ☐ Lack of NICU bed
- ☐ Stepdown care
- ☐ Chronic care
- ☐ Surgery / Diagnostic Services
- ☐ Social / Logistic reason
- ☐ Others, specify: .....

Post Transfer Disposition
(pls fill this section if place transferred to is not part of the NNR Network):

a.
- ☐ Home
- ☐ Death
- ☐ Still hospitalized as of 1st birthday
- ☐ Transferred again to another hospital
- ☐ Readmitted to your hospital

b. Date of Discharge: \| \| \| (dd/mm/yy)

c. Weight on Discharge: ..... (grams)

d. Duration of stay in the hospital transferred to: ..... (in completed days)

☐ **Dead** → **Place of Death:** ☐ Labour Room/OT ☐ In Transit ☐ Neonatal Unit ☐ Others, specify: .....

SECTION 5 : PROBLEMS / DIAGNOSES

Mandatory fields for diagnoses / procedures:

1. RDS
- ☐ Yes
- ☐ No

2. PDA (For Preterm)
- ☐ No PDA
- ☐ Indomethacin/Ibuprofen > 24hrs
- ☐ Ligation
- ☐ Not treated
- ☐ Not Available / Unknown

3. Pneumothorax
- ☐ Yes
- ☐ No

4. Supplemental oxygen at:

Day 28:
- ☐ Yes ☐ No

36 weeks corrected age:
- ☐ Yes ☐ No

5. NEC (Stage 2 and above)
- ☐ None
- ☐ Medical Rx
- ☐ Surgical Rx
- ☐ Not Available / Unknown

6. ROP
- ☐ None
- ☐ Stage 1
- ☐ Stage 2
- ☐ Stage 3
- ☐ Stage 4
- ☐ Stage 5
- ☐ Not Applicable / Not Checked
- ☐ Laser therapy
- ☐ Cryotherapy

7. IVH
- ☐ None
- ☐ Grade 1
- ☐ Grade 2
- ☐ Grade 3
- ☐ Grade 4
- ☐ Not Applicable / Not Checked
- ☐ VP shunt / reservoir insertion

8. Seizures
- ☐ None
- ☐ Suspected
- ☐ Definite
- ☐ Not Available / Unknown

9. Infection
- ☐ None
- ☐ Presumed sepsis
- ☐ Clinical sepsis
- ☐ Confirmed sepsis

10. For confirmed sepsis:
- ☐ Group B Streptococcus
- ☐ MRSA
- ☐ CONS
- ☐ ESBL organisms
- ☐ Fungal
- ☐ Others, specify: .....

11. HIE (BW > 2000 gm)
- ☐ None
- ☐ Mild / Moderate
- ☐ Severe
- ☐ Not Available / Unknown
- ☐ Not applicable

12. Highest total bilirubin if > 340 for Term babies and > 260 for Preterm babies

..... umol/l

☐ Not Available

13. Congenital Anomalies

13a. Congenital Anomalies

☐ Yes ☐ No

- ☐ Syndrome (known)
  - ☐ Down
  - ☐ Edward
  - ☐ Patau
  - ☐ Others, specify (Please refer to ICD 10):
- ☐ Not a Recognised Syndrome

13b. Types of Abnormalities (Check all that are present. Applies to all including 'syndromes' and 'not a recognised syndrome', 'single' and 'multiple abormalities')

- ☐ None
- ☐ CVS →
  - ☐ Cyanotic
  - ☐ Acyanotic
- ☐ CNS →
  - ☐ Hydrocephalus
  - ☐ Others, check ICD10 .....
- ☐ Neural Tube Defect →
  - ☐ Spina bifida
  - ☐ Anencephaly
  - ☐ Others, check ICD10 .....
- ☐ Skeletal dysplasia
- ☐ Abnormal Facies, Specify: .....
- ☐ Respiratory
- ☐ GIT
- ☐ Hydrops
- ☐ Renal
- ☐ Cleft →
  - ☐ Lip
  - ☐ Palate
  - ☐ Lip and Palate
- ☐ Others, specify:

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SECTION 5 : PROBLEMS / DIAGNOSES (continue)

Mandatory fields for diagnoses / procedures: (continue)

14. Inborn Errors of Metabolism (IEM)

☐ Yes → a. Clinical Diagnosis? ☐ Yes ☐ No

☐ No b. Confirmed Diagnosis? ☐ Yes, state type: ..... ☐ No

Other Diagnoses :

15. Respiratory
- ☐ Meconium aspiration syndrome
- ☐ Transient tachypnoea newborn
- ☐ Pulmonary haemorrhage
- ☐ Pulmonary interstitial emphysema
- ☐ Pneumonia
- ☐ Others: (Please refer to ICD 10)

.....

16. Central Nervous System
- ☐ Neonatal encephalopathy
- ☐ Neonatal meningitis
- ☐ Others: (Please refer to ICD 10)

.....

.....

17. Birth Trauma
- ☐ Bruises, superficial
- ☐ Cephalhaematoma
- ☐ Subaponeurotic haemorrhage
- ☐ Erb's paralysis
- ☐ Others: (Please refer to ICD 10)

.....

18. Renal
- ☐ Renal failure, unspecified (due to any cause)
- ☐ Others: (Please refer to ICD 10)

.....

.....

.....

19. Haematology
- ☐ DIVC
- ☐ Polycythaemia neonatorum
- ☐ Anaemia of Prematurity
- ☐ Others: (Please refer to ICD 10)

.....

.....

20. Cardiovascular
- ☐ Persistent Foetal Circulation (PPHN)
- ☐ Others: (Please refer to ICD 10)

.....

21. Miscellaneous
- ☐ Inguinal hernia
- ☐ Congenital intrauterine infection, specify organism :

.....
- ☐ Others: (Please refer to ICD 10)

.....

22. Others

(Please refer to ICD 10)

.....

.....

.....

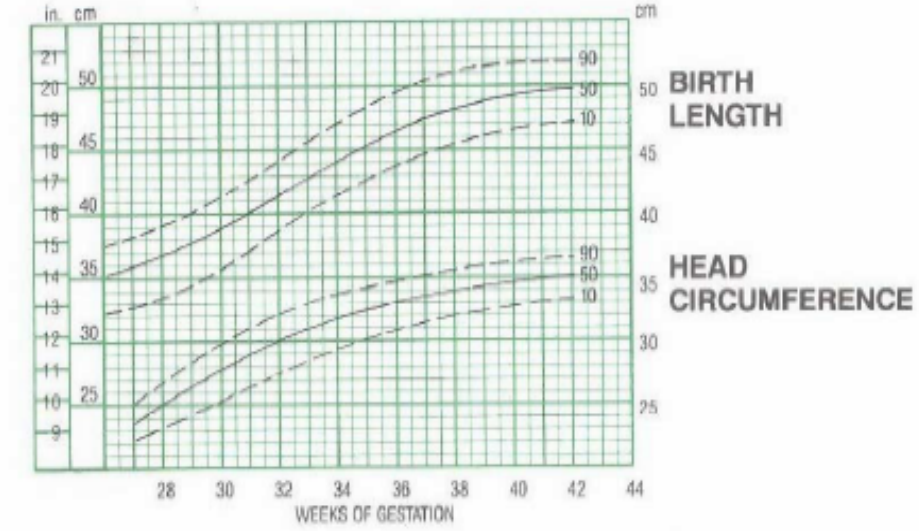
Name : _____ Signature : _____ Date: ☐☐☐ (dd/mm/yy)

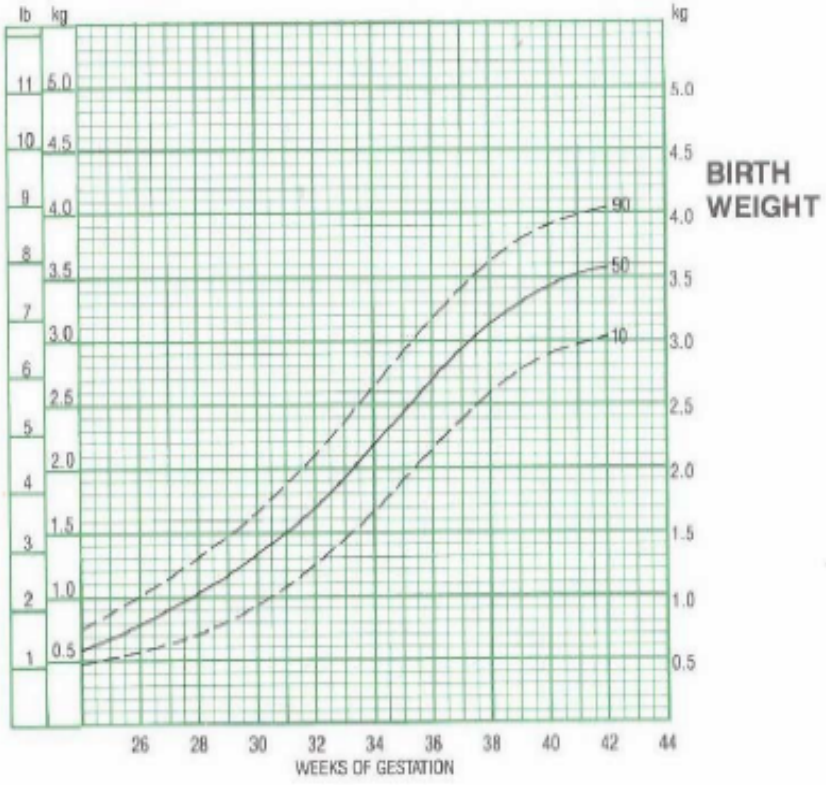
CRIB Score (APPENDIX 1)

It stands for 'clinical risk index for babies' score. It is a tool for assessing initial neonatal risk and comparing performance of neonatal intensive care units. It is based on routine data recorded within 12 hours of birth. Six variables that are independently associated with hospital deaths are scored.

Factor	Score
1. Birth weight (gm)	
a. > 1350	0
b. 851 - 1350	1
c. 701 - 850	4
d. <= 700	7
2. Gestation (week)	
a. > 24	0
b. <= 24	1
3. Congenital anomalies (excluding lethal)	
a. None	0
b. Not acutely life threatening	1
c. Acutely life threatening	3
4. Maximum base excess in first 12 hours (mmol/l)	
a. > - 7.0	0
b. - 7.0 to - 9.9	1
c. - 10.0 to - 14.9	2
d. <= - 15.0	3
5. Minimum appropriate FIO2 in first 12 hours	
a. <= 0.40	0
b. 0.41 - 0.60	2
c. 0.61 - 0.90	3
d. 0.91 - 1.00	4
6. Maximum appropriate FIO2 in first 12 hours	
a. <= 0.40	0
b. 0.41 - 0.80	1
c. 0.81 - 0.90	3
d. 0.91 - 1.00	5
TOTAL SCORE: _____	

INTRAUTERINE GROWTH CURVES (COMPOSITE MALE / FEMALE) (APPENDIX 2)





Data Source: W.H. Kitchen et al Revised intrauterine growth curves for an Australian hospital population. Aust. Paediatr. J. (1983) 19:157–161.

Appendix 5 Presentations

POSTERS, ABSTRACTS AND PAPERS PRESENTED

1. Cheah IGS. Neonatal Survival based on 2007 data. Presented at the MNNR SDP Meeting and Forum, Hotel Prince & Residence, Kuala Lumpur Malaysia, 2009
2. Chang ASM. Chronic Lung Disease (CLD) and ventilation 2007. Presented at the MNNR SDP Meeting and Forum, Hotel Prince & Residence, Kuala Lumpur Malaysia, 2009
3. Lee JKF. Inborn vs. Outborn Babies 2007. Presented at the MNNR SDP Meeting and Forum, Hotel Prince & Residence, Kuala Lumpur Malaysia, 2009
4. Boo NY. Pneumothorax 2007. Presented at the MNNR SDP Meeting and Forum, Hotel Prince & Residence, Kuala Lumpur Malaysia, 2009
5. Soo TL. Neonatal Infections in Malaysian NICUs 2007. Presented at the MNNR SDP Meeting and Forum, Hotel Prince & Residence, Kuala Lumpur Malaysia, 2009
6. Van Rostenberghe H. Intraventricular Haemorrhage (IVH) 2007. Presented at the MNNR SDP Meeting and Forum, Hotel Prince & Residence, Kuala Lumpur Malaysia, 2009
7. Thong MK and Cheah IGS. Malaysian National Neonatal Registry: Congenital Anomalies (2007). National Conference for Clinical Research 2009 (NCCR '09), Penang Malaysia, 2009.
8. Chang ASM. Neonatal Respiratory Trends from the Malaysian National Neonatal Registry (MNNR). National Conference for Clinical Research 2009 (NCCR '09), Penang Malaysia, 2009.
9. Ling MMM and Chang ASM. Impact of Evidence Based Clinical Practice on Morbidity and Mortality in an NICU. 16th Annual Congress of the Perinatal Society of Malaysia (PSM). Sabah Malaysia, 2009.
10. Ramli N, Rostenberghe HV, Yeap L and Cheah IGS. Malaysian National Registry Data on Cranial Ultrasound and Intraventricular Haemorrhage in Very Low Birthweight Babies. 16th Annual Congress of the Perinatal Society of Malaysia (PSM). Sabah Malaysia, 2009.
11. Lee KF. ELBW Inborn versus Outborn Babies in 2007. 16th Annual Congress of the Perinatal Society of Malaysia (PSM). Sabah Malaysia, 2009.
12. JKF Lee. VLBW Inborn versus Outborn Babies in 2007. 16th Annual Congress of the Perinatal Society of Malaysia (PSM). Sabah Malaysia, 2009.
13. Cheah IGS. Retinopathy of Prematurity in Malaysian Neonatal Intensive Care Units. 5th Congress of the Asian Society for Paediatric Research Hangzhou China, 2009

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