Report of the Malaysian National Neonatal Registry 2005

A Study of Critically Ill babies in Neonatal Intensive Care Units

Edited by:
Nyok-Ling Lim

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FOREWORD

The Malaysian National Neonatal Registry started data collection on the 1st of January 2004 and the first report was published and disseminated in July 2006. The objectives and inclusion criteria for the 2005 study remained essentially the same as that in 2004 but data standards in the Problems/Diagnoses Section were modified considerably in 2005 in that pertinent information on problems/diagnoses was captured as mandatory fields to increase the accuracy and completeness of data being captured.

As in the 2004 report analysis of data on the 'Outcome of Critically Ill Babies in Neonatal Intensive Care Units (NICUs) in Malaysia' has also been kept at a minimal level. Outcomes are generally reported as overall outcomes in the main section of the report while comparative data on some specific outcomes among the participating centres are included in the back section of the report. Many of the tables on overall outcomes also include comparative data for the year 2004. There were an additional 3 centres in 2005 compared to 2004 (27 vs. 24 respectively) and cases included in the study numbered 9023 in 2005 compared to 7350 in 2004.

Some specific outcomes e.g. 'Outcomes of inborn vs. outborn infants', 'Congenital anomalies among critically ill babies ' and 'Outcomes of term critically ill babies in NICUs' have also been studied by individual participants and presentations made at the 5th MNNR Forum held in December 2006 in Kuala Lumpur. Further studies e.g. 'Is intravenous preferable to oral indomethacin for use in VLBW babies in NICUs?' and 'Hyperbilirubinaemia among sick babies in NICUs' were presented at the 14th Annual Perinatal Congress in March 2007.

We await though the publication of the first paper in a medical journal from data collected from the registry so far. It is understood that some authors who have made presentations at various meetings are in the process of writing up the papers to be submitted for publication and we wish each of them success. All source data producers are encouraged to be involved in utilization of data collected in the MNNR for further study, presentations and publications.

At the 5th MNNR Forum on 'Data-based evidence for quality improvement' Professor Shoo K Lee from the Canadian Neonatal Network shared some of the Canadian experience on quality improvement strategies while Professor NY Boo from Universiti Kebangsaan Malaysia shared her experience from UKM's involvement in the Vermont-Oxford Neonatal Network. The MNNR will have to consider incorporating some formal quality improvement programs into its structure. Meanwhile it is vital however that each centre study its outcome in greater detail and objectivity so that weaknesses can be identified and remedial measures instituted where appropriate.

It is hoped that the registry will grow each year in terms of engaging participation of increasing numbers of NICUs and in the technical development of its study design and protocol. Web-based data entry and analysis software has been developed for 2006 data and it is aimed that each centre will finally be able to gain access to data on-site, promptly.

Dato' Dr Lim Nyok Ling
Chairman
Malaysian National Neonatal Registry

ACKNOWLEDGMENT LIST

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- Contributors who have provided financial support in 2004

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Report of the Malaysian National Neonatal Registry (MNNR) 2005

1. Organisation of the MNNR

1.1 History

In October 2001 at a National Paediatricians' meeting it was decided that a registry should be set up to study the outcome of sick babies admitted to Neonatal Intensive Care Units (NICUs) in the country. It was recognised that a minimum data set and a data collection system at a national level are important to monitor mortality and morbidity of infants admitted to NICUs

In collaboration with the Clinical Research Centre (CRC), Ministry of Health of Malaysia, a pilot study was first conducted from 1st October to 31st December in which 14 centres participated. A report of this study has been published in October 2003. It was concluded that the NNR is feasible and very useful information can be obtained for purposes of clinical management, resource allocation and policy development. The NNR proper was then launched on 1st January 2004 and the first MNNR report for the year 2004 was published in July 2006.

The Malaysian NNR aims to:

1. Determine the frequency and distribution of critically ill neonates in Malaysia. These are useful measures of the health burden arising of neonatal critical illness and its care in the country.
2. To study the mortality and some morbidity outcomes of babies admitted to NICU in participating hospitals.
3. To calculate the perinatal, neonatal, and stillbirth mortality rates of inborn babies.
4. To compare 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 outcome of very low birth weight babies.
7. Stimulate and facilitate research on neonatal critical illness and its management.

1.2 Structure

The MNNR consists of an Advisory Committee, Steering Committee and administrative staff. The Advisory Committee consists of heads of department (or their nominee) of each participating hospital, a few academic neonatologists from the Universities and a clinical biostatistician and epidemiologist. This committee is to monitor and direct the functions of MNNR and it meets at least once a year during a National Neonatal Registry Forum.

The Steering committee consists of 8 members, 6 of whom were elected. The 7th was appointed for his expertise and involvement in the development of the 'congenital anomalies' section of the registry and the 8th for his expertise and invaluable contribution to the project. This committee is concerned with the general running and decision making of the Registry and to approve 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 registry officer and 2 other clinical registry assistants. Statistical support is provided by the CRC.

1.3 Funding

The Ministry of Health of Malaysia provided a research grant for 2 years in 2004 to 'Study the outcome of critically ill babies in NICUs'. Considerable funding was also obtained from the Perinatal Society of Malaysia, the Malaysian Paediatric Foundation, Penyayang, Hwang DBS, Abbott Laboratories, Frisenius Kabi and some individuals and institutions in 2004. In 2005 some funds were also raised from the organisation of 3 NNR Forums. We thank all involved for their very generous and encouraging support.

2. Data Set

2.1 Registration criteria

The NNR audit of critically ill babies admitted to a Neonatal Unit (NNU) 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 with a birth weight of 1500 gms and below
   3. were ventilated

B. All neonatal deaths (i.e. newborn babies (<28days) who die in the NNU, delivery room ie Operating Theatre and labour room, and other wards)

Both inborn and outborn babies will be included but outborn babies who expire 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.

2.2 Data set variables

In 2005 the format of Case Report Forms (CRFs) was changed slightly to accommodate some changes in data variables. This is mainly in the area of chronic lung disease definitions (28 day's oxygen and 36 corrected weeks' dependence) and list of problems and diagnosis. Some of the diagnoses/problems have been captured into mandatory fields.

Data on all inborn births was also collected to facilitate calculation on perinatal and neonatal mortality rates of each hospital. (Appendix 1 Birth Census)

2.3 Data Collection Technique

The CRF consisted of 4 pages of forms. (Appendix 2 CRF) The first page had 4 sections. Section 1 consisted of Patient Particulars, Section 2 Birth History, Section 3 Neonatal Events and Section 4 Outcome.

The second page, which had Section 5, was a list of diagnoses/problems, any of which if present mandated a tick on the corresponding box. The third page had the graphs of intrauterine growth charts while the last page was the scoring sheet for CRIB score. Babies discharged /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 CRFs completed and readmission of the same babies into the NNU will require a new set of CRFs.

A baby who was transferred between neonatal and paediatric wards under the same department will be considered to be the same admission and the discharge CRF is to be completed after complete discharge from the hospital.

Hard copies CRFs were used and completed CRFs were sent to the Neonatal Registry Unit (NRU) after a defined period.

2.4 Data Verification

Missing or anomalous data are 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 2005, total births in the 27 participating centres totaled 226878 of which 2063 were stillbirths and 224815 were livebirths.

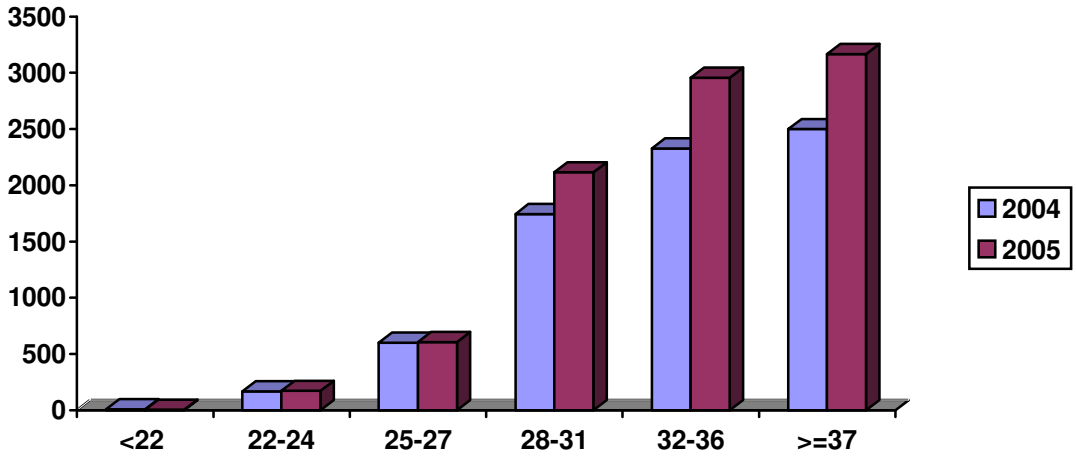
A total of 9023 babies who were admitted (admissions also included outborns who were not delivered in respective hospitals of the participating centres) met the criteria to be included in the MNNR (Table 2). Of these 2901 (32.2%) were less than 32 completed weeks (Table 3) and 3354 (37.2%) had birthweights of 1500 grams and below (Table 4). There were more babies in the 2005 cohort compared to 2004 especially in the higher gestation and birthweight groups (Figs 1 and 2).

While the babies who met the criteria for the study were generally babies requiring the most care they do not include many other babies admitted to the NICUs for other treatments and observation.

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 week’s gestation or more. Very low birth weight (VLBW) babies are babies with birthweight (BW 501-1500g) and extremely low birthweight (ELBW) 501-1000g.

Fig 1. Case distribution according to gestational age group, 2004 & 2005

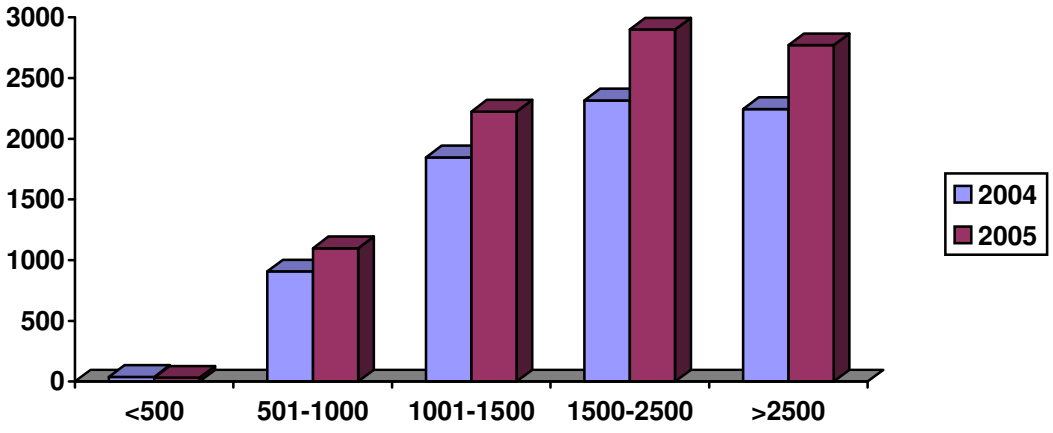
No. of cases



Gestational age group in weeks

Fig 2. Case distribution according to birthweight group, 2004 & 2005

No. of cases



Birthweight group in grams

In terms of growth status 1747 (19%) of the whole study population was small for gestational age (SGA < 10^{th} centile for gestation according to Lubchenko chart). The SGA rate for very preterm infants (gestation<32 weeks) was 18% and VLBW infants (BW 501-1500g) was 33% (Tables 5 and 5a).

Ventilatory support of whatever mode was given to a total of 7772 (86.1%) babies (Table 6).

3.1.1 Registrants per unit

Number of admissions and number of babies included in the study from each Neonatal Unit are as shown in Table 2. The number of babies who met the criteria and was included in the study ranged from 36 in one centre to 784 in another. These numbers reflected the size of the centre, the case mix of their patients and the geography and population distributions of each area.

3.1.2 Levels of Neonatal Care

Care for the newborn is provided at three levels. 'Level I' care is for normal healthy babies, some of whom may need short-term observation during the first few hours of life. Level 1 care is mostly given to babies who are rooming –in with their mothers in obstetric wards

Level II or 'special care' refers to a nursery that generally has babies born at 32-36 weeks gestation or weighing around 1500-2500 grams at birth. It includes the care of babies who require intravenous therapy or antibiotics, and/or those who are convalescing after intensive care, and/or those who need their heart rate or breathing monitored, and/or those who need short term oxygen therapy. Babies who are above 35 weeks' gestation and have birth weights above 1.8 kg but are otherwise well are usually not admitted but managed in the obstetric wards.

Level III or intensive care refers to the care of newborn infants who require specialized care and treatment. It includes most babies born at less than 32 weeks gestation or less than 1500 grams birthweight, and others who may require intravenous feeding, and/or surgery, and/or cardio-respiratory monitoring for management of apnoea or seizures, and/or supplemental oxygen over 40% or long term oxygen.

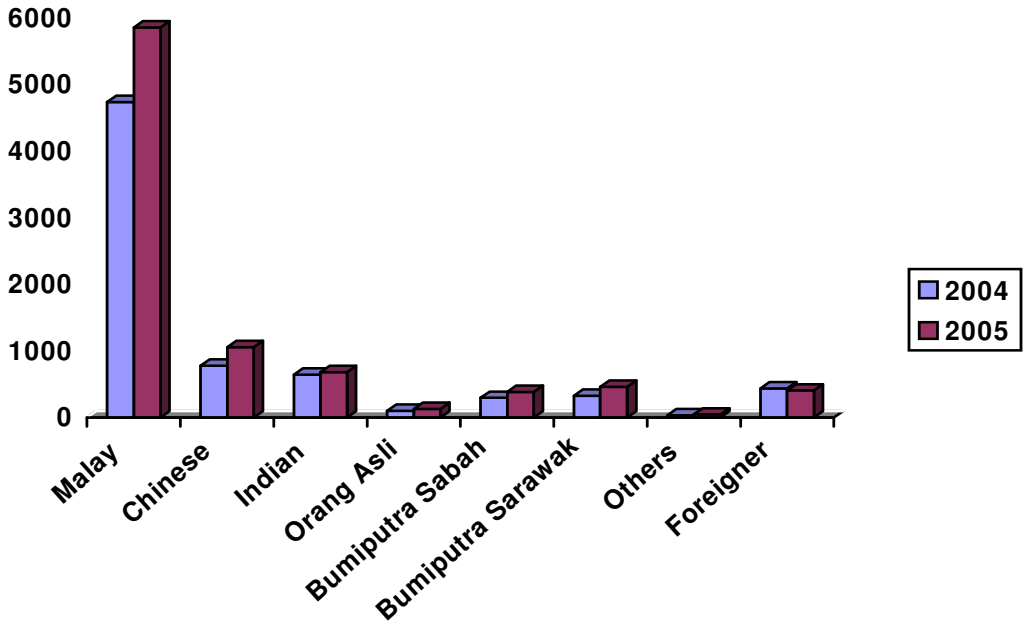
Hospitals with a level III NICU provide all the above levels of care and are referred to in this report as tertiary hospitals. Most Level III NICUs are in Ministry of Health hospitals and a few are in university hospitals. Big private hospitals generally do provide neonatal intensive care but very few do so in the context of an actual NICU. Most provide level III care to sick babies in an adult intensive care. A total of about 30-35 centres in the country provided neonatal intensive care to sick babies in 2005, and 27 of these NICUs are source data producers (SDPs) of the MNNR.

Many more hospitals provide only Level I and II neonatal care and refer sicker babies to Level III NICUs when the need arises.

3.2 The Mother

Ethnicity as identified by the mother was reported as 64.8% Malays, 11.7% Chinese, 7.6 % Indians, 1.4 % Orang Asli, 4.3% Bumiputra Sabah, 5.1% Bumiputra Sarawak, 0.5% other Malaysians and 4.5% foreigners (Table 7). Similar case distribution was seen in 2004 (Fig 3). Racial distribution in Malaysia in 2004 was estimated at 50.4% Malays, 23.7% Chinese, 7.1% Indians, 11% indigenious and 7.8% others (Information and Documentation Unit, Planning and Development Division, Ministry of Health Malaysia).

Fig 3. Case distribution according to ethnicity, 2004 & 2005



The mean maternal age in the study group was 30 +/- 7 years and there was little variation between the gestational and birthweight groups. (Tables 8 and 8a)

3.3 Antenatal events

3.3.1 Antenatal corticosteroids

Corticosteroids are administered to the mother to enhance the maturation of her baby's lungs when it is thought she will deliver before 34 weeks' gestation. The first randomized controlled trail 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 in order to improve neonatal outcomes. (PSM Clinical Practice Guidelines, 1995 updated 2001)

This therapy was given to mothers of 1645 (57%) out of 2901 babies < 32 weeks (note babies 32-33 weeks who are not VLBW, and did not require ventilatory support or not died were not included in the study). The use was better in the inborn (1522 out of 2426 ie 63%) compared to outborn babies (123 out of 475 i.e. 26%) as shown in Tables 9 and 9a.

3.4 The baby

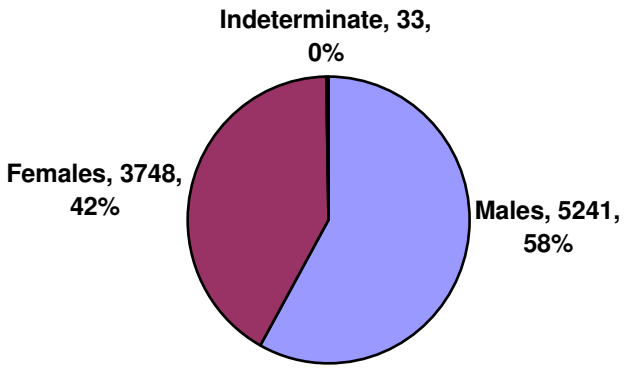
3.4.1 Multiple births

There were 8243 (91.4%) singletons, 737 (8.2%) twins, and 39 (0.4%) triplets in the study. (Tables 10 and 10a)

The proportion of males in the study was 5241/9023 i.e. 58.1% and females 3748/9023 i.e. 41.5 %. Sex was indeterminate in 33 babies (0.4%) (Fig 4). Sex ratio at birth of all babies in the country was estimated at 1.07 male / 1 female in 2004 (Information and Documentation Unit, MOH). Relatively more males admitted into the study implied that babies of the male sex were at higher risk of being critically ill at birth. Tables 11 and 11a show the gender distribution according to gestational age and birthweight group.

Fig. 4. Case distribution according to sex, 2005

3.5 Birth

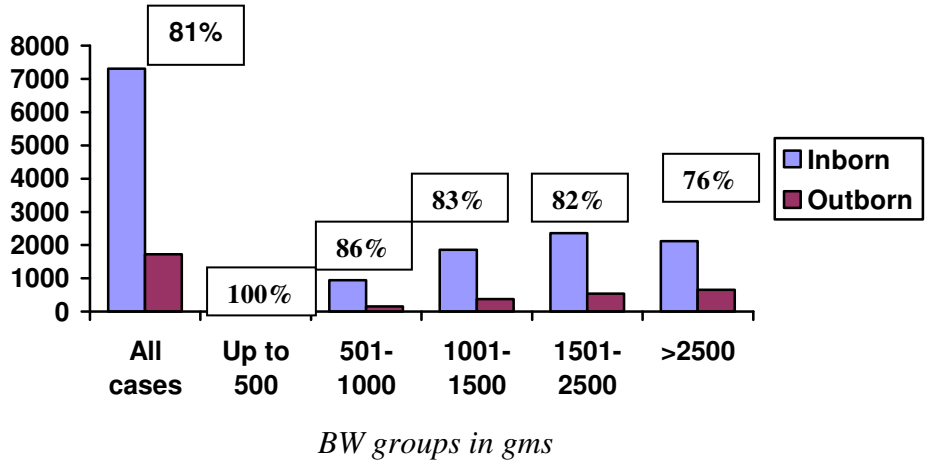


3.5.1 Inborn vs Outborn Babies

Babies are usually cared for in the hospital of their births. However some high-risk babies may need to be transferred to a hospital with a level III NICU, if care is being received at a hospital without NICU facilities. When this risk is anticipated both mother and baby may be transferred before birth (in-utero), or if risk is not anticipated baby is transferred only after being born (ex-utero). Transfer is usually made to the nearest NICU with an available bed, and in most places an escort transport system is practised. Sometimes this transfer may have to be made to an NICU which is quite far away from the referring unit. It is generally recommended that all babies <34 weeks should be delivered in an obstetric unit in a hospital with an NICU.

In this cohort 7306 (81.0%) out of 9023 babies were inborn. For babies of <32 weeks gestation 2426 out of 2901 (83.6%) were inborn (Table 12). Fig 5 shows the inborn-outborn status according to birthweight groups. Proportionately babies in the lower birthweight groups were more likely to be inborn.

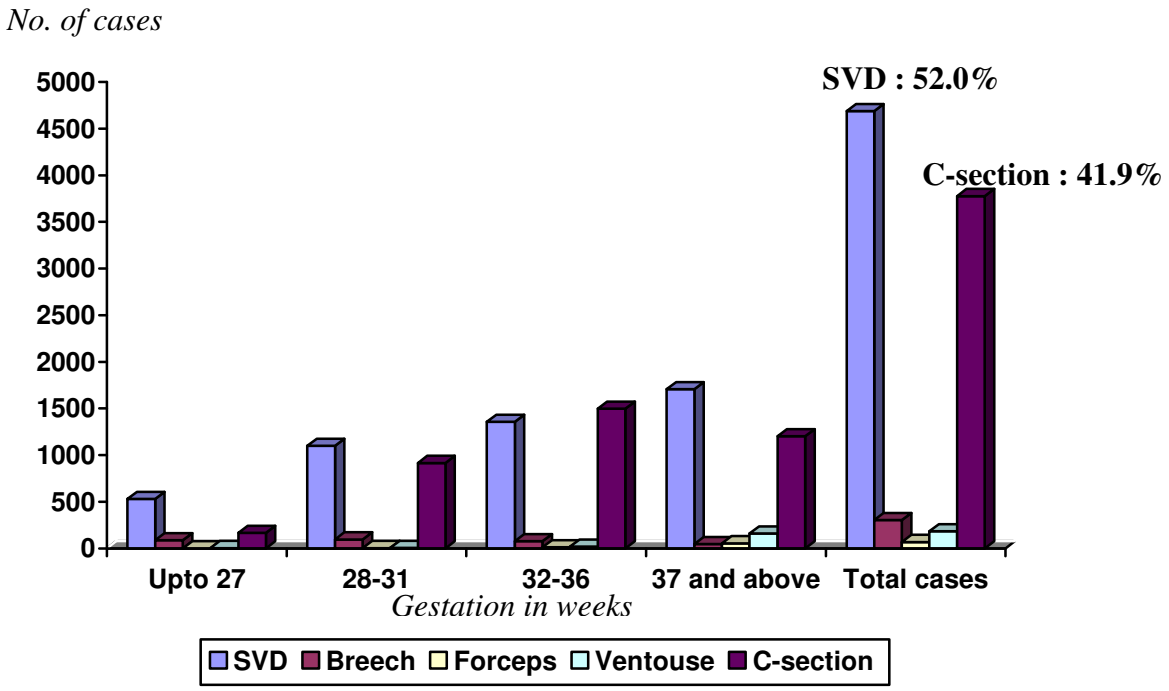
Fig 5. Case distribution according to BW groups and inborn - outborn status, 2005
(Percentages pertain to inborn cases)



NICUs are generally placed in general hospitals, university hospitals and some district hospitals with specialist. Some private hospitals also provided neonatal intensive care to sick babies either in a separate NICU or as part of a general ICU. In both the 2004 and 2005 study however none of the private hospitals participated. Some babies delivered in private hospitals however have been transferred to NICUs in the participating hospitals. Place of birth according to gestation and birthweight groups are as shown in Tables 13 and 13a. As most babies were inborn the place of birth reflected the nature of NICUs participating in the study. Hence 62% were delivered in general hospitals and 21% in district hospitals with specialists.

3.5.2 Mode of delivery

Fig 6. Mode of delivery according to gestation, 2005



The overall spontaneous vertex delivery rate was 52.0% (4688/9023) and caesarean section rate 41.9% (3777/9023). For very preterm (<32 weeks) babies the caesarean section rate was 37.2%. (1080/2901) Table14.

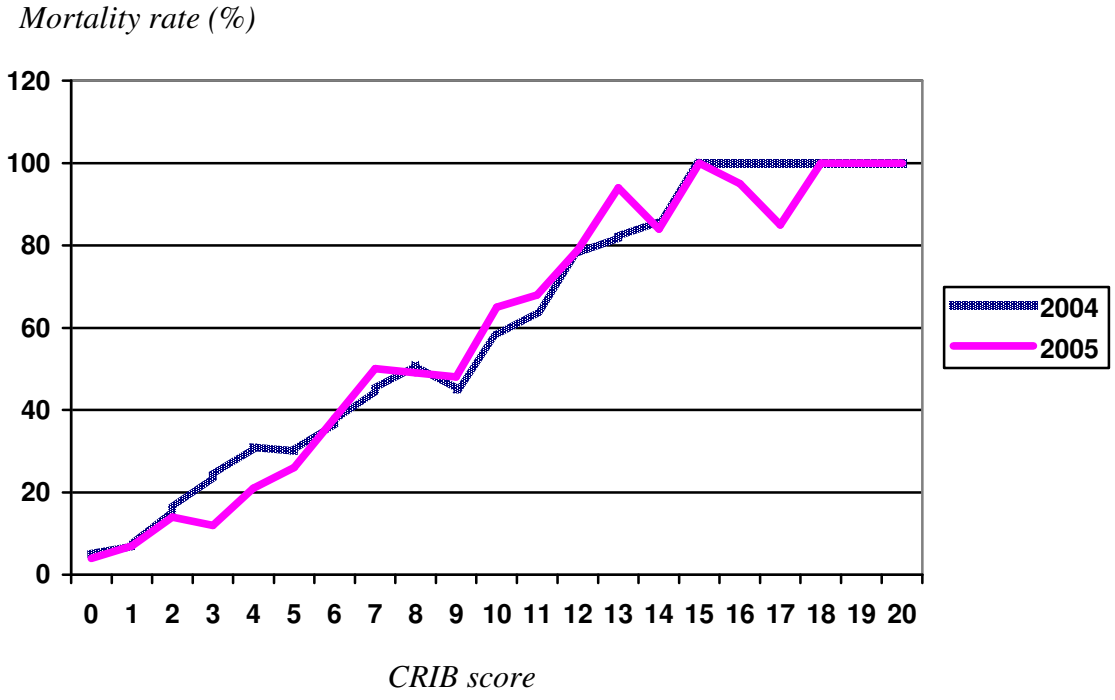
3.5.3 Condition of VLBW babies (BW <1500gm)

A 'clinical risk index for babies' (CRIB) score was performed based on six variables, derived from routine data recorded within 12 hours of birth. These variables have been found to be independently associated with hospital deaths. (Appendix 1 CRF) and the score may be used as a tool for assessing initial risk and comparing performance of neonatal intensive care units.

The mean CRIB score of babies with BW < 1500gm in both the 2004 and 2005 cohorts was 4 +/- 4 and of overall mortality was 27.8% in 2004 and 26.1% in 2005.

There was a strong correlation of CRIB score with mortality rates in both the years. (Fig 7). However centre comparison in CRIB score and performance shows some variation in outcomes among centres with similar scores (Table 15a).

Fig 7. Mortality of VLBW babies according to CRIB score, 2004 & 2005



3.5.4 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 2298/2901 (79.2%) 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 only if they needed VS or they had died for these babies (32 weeks and above) the VS rate was 5474/6122 i.e. 89.4% (Table 6).

The overall VS support rate was 86.1% (7772/9023).

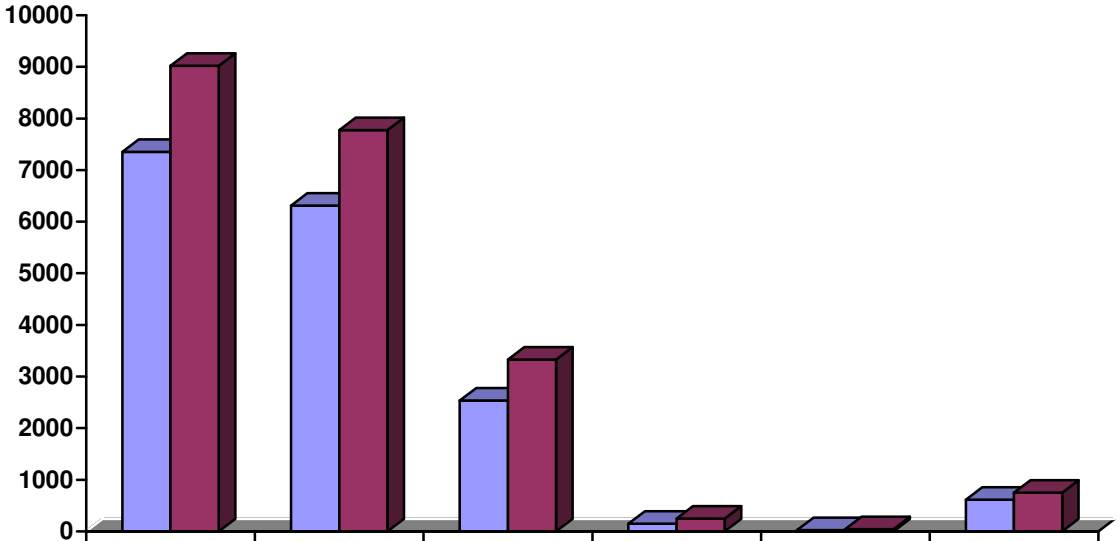
CPAP alone as a mode of ventilatory support was given to 1500 (16.5%) of the babies, highest rate of use (about 23%) being among babies in gestational age group of 32-36 weeks and BW group of 1501-2500 gm (Tables 16 and 16a). Another 1829 of the total 9023 (20.3%) babies was supported with CPAP in combination of other VS modes, most commonly IMV.

HFOV is a specialized form of mechanical ventilation given at 8-15 hertz per second, in contrast to conventional IPPV which is given at about one breath or less per second.

Figure 8 shows the total usage of CPAP, HFOV, NO and PTV in all the babies for 2004 and 2005. Usage according to gestational age and BW groups are as shown in Tables 16,16a, 17, 17a, 18, 18a, 19 and 19a.

Fig 8. Use of specific ventilation support modes, 2004 & 2005

No. of cases



	Total babies	Total VS	No. on CPAP	No. on HFOV	No. on NO	No. on PTV
2004	7350	6310	2537	146	25	615
2005	9023	7772	3329	250	46	749

3.6 Morbidity

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

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

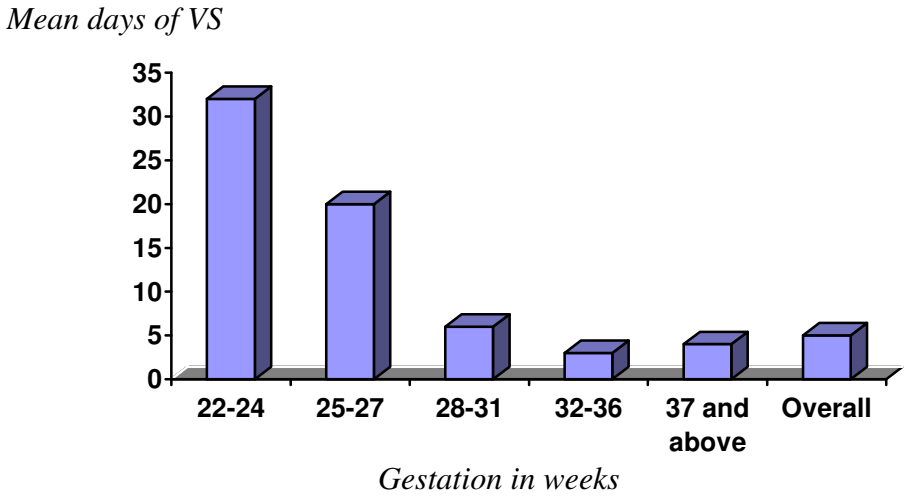
3.6.1 Respiratory distress

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 in these sick babies.

Use of ventilatory support according to gestation has been alluded to above.
For preterm babies who survived, the duration of ventilatory support increased with decreasing gestational age. Duration of VS for term survivors however was slightly longer on average (Mean of 4+/- 8 days) compared to borderline preterm babies of 32-36 weeks gestation. (Mean of 3+/- 6 days) who survived. Table 20.

This is further illustrated in Fig 9.

Fig 9. Mean duration of VS for survivors according to gestational group, 2005



Specific conditions in relation to respiratory morbidity

3.6.1.1 Respiratory distress syndrome

Respiratory distress syndrome (RDS) was the predominant respiratory diagnosis for babies in this study, being present in 4225 babies out of which 3861/4225 (91.4%) needed ventilatory support. Table 21. Of babies with RDS 900 (21.3%) died.

3.6.1.2 Congenital pneumonia (C Pneu)

There were 1794 babies with congenital pneumonia of which 1744 (97.2%) required VS and 227 (12.7%) died. Table 21.

3.6.1.3 Meconium aspiration syndrome (MAS)

There were 683 babies with MAS, 677 (99.1%) required VS and 106 (15.5%) died. Table 21.

3.6.1.4 Hypoxic ischaemic encephalopathy

A total of 1011 babies had hypoxic ischaemic encephalopathy, 687 (68.0%) of which was mild/moderate and 324 (32%) severe. Nearly all (97-98%) required ventilation and 64% of severe HIE died (Table 21).

3.6.1.5 Neonatal encephalopathy (NE)

A smaller number of babies (74) had NE of 'non-HIE aetiology' and mortalilty in this group was 33.8% (Table 21).

3.6.1.6 Congenital anomalies (CA)

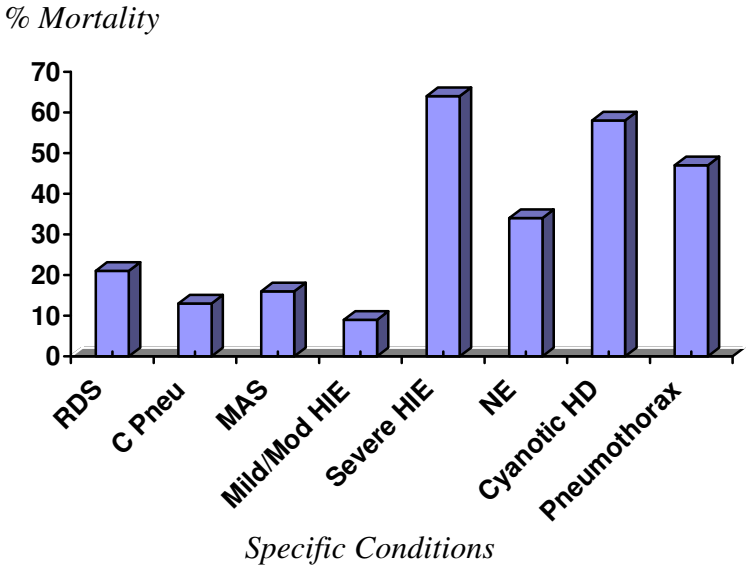
Only babies with congenital anomalies who required VS or had died were included in the study. Some with congenital anomalies were included based on other criteria of being very preterm or VLBW. These consisted of various abnormalities and many were heart defects.

The various types of congenital anomalies are as shown in Table 22. A total of 644 babies have some form of congenital anomalies. The most common CA was of the cardiovascular system (232 Acyanotic and 162 Cyanotic). This was followed by 'Multiple congenital abnormalities' (230).

3.6.1.7 Pneumothorax (PTX)

Pneumothorax often complicates mechanical ventilation and contributes to further morbidity and mortality of babies. (Fig10). A total of 532 (6.8%) babies who had ventilatory support developed pneumothorax out of whom 250 died (47.0%). (Table 23)

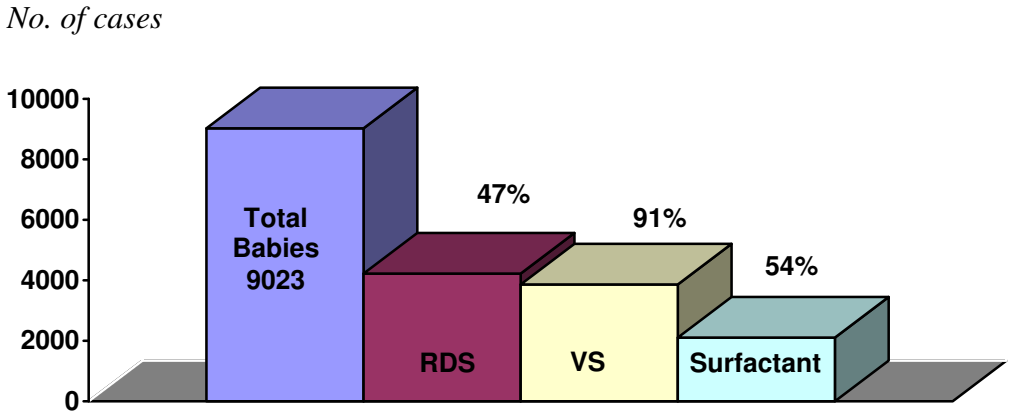
Fig 10. Mortality rate according to specific condition, 2005



3.6.1.8 Exogenous Surfactant

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 (Soll, 2003) and this treatment in the Malaysian CPG is recommended for babies who are ventilated for RDS. In this study of the 3861 babies who had RDS and required ventilatory support 2104 (54.5%) were treated with surfactant (Table 24).

Fig 11. Use of surfactant in RDS, 2005



Surfactant was given to 1020 (45%) babies within 2 hours of life and 1247 (55%) babies beyond 2 hours of life (Table 25).

Chronic lung disease in this study was captured as supplemental oxygen at Day 28 and also again at 36 weeks corrected age. Among ELBW survivors the rates of supplemental oxygen use at Day 28 and 36 weeks corrected gestation were 46.2% and 18.3% respectively. The rates were lower among bigger babies. Among babies who had died the rates of oxygen dependency were also lower (Table 26 and 26a).

3.6.2 Cerebral ultrasound scan (CUS)

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. These IVHs are graded according to an internationally recognized method (Papile et al. 1978). Grade 1 and 2 are milder grades and generally do not affect outcome adversely while Grade 3 and 4 are not only associated with early morbidity and mortality but are also markers of possible later disability.

Of the 3322 babies with BW 501-1500 g, 2239 (67.4%) had CUS and 272 (12.1%) had Grade 3 or 4 IVH. Combined mortality rate from Grade 3 and 4 IVH was 60.3% (Table 27). The rates of cerebral ultrasound scanning for various birthweight groups are as shown in Table 28.

3.6.3 Eye Examinations

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 disease ie Stage III plus or Stage IV usually necessitates laser or cryotherapy to preserve vision. Criteria that is being used for ROP screening in Malaysia are babies with gestation < 32 weeks or birth weights of <1250 gms. Other babies out of these BW and gestation criteria are also screened if significant risk is perceived by the doctors taking care of these babies. First screening is generally recommended at 4-6 weeks of life. This audit did not study the exact time screening was done for the survivors who satisfy the criteria for screening. However of these babies who survived, 1581 out of 2040 (77.5%) very preterm infants <

32 weeks, and 1072 out of 1220 (87.9%) babies of BW < 1251 gms had ROP screening. The rate of ROP screening for various gestation and BW groups are as shown in Tables 29 and 29a. It is to be noted that some very preterm or VLBW babies have been discharged early without an ROP screening. These babies were likely to be screened on an out-patient basis but this information was not captured in this study.

An overall total of 77 babies developed Grade 3, 4 or 5 ROP, 74 with BW 501-1500 gm and 3 in 1501-2500 gms (Table 30).

3.6.4 Necrotising enterocolitis

Necrotising enterocolitis (NEC) is a disease of the gut which usually affects the large intestine (colon). It is associated with a 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.

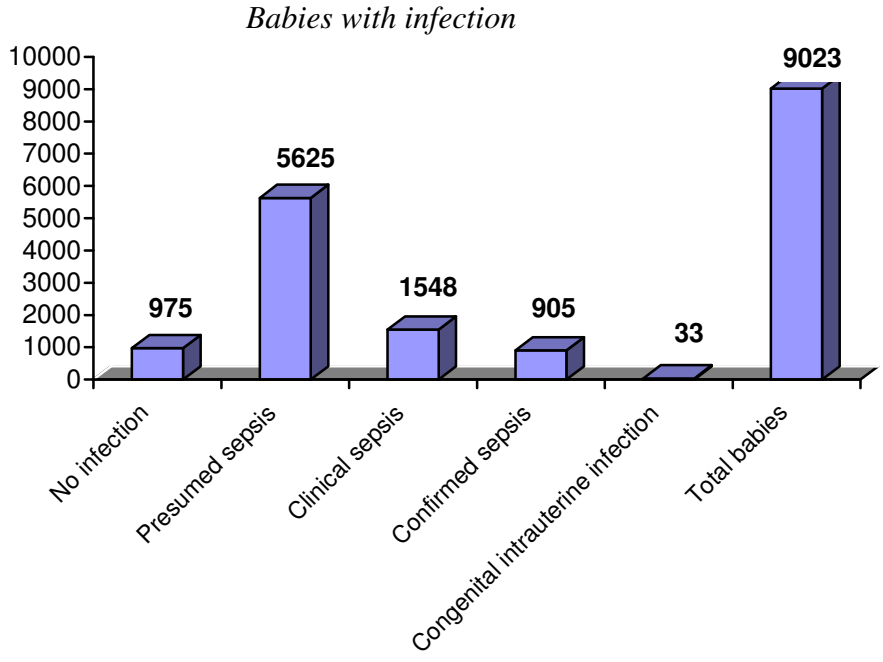
An overall NEC rate of 4 (medical Rx) and 1 (surgical Rx) % i.e. 5 % was recorded. Extremely low birth weight (ELBW) infants had the highest incidence (11+2 % i.e. 13 %) of NEC (Table 31).

3.6.5 Neonatal infections

Systemic infection is a potentially serious complication in sick babies. This audit categorises infections into 1) Presumed sepsis (Antibiotics initially given in the presence of obstetric risk factors but infection ruled out subsequently in the absence of clinical signs and laboratory findings. 2) Clinical sepsis (not confirmed by culture or serology) and 3) Confirmed sepsis (i.e. culture proven bacterial infections)

Number of episodes of various infections are as shown in Fig 12.

Fig 12. Frequency of various types of infections, 2005



A very high proportion of babies 5625 out of 9023 (62.3%) had presumed sepsis, and 1548 (17.2%) had clinical sepsis. The confirmed sepsis rate was 10.0%.

Each infant might have more than 1 type of infection and also >1 episode of a specific infection. i.e. infections in various categories are not mutually exclusive. Also the number of episodes of each specific infection was not captured in this study. For eg, if a baby had 2 episodes of infections due to coagulase negative staphylococcus (CoNs) it will be recorded as 1 infection while an episode of infection caused by *Klebsiella* sp and an episode caused by CoNs will be recorded as 2 infections.

Types of infecting organisms in bacterial blood-stream infections (BSI) are as shown in Fig 12a.

Fig 12a. Types of infecting organisms in confirmed sepsis, 2005

Types of organisms	**No of infections (%)**
Group B Streptococcus	67
MRSA	129
CoNS	181
ESBL Organisms	143
Staphylococcus aureus	16
Klebsiella organisms	65
Pseudomonas organisms	59
Acinetobacter organisms	32
Other bacteria (miscellaneous)	278
Total bacterial sepsis	970
Fungal organisms	54

Miscellaneous organisms included *Aeromonas* sp, *Citrobacter* sp., *Bulkhoderia sp*, *Bacillus sp, Flavobacterium sp*, *H influenza*, *Moraxella* sp *Stenotrophomonas maltophilia, Escherichia* coli*, Enterobacter* sp, Grp D strep and *Enterococcus.*

The most common was Coagulase-negative Staphlococcus (CoNS) which accounted for 181 (18.7%) of the 970 episodes of infections. Of the Gram-negative infections *Klebsiella* species was the most common accounting for 65 (6.7%) infections. There were 143 (14.7%) episodes of infection due to extended spectrum beta lactamase (ESBL) producing organisms.

Except for the ELBW babies where mortality may have occurred before acquisition of infection, sepsis associated mortality was higher among those with confirmed bacterial sepsis compared to those without (Table 32). Overall 27.2 % of confirmed bacterial sepsis was associated with mortality. (Table 32)

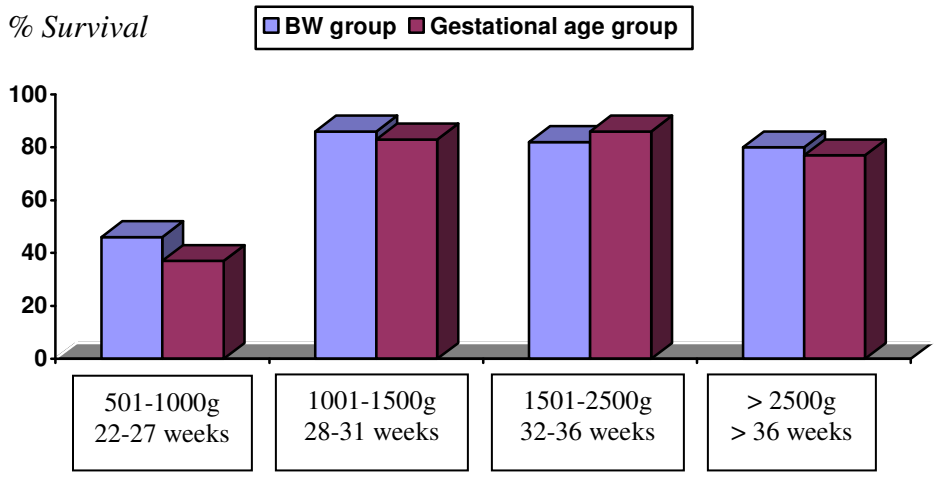
3.7 Outcome

The overall survival at discharge of this high risk group of babies was 7013 (out of 9023) ie 77.7%. Table 33 and 33a. Survival is dependent on many factors including gestational age and birthweight. No babies of gestation 22 weeks and below and 2 babies of BW <500gms survived. Up to 31 weeks and up to 1500gms survival improved progressively with increasing gestation and BW. Babies who were 32 weeks and above and babies of BW > 1500gms were entered into the study only if they had required ventilatory support or had died, hence the survival were rather low in these more mature and bigger babies.

Less than half (41.1%) of babies of 26 weeks' gestation survived and slightly more than half (58.5%) of babies with BW 801-900 grams survived (Tables 33 and 33a).

Survival of BW groups and gestation groups are as shown in Fig 13 and survival of VLBW and very preterm babies for 2004 and 2005 are as shown in Fig 14 and Fig 15.

Fig 13. Survival according to birthweight and gestational age group, 2005



** Babies with gestation of 32 weeks and above and birthweight > 1500g were in the study only if they were ventilated or had died, hence survival was not as high as it otherwise would have been.*

Fig 14. Survival according to BW group for VLBW babies (BW up to 1500g), 2004 & 200

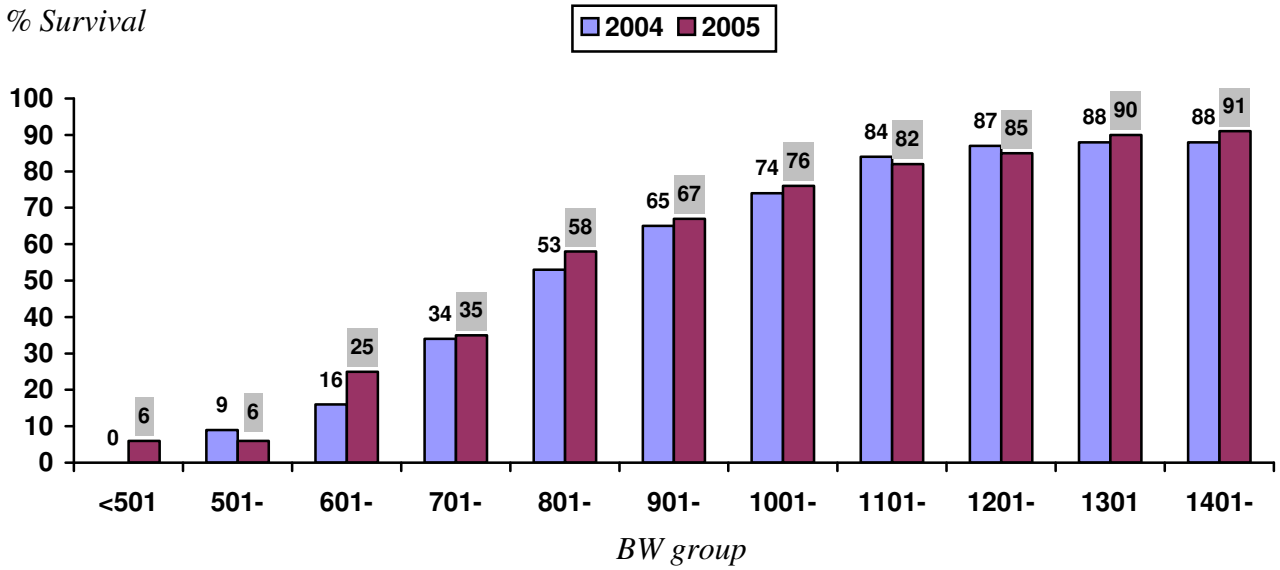
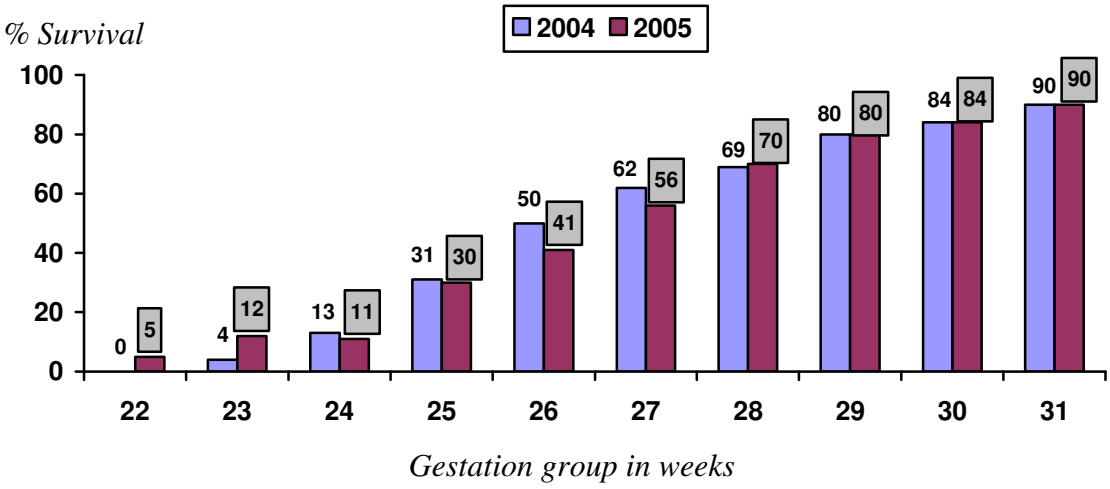


Fig 15. Survival according to gestation for very preterm babies (gestation < 32 weeks) 2004 & 2005



3.7.1 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 =

$$\frac{\text{No stillbirths + neonatal deaths < 7 days (BW 500gm and above or gestation 22 weeks and above}}{\text{No total births (TBs)}} \times 1000 \text{ TBs}$$

Early Neonatal Mortality Rate

$$\frac{\text{No neonatal deaths < 7 days (BW 500gm and above or gestation 22 weeks and above}}{\text{No live births (LBs)}} \times 1000 \text{ LBs}$$

Neonatal Mortality Rate

$$\frac{\text{No neonatal deaths < 28 days (BW 500gm and above or gestation 22 weeks and above}}{\text{No live births (LBs)}} \times 1000 \text{ LBs}$$

Fig 16 shows the number of total births and neonatal deaths in all the centres in the study. The perinatal, early neonatal and neonatal mortality rates were calculated to be 14.3 per 1000 TBs, 4.8 and 6.2 per 1000 LBs respectively.

Fig. 16. Total births and neonatal deaths and mortality rates, 2005

Total Births	226878
No of Stillbirths	2063
No of Livebirths	224815
Inborn deaths <7 days (early neonatal deaths)	1142
Inborn deaths < 28 days (neonatal deaths)	1468
Stillbirth rate	9.1 per 1000 TBs
Perinatal Mortality Rate (PMR)	14.1 per 1000 TBs
Early Neonatal Mortality Rate (Early NMR)	5.0 per 1000 TBs
Neonatal Mortality Rate (NMR)	6.5 per 1000 LBs

These rates are high when compared to the overall national figures which were 10.0 for PMR, 3.9 for Early NMR and 4.9 for NMR. (Health Management and Information System (HMIS) Ministry of Health 2002 data). This is expected as these NICUs are tertiary centres handling high risk pregnancies and sick babies.

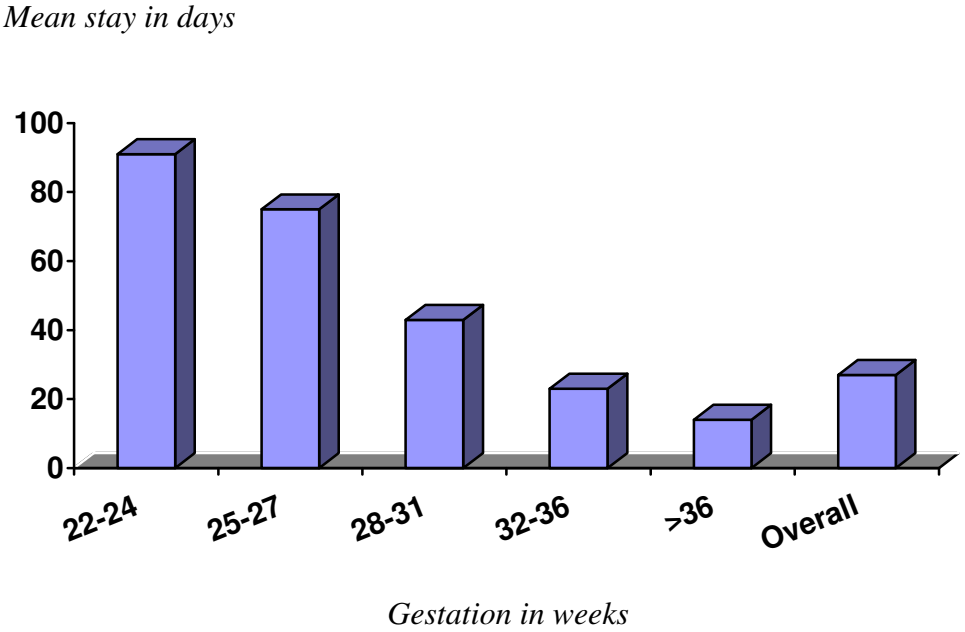
3.7.2 Discharge

Babies are usually discharged straight home from the participating NICUs in the hospital. 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.

The duration of hospital stay is dependent on many factors especially gestational age and birth weight and whether babies survived.

For survivors the mean duration of hospital stay according to gestation and birthweight groups are as shown in Tables 34 and 34a. The overall duration of stay was 27 +/- 28 days and stay was progressively shorter with higher birthweight and gestational age groups. (Fig 17).

Fig 17. Mean duration of hospital stay for survivors according to gestational age group, 2005



4. Tables

Table 1: Birth census in participating hospitals, 2005

Centre	No. of Stillbirths	No. of Live births	Total Births
All centres	2063	224815	226878
2	114	10007	10121
3	68	9029	9097
4	54	6218	6272
5	119	10089	10208
6	142	12715	12857
7	135	15738	15873
8	104	10913	11017
9	69	9782	9851
10	40	6346	6386
11	26	4025	4051
12	41	5043	5084
13	43	5344	5387
14	35	5500	5535
15	73	6731	6804
16	90	10810	10900
17	58	8975	9033
18	17	3193	3210
19	35	5071	5106
20	66	6240	6306
21	46	4950	4996
22	85	8785	8870
23	136	14637	14773
24	90	11120	11210
25	86	6832	6918
26	221	19873	20094
27	45	5027	5072
28	25	1822	1847

Table 2: Admissions to each Neonatal Unit, 2004 and 2005

Centre	No. of babies admitted to the Neonatal Unit		No. of babies included in the study	
	2004	**2005**	**2004**	**2005**
All centres	45557	54671	7350	9023
2	2923	3069	452	509
3	941	1620	369	446
4	1020	1539	252	248
5	1251	1463	402	481
6	2135	2553	343	349
7	5074	4657	674	671
8	3566	4373	403	463
9	3486	3862	350	390
10	1131	1913	146	213
11	2182	2327	82	114
12	2023	2402	251	211
13	1602	1572	262	276
14	887	841	163	157
15	1187	1369	208	183
16	1266	1492	384	368
17	1469	1759	312	433
18	565	643	71	72
19	812	827	270	295
20	1993	1993	228	218
21	1535	1558	139	162
22	2477	3316	372	428
23	2597	2351	714	665
24	2543	2483	312	386
25	892	1408	191	309
26	0	2638	0	784
27	0	468	0	156
28	0	175	0	36

Table 3: Case distribution according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study, 2004 & 2005	2004		2005	
		No. babies	%	No. babies	%
<22	14	9	0	5	0
22-24	341	168	2	173	2
25-27	1208	601	8	607	7
28-31	3860	1744	24	2116	23
32-36	5284	2328	32	2956	33
>=37	5666	2500	34	3166	35
Total	16373	7350	100	9023	100

Table 4: Case distribution according to birth weight group, 2004 and 2005

Birthweight group (grams)	All Babies in study, 2004 & 2005	2004		2005	
		No. babies	%	No. babies	%
<=500	70	38	1	32	0
501-1000	2005	907	12	1098	12
1001-1500	4070	1846	25	2224	25
1501-2500	5214	2315	31	2899	32
>2500	5014	2244	31	2770	31
Total	16373	7350	100	9023	100

Table 5: Growth status according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		SGA				AGA				LGA			
			2004		2005		2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	9	5	2	22	1	20	7	78	3	60	0	0	1	20
22-24	168	173	40	24	31	18	126	75	141	82	2	1	1	1
25-27	601	607	95	16	104	17	501	83	493	81	5	1	10	2
28-31	1744	2116	239	14	373	18	1456	83	1681	79	49	3	61	3
32-36	2328	2956	539	23	744	25	1740	75	2153	73	49	2	59	2
>=37	2500	3166	362	14	494	16	1989	80	2461	78	149	6	210	7
Total	7350	9023	1277	17	1747	19	5819	79	6932	77	254	3	342	4

Table 5a: Growth status according to birth weight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		SGA				AGA				LGA			
			2004		2005		2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	38	32	25	66	19	59	12	32	12	38	1	3	1	3
501-1000	907	1098	283	31	370	34	622	69	723	66	2	0	5	0
1001-1500	1846	2224	479	26	709	32	1361	74	1500	67	6	0	14	1
1501-2500	2315	2899	461	20	597	21	1800	78	2239	77	54	2	63	2
>2500	2244	2770	29	1	52	2	2024	90	2458	89	191	9	259	9
Total	7350	9023	1277	17	1747	19	5819	79	6932	77	254	3	342	4

Table 6: Ventilatory support according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		Babies with Ventilatory support			
			2004		2005	
	2004	2005	No.	%	No.	%
<22	9	5	1	11	0	0
22-24	168	173	74	44	72	42
25-27	601	607	493	82	506	83
28-31	1744	2116	1416	81	1720	81
32-36	2328	2956	1967	84	2489	84
>=37	2500	3166	2359	94	2985	94
Total	7350	9023	6310	86	7772	86

Table 6a: Ventilatory support according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		Babies with Ventilatory support			
			2004		2005	
	2004	2005	No.	%	No.	%
<=500	38	32	10	26	8	25
501-1000	907	1098	686	76	857	78
1001-1500	1846	2224	1315	71	1553	70
1501-2500	2315	2899	2121	92	2653	92
>2500	2244	2770	2178	97	2701	98
Total	7350	9023	6310	86	7772	86

Table 7: Ethnicity according to gestational age group, (weeks) 2004 and 2005

Ethnic group	All Babies in study		<22				22-24				25-27			
	2004	2005	2004		2005		2004		2005		2004		2005	
	No.	No.	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	4731	5850	4	0	2	0	104	2	103	2	347	7	377	6
Chinese	778	1057	2	0	0	0	22	3	28	3	77	10	92	9
Indian	643	683	0	0	1	0	16	2	16	2	66	10	44	6
Orang Asli	101	130	0	0	0	0	1	1	2	2	5	5	11	8
Bumiputra Sabah	296	385	2	1	1	0	8	3	6	2	26	9	27	7
Bumiputra Sarawak	327	463	1	0	0	0	8	2	9	2	31	9	37	8
Other	35	47	0	0	0	0	3	9	2	4	5	14	2	4
Foreigner	439	407	0	0	1	0	6	1	7	2	44	10	17	4
Total	7350	9022	9	0	5	0	168	2	173	2	601	8	607	7

Ethnic group	28-31				32-36				37 and above			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Malay	1093	23	1320	23	1471	31	1914	33	1712	36	2134	36
Chinese	215	28	265	25	252	32	334	32	210	27	338	32
Indian	155	24	147	22	223	35	246	36	183	28	229	34
Orang Asli	20	20	29	22	45	45	49	38	30	30	39	30
Bumiputra Sabah	78	26	92	24	95	32	114	30	87	29	145	38
Bumiputra Sarawak	88	27	152	33	111	34	155	33	88	27	110	24
Other	4	11	11	23	8	23	13	28	15	43	19	40
Foreigner	91	21	100	25	123	28	130	32	175	40	152	37
Total	1744	24	2116	23	2328	32	2955	33	2500	34	3166	35

Table 7a: Ethnicity according to birthweight group, 2004 and 2005

Ethnic group	All Babies in study		BW 501 - 1000gm				BW 1001 - 1500gm			
	2004	2005	2004		2005		2004		2005	
	No.	No.	No.	%	No.	%	No.	%	No.	%
Malay	4731	5850	561	12	677	12	1082	23	1373	23
Chinese	778	1057	99	13	155	15	217	28	265	25
Indian	643	683	112	17	101	15	180	28	168	25
Orang Asli	101	130	7	7	13	10	29	29	42	32
Bumiputra Sabah	296	385	39	13	42	11	102	34	107	28
Bumiputra Sarawak	327	463	41	13	62	13	117	36	153	33
Other	35	47	7	20	7	15	6	17	13	28
Foreigner	439	407	41	9	41	10	113	26	102	25
Total	7350	9022	907	12	1098	12	1846	25	2223	25

Ethnic group	BW 1501 - 2500gm				BW >2500 gm			
	2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%
Malay	1528	32	1877	32	1538	33	1899	32
Chinese	253	33	340	32	206	26	295	28
Indian	190	30	219	32	154	24	191	28
Orang Asli	45	45	50	38	19	19	25	19
Bumiputra Sabah	80	27	117	30	74	25	118	31
Bumiputra Sarawak	87	27	161	35	80	24	86	19
Other	10	29	11	23	12	34	16	34
Foreigner	122	28	124	30	161	37	140	34
Total	2315	31	2899	32	2244	31	2770	31

Table 8: Mean maternal age according to gestational age group, 2004 and 2005

Gestational age group (weeks)	2004			2005		
	Total Babies	Mean Maternal Age	SD	Total Babies	Mean Maternal Age	SD
<22	9	28	5	5	27	8
22-24	168	30	7	173	29	6
25-27	601	29	6	606	29	7
28-31	1744	29	7	2113	30	7
32-36	2328	30	7	2946	30	7
>=37	2500	31	6	3155	31	6
Total	7350	30	7	8998	30	7

Table 8a: Mean maternal age according to birthweight group, 2004 and 2005

Birthweight group (grams)	2004			2005		
	Total Babies	Mean Maternal Age	SD	Total Babies	Mean Maternal Age	SD
<=500	38	30	6	32	29	6
501-1000	907	29	6	1098	30	7
1001-1500	1846	29	7	2214	30	7
1501-2500	2315	30	7	2893	30	7
>2500	2244	31	6	2761	31	6
Total	7350	30	7	8998	30	7

Table 9: Use of antenatal steroid according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		Antenatal steroid given			
			2004		2005	
	2004	2005	No.	%	No.	%
<22	9	5	0	0	0	0
22-24	168	173	48	29	52	30
25-27	601	607	354	59	320	53
28-31	1744	2116	1117	64	1273	60
<32	2522	2901	1519	60	1645	57
32-33	1107	1376	700	63	765	56
<34	3629	4277	2219	61	2410	56
>=34	3721	4746	462	12	599	13
Total	7350	9023	2681	36	3009	33

Table 9a: Use of antenatal steroid in inborn and outborn babies < 32 weeks gestation, 2005

Centres	Babies < 32 weeks	Babies < 32 weeks given antenatal steroids	
		No.	%
All babies	2901	1645	57
Inborn	2426	1522	63
Outborn	475	123	26

Table 10: Multiplicity of births according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		Singletons				Twins			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<22	9	5	9	100	5	100	0	0	0	0
22-24	168	173	144	86	151	87	19	11	22	13
25-27	601	607	504	84	489	81	90	15	111	18
28-31	1744	2116	1488	85	1829	86	234	13	266	13
32-36	2328	2956	2096	90	2667	90	212	9	275	9
>=37	2500	3166	2455	98	3102	98	44	2	63	2
Total	7350	9023	6696	91	8243	91	599	8	737	8

Gestational age group (weeks)	Triplets				Others			
	2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%
<22	0	0	0	0	0	0	0	0
22-24	5	3	0	0	0	0	0	0
25-27	7	1	7	1	0	0	0	0
28-31	22	1	20	1	0	0	1	0
32-36	19	1	12	0	1	0	1	0
>=37	1	0	0	0	0	0	1	0
Total	54	1	39	0	1	0	3	0

Table 10a: Multiplicity of births according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		Singletons				Twins			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<=500	38	32	28	74	24	75	10	26	7	22
501-1000	907	1098	754	83	911	83	137	15	178	16
1001-1500	1846	2224	1583	86	1901	85	237	13	299	13
1501-2500	2315	2899	2104	91	2661	92	198	9	230	8
>2500	2244	2770	2227	99	2746	99	17	1	23	1
Total	7350	9023	6696	91	8243	91	599	8	737	8

Birthweight group (grams)	Triplets				Others			
	2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%
<=500	0	0	1	3	0	0	0	0
501-1000	16	2	8	1	0	0	1	0
1001-1500	25	1	22	1	1	0	1	0
1501-2500	13	1	8	0	0	0	0	0
>2500	0	0	0	0	0	0	1	0
Total	54	1	39	0	1	0	3	0

Table 11: Gender according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies		Male				Female				Indeterminate			
			2004		2005		2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	9	5	4	44	4	80	5	56	1	20	0	0	0	0
22-24	168	173	91	54	109	63	77	46	63	36	0	0	1	1
25-27	601	607	327	54	331	55	271	45	275	45	3	0	1	0
28-31	1744	2116	985	56	1183	56	754	43	926	44	5	0	6	0
32-36	2328	2956	1345	58	1666	56	973	42	1277	43	10	0	13	0
>=37	2500	3166	1507	60	1948	62	984	39	1206	38	9	0	12	0
Total	7350	9023	4259	58	5241	58	3064	42	3748	42	27	0	33	0

Table 11a: Gender according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies		Male				Female				Indeterminate			
			2004		2005		2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	38	32	11	29	14	44	26	68	18	56	1	3	0	0
501-1000	907	1098	470	52	560	51	434	48	533	49	3	0	4	0
1001-1500	1846	2224	1010	55	1144	51	829	45	1072	48	7	0	8	0
1501-2500	2315	2899	1375	59	1737	60	930	40	1146	40	10	0	16	1
>2500	2244	2770	1393	62	1786	64	845	38	979	35	6	0	5	0
Total	7350	9023	4259	58	5241	58	3064	42	3748	42	27	0	33	0

Table 12: Inborn-Outborn status according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		Inborn				Outborn			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<22	9	5	9	100	5	100	0	0	0	0
22-24	168	173	151	90	161	93	17	10	12	7
25-27	601	607	473	79	495	82	128	21	112	18
28-31	1744	2116	1424	82	1765	83	320	18	351	17
32-36	2328	2956	1883	81	2488	84	445	19	468	16
>=37	2500	3166	1879	75	2392	76	621	25	774	24
Total	7350	9023	5819	79	7306	81	1531	21	1717	19

Table 12a: Inborn-Outborn status according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		Inborn				Outborn			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<=500	38	32	36	95	32	100	2	5	0	0
501-1000	907	1098	750	83	942	86	157	17	156	14
1001-1500	1846	2224	1502	81	1851	83	344	19	373	17
1501-2500	2315	2899	1856	80	2365	82	459	20	534	18
>2500	2244	2770	1675	75	2116	76	569	25	654	24
Total	7350	9023	5819	79	7306	81	1531	21	1717	19

Table 13: Place of birth according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		University Hospital				General Hospital			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<22	9	5	0	0	0	0	7	78	2	40
22-24	168	173	5	3	6	3	108	64	110	64
25-27	601	607	12	2	7	1	370	62	387	64
28-31	1744	2116	24	1	51	2	1103	63	1334	63
32-36	2328	2956	41	2	57	2	1436	62	1900	64
>=37	2500	3166	55	2	97	3	1459	58	1885	60
Total	7350	9023	137	2	218	2	4483	61	5618	62

Gestational age group (weeks)	Private Hospital				District Hospital with specialist				District Hospital without specialist			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	0	0	0	0	2	2	2	2	0	0	0	0
22-24	2	1	4	2	38	38	38	38	7	4	2	1
25-27	19	3	16	3	117	117	117	117	39	6	30	5
28-31	49	3	65	3	345	345	345	345	117	7	112	5
32-36	64	3	71	2	525	525	525	525	119	5	154	5
>=37	89	4	110	3	516	516	516	516	217	9	264	8
Total	223	3	266	3	1543	1543	1543	1543	499	7	562	6

Gestational age group (weeks)	Private Maternity Home				Home				Others			
	2004		2005		2004		2005		2004		2005	
	No.	No.	No.	No.	No.	%	No.	%	No.	%	No.	%
<22	0	0	0	0	0	0	0	0	0	0	0	0
22-24	0	0	1	1	6	4	0	0	2	1	1	1
25-27	9	1	2	0	17	3	22	4	18	3	14	2
28-31	15	1	16	1	47	3	52	2	44	3	38	2
32-36	55	2	54	2	57	2	41	1	31	1	48	2
>=37	91	4	114	4	46	2	40	1	27	1	29	1
Total	170	2	187	2	173	2	155	2	122	2	130	1

Table 13a: Place of birth according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		University Hospital				General Hospital			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<=500	38	32	0	0	1	3	29	76	25	78
501-1000	907	1098	22	2	23	2	579	64	726	66
1001-1500	1846	2224	28	2	43	2	1153	62	1428	64
1501-2500	2315	2899	34	1	72	2	1426	62	1789	62
>2500	2244	2770	53	2	79	3	1296	58	1650	60
Total	7350	9023	137	2	218	2	4483	61	5618	62

Birthweight group (grams)	Private Hospital				District Hospital with specialist				District Hospital without specialist			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	1	3	0	0	6	16	6	19	0	0	0	0
501-1000	23	3	31	3	190	21	231	21	42	5	30	3
1001-1500	42	2	60	3	366	20	451	20	122	7	135	6
1501-2500	62	3	68	2	522	23	634	22	134	6	179	6
>2500	95	4	107	4	459	20	564	20	201	9	218	8
Total	223	3	266	3	1543	21	1886	21	499	7	562	6

Birthweight group (grams)	Private Maternity Home				Home				Others			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	0	0	0	0	1	3	0	0	1	3	0	0
501-1000	11	1	5	0	18	2	32	3	22	2	20	2
1001-1500	19	1	14	1	71	4	50	2	45	2	42	2
1501-2500	51	2	60	2	54	2	53	2	32	1	44	2
>2500	89	4	108	4	29	1	20	1	22	1	24	1
Total	170	2	187	2	173	2	155	2	122	2	130	1

Table 14: Mode of delivery according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		SVD				Breech			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<22	9	5	8	89	4	80	1	11	0	0
22-24	168	173	136	81	129	75	20	12	23	13
25-27	601	607	406	68	396	65	57	9	64	11
28-31	1744	2116	934	54	1099	52	88	5	95	4
32-36	2328	2956	1086	47	1355	46	67	3	76	3
>=37	2500	3166	1391	56	1705	54	52	2	45	1
Total	7350	9023	3961	54	4688	52	285	4	303	3

Gestational age group (weeks)	Forceps				Ventouse				Caesarean Section			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	0	0	0	0	0	0	0	0	0	0	1	20
22-24	0	0	0	0	0	0	0	0	0	0	21	12
25-27	1	0	1	0	1	0	1	0	0	0	143	24
28-31	2	0	2	0	2	0	2	0	0	0	915	43
32-36	9	0	9	0	9	0	9	0	0	0	1495	51
>=37	35	1	35	1	35	1	35	1	0	0	1202	38
Total	47	1	47	1	47	1	47	1	0	0	3777	42

Gestational age group (weeks)	Unknown				LSCS Elective				LSCS Emergency			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	0	0	0	0	0	0	0	0	0	0	0	0
22-24	0	0	0	0	0	0	0	0	12	7	0	0
25-27	0	0	1	0	6	1	0	0	131	22	0	0
28-31	0	0	0	0	26	1	0	0	694	40	0	0
32-36	0	0	1	0	83	4	0	0	1066	46	0	0
>=37	0	0	2	0	147	6	0	0	774	31	0	0
Total	0	0	4	0	262	4	0	0	2677	36	0	0

Table 14a: Mode of delivery according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		SVD				Breech			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<=500	38	32	27	71	21	66	2	5	3	9
501-1500	907	1098	555	61	593	54	84	9	102	9
1001-1500	1846	2224	918	50	1086	49	89	5	90	4
1501-2500	2315	2899	1212	52	1518	52	73	3	78	3
>2500	2244	2770	1249	56	1470	53	37	2	30	1
Total	7350	9023	3961	54	4688	52	285	4	303	3

Birthweight group (grams)	Forceps				Ventouse				Caesarean Section			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	0	0	0	0	0	0	1	3	0	0	7	22
501-1500	1	0	1	0	0	0	4	0	0	0	397	36
1001-1500	2	0	2	0	0	0	2	0	0	0	1043	47
1501-2500	10	0	14	0	20	1	23	1	0	0	1266	44
>2500	34	2	51	2	98	4	153	6	0	0	1064	38
Total	47	1	68	1	118	2	183	2	0	0	3777	42

Birthweight group (grams)	Unknown				LSCS Elective				LSCS Emergency			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	0	0	0	0	1	3	0	0	8	21	0	0
501-1000	0	0	1	0	15	2	0	0	252	28	0	0
1001-1500	0	0	1	0	37	2	0	0	800	43	0	0
1501-2500	0	0	0	0	82	4	0	0	918	40	0	0
>2500	0	0	2	0	127	6	0	0	699	31	0	0
Total	0	0	4	0	262	4	0	0	2677	36	0	0

Table 15: Survival rate according to CRIB score for babies <1500 gm, 2004 and 2005

CRIB score	No. of babies with corresponding score		Survival			
			2004		2005	
	2004	2005	No.	%	No.	%
0	194	220	184	95	212	96
1	430	572	399	93	531	93
2	283	282	238	84	243	86
3	185	194	141	76	171	88
4	200	262	138	69	207	79
5	129	163	90	70	120	74
6	95	105	60	63	65	62
7	95	107	52	55	53	50
8	72	90	35	49	46	51
9	66	86	36	55	45	52
10	43	84	18	42	29	35
11	67	66	24	36	21	32
12	37	42	8	22	9	21
13	28	33	5	18	2	6
14	14	19	2	14	3	16
15	14	11	0	0	0	0
16	13	19	0	0	1	5
17	5	13	0	0	2	15
18	3	5	0	0	0	0
19	6	6	0	0	0	0
20	2	2	0	0	0	0
Total	1981	2381	1430	72	1760	74

Table 15a: Mean CRIB score and survival rate according to centre, 2004 and 2005

Centres	Babies with BW < 1500 gm		CRIB score				Survival			
			2004		2005		2004		2005	
	2004	2005	Mean	SD	Mean	SD	No.	%	No.	%
All centres	1981	2381	4	4	4	4	1430	72	1760	74
2	143	153	5	4	4	4	106	74	110	72
3	73	79	2	2	4	3	50	68	62	78
4	41	47	5	5	6	5	30	73	35	74
5	90	136	4	3	4	4	73	81	106	78
6	85	77	5	4	4	3	51	60	52	68
7	179	152	4	4	5	4	140	78	117	77
8	88	113	4	3	4	3	52	59	64	57
9	98	86	5	4	5	4	68	69	61	71
10	54	49	5	4	6	5	32	59	30	61
11	25	32	6	4	6	5	19	76	25	78
12	72	69	4	4	4	4	51	71	53	77
13	44	65	5	4	5	4	31	70	47	72
14	56	56	5	4	5	5	40	71	40	71
15	70	44	5	4	4	4	45	64	30	68
16	111	98	4	3	5	4	91	82	82	84
17	103	119	5	5	6	5	77	75	80	67
18	25	25	2	2	4	3	21	84	18	72
19	85	98	3	4	2	3	66	78	88	90
20	56	57	4	4	4	4	39	70	38	67
21	41	60	1	2	3	3	29	71	35	58
22	80	94	3	3	4	3	66	83	78	83
23	197	170	4	4	4	4	139	71	139	82
24	133	177	4	4	3	4	99	74	139	79
25	32	45	6	5	5	5	15	47	31	69
26	0	213	0	0	4	4	0	0	145	68
27	0	57	0	0	3	3	0	0	47	82
28	0	10	0	0	3	4	0	0	8	80

Table 16: Use of CPAP according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		Babies with CPAP alone				Babies with CPAP in combination with any other modes of VS			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<22	9	5	0	0	0	0	0	0	0	0
22-24	168	173	10	6	9	5	10	6	15	9
25-27	601	607	56	9	31	5	169	28	187	31
28-31	1744	2116	232	13	301	14	507	29	637	30
32-36	2328	2956	508	22	693	23	451	19	576	19
>=37	2500	3166	341	14	466	15	253	10	414	13
Total	7350	9023	1147	16	1500	17	1390	19	1829	20

Table 16a: Use of CPAP according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		Babies with CPAP alone				Babies with CPAP in combination with any other modes of VS			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<=500	38	32	3	8	2	6	1	3	1	3
501-1000	907	1098	90	10	88	8	215	24	317	29
1001-1500	1846	2224	230	12	318	14	478	26	542	24
1501-2500	2315	2899	493	21	653	23	462	20	600	21
>2500	2244	2770	331	15	439	16	234	10	369	13
Total	7350	9023	1147	16	1500	17	1390	19	1829	20

Table 17: Use of HFOV according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		Babies with HFOV alone				Babies with HFOV in combination with any others mode of VS			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<22	9	5	0	0	0	0	0	0	0	0
22-24	168	173	3	2	2	1	3	2	5	3
25-27	601	607	7	1	9	1	21	3	20	3
28-31	1744	2116	4	0	13	1	28	2	40	2
32-36	2328	2956	5	0	11	0	20	1	35	1
>=37	2500	3166	25	1	34	1	30	1	81	3
Total	7350	9023	44	1	69	1	102	1	181	2

Table 17a: Use of HFOV according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		Babies with HFOV alone				Babies with HFOV in combination with any others mode of VS			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<=500	38	32	0	0	1	3	0	0	1	3
501-1000	907	1098	9	1	12	1	32	4	33	3
1001-1500	1846	2224	4	0	10	0	17	1	30	1
1501-2500	2315	2899	4	0	15	1	23	1	42	1
>2500	2244	2770	27	1	31	1	30	1	75	3
Total	7350	9023	44	1	69	1	102	1	181	2

Table 18: Use of Nitric Oxide to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		Babies with Nitric Oxide			
			2004		2005	
	2004	2005	No.	%	No.	%
<22	9	5	0	0	0	0
22-24	168	173	0	0	0	0
25-27	601	607	1	0	1	0
28-31	1744	2116	2	0	5	0
32-36	2328	2956	5	0	8	0
>=37	2500	3166	17	1	32	1
Total	7350	9023	25	0	46	1

Table 18a: Use of Nitric Oxide according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		Babies with Nitric Oxide			
			2004		2005	
	2004	2005	No.	%	No.	%
<=500	38	32	0	0	0	0
501-1000	907	1098	1	0	1	0
1001-1500	1846	2224	2	0	3	0
1501-2500	2315	2899	3	0	10	0
>2500	2244	2770	19	1	32	1
Total	7350	9023	25	0	46	1

Table 19: Use of patient-trigger ventilation to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies in study		Babies with IMV +PTV			
			2004		2005	
	2004	2005	No.	%	No.	%
<22	9	5	0	0	0	0
22-24	168	173	13	8	10	6
25-27	601	607	62	10	62	10
28-31	1744	2116	151	9	200	9
32-36	2328	2956	128	5	182	6
>=37	2500	3166	261	10	295	9
Total	7350	9023	615	8	749	8

Table 19a: Use of patient-trigger ventilation according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		Babies with IMV +PTV			
			2004		2005	
	2004	2005	No.	%	No.	%
<=500	38	32	2	5	1	3
501-1000	907	1098	94	10	95	9
1001-1500	1846	2224	108	6	173	8
1501-2500	2315	2899	184	8	217	7
>2500	2244	2770	227	10	263	9
Total	7350	9023	615	8	749	8

Table 20: Mean total duration of ventilatory support according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies		Babies who survived				For survivors, total duration of ventilatory support in days			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	Mean	SD	Mean	SD
<22	1	5	0	0	0	0	0	0	0	0
22-24	74	173	12	16	18	10	35	26	32	26
25-27	493	607	281	57	274	45	19	21	20	20
28-31	1415	2116	1150	81	1748	83	7	12	6	10
32-36	1967	2956	1710	87	2540	86	4	7	3	6
>=37	2361	3166	1865	79	2433	77	4	5	4	8
Total	6311	9023	5018	80	7013	78	6	10	5	9

Table 20a: Mean total duration of ventilatory support according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies		Babies who survived				For survivors, total duration of hospital stay in days			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	Mean	SD	Mean	SD
<=500	10	32	0	0	2	6	0	0	3	1
501-1000	686	1098	351	51	509	46	18	22	15	18
1001-1500	1315	2224	1095	83	1904	86	7	10	5	10
1501-2500	2121	2899	1815	86	2381	82	4	7	4	7
>2500	2179	2770	1757	81	2217	80	4	5	4	7
Total	6311	9023	5018	80	7013	78	6	10	5	9

Table 21: Ventilatory support and mortality rates according to diagnosis, 2005

Diagnosis	No. of babies with diagnosis	Babies with diagnosis with VS		Babies with diagnosis who died	
		No.	%	No.	%
RDS	4225	3861	91	900	21
Pneumonia	1794	1744	97	227	13
Meconium aspiration syndrome	683	677	99	106	16
Mild/Mod HIE	687	671	98	65	9
Severe HIE	324	314	97	207	64
Neonatal encephalopathy	74	68	92	25	34
CVS cyanotic	162	151	93	94	58
CVS acyanotic	232	198	85	60	26
Down syndrome	119	111	93	44	37
Persistent foetal circulation	406	402	99	196	48
Pulmonary haemorrhage	277	274	99	162	58
DIVC	278	274	99	204	73

Table 22: Congenital anomalies according to birthweight group, 2005

Congenital Anomalies	501-1000 gm		1001-1500 gm		1501-2500 gm		>2500 gm		Total
	No.	%	No.	%	No.	%	No.	%	No.
None	1057	13	2104	25	2635	31	2583	31	8379
Down syndrome	3	3	20	17	50	42	46	39	119
Edward syndrome	11	11	28	29	54	56	4	4	97
Patau syndrome	1	2	10	19	30	56	13	24	54
Other syndrome	11	7	31	21	58	39	47	32	147
IEM	1	5	0	0	7	37	11	58	19
Multiple congenital abnormalities	13	6	39	17	93	40	85	37	230
CVS Cyanotic	6	4	11	7	58	36	87	54	162
CVS Acyanotic	20	9	60	26	81	35	71	31	232
CNS hydrocephalus	12	16	19	25	19	25	27	35	77
CNS others	5	14	8	22	11	30	13	35	37
Neural tube defect Sipna bifida	0	0	1	6	6	35	10	59	17
Anencephaly	12	17	11	16	30	43	17	24	70
Others	1	6	5	28	9	50	3	17	18
Skeletal dysplasia	0	0	0	0	0	0	0	0	0
Respiratory anomalies	2	2	11	10	37	32	64	56	114
GIT anomalies	10	5	25	13	87	44	74	38	196
Hydrops	1	3	6	15	10	25	23	58	40
Renal	3	7	15	34	11	25	15	34	44
Cleft lip	3	11	8	30	8	30	8	30	27
Cleft palate	2	6	8	24	15	45	8	24	33
Cleft lip and palate	3	10	5	16	20	65	3	10	31
Other isolated anomalies	0	0	0	0	0	0	0	0	0

Table 23: Pneumothorax in ventilated babies, 2005

	Babies in study	Babies with VS		Babies with VS and pneumothorax		Babies with VS and pnuemothorax who died	
	No.	No.	%	No.	%	No.	%
All centres	9023	7772	86	532	7	250	47

Table 24: Use of surfactant in Respiratory Distress Syndrome (RDS), 2005

	Babies in study	Babies with RDS		Babies with RDS requiring VS		Babies with RDS requiring VS given surfactant	
	No.	No.	%	No.	%	No.	%
All centres	9023	4225	47	3861	91	2104	54

Table 25: Use and timing of surfactant therapy according to birthweight group, 2005

Birthweight group (grams)	Babies in study	Babies given surfactant		Babies given surfactant <=2 hours		Babies given surfactant >2 hours	
		No.	%	No.	%	No.	%
<=500	32	3	9	2	67	1	33
501-1000	1098	576	52	335	58	239	41
1001-1500	2224	823	37	396	48	427	61
1501-2500	2899	698	24	239	34	457	65
>2500	2770	171	6	48	28	123	72
Total	9023	2271	25	1020	45	1247	55

Table 26: Supplemental oxygen use according to survival status of birthweight group, 2005

Birthweight group (grams)	All Babies	Babies who survived		Babies who survived and on oxygen at Day 28		Babies who survived and on oxygen at 36 weeks corrected gestation		Babies who died		Babies who died and on oxygen at Day 28		Babies who died and on oxygen at 36 weeks corrected gestation	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	32	2	6	0	0	0	0	30	94	0	0	0	0
501-1000	1098	509	46	235	46	93	18	589	54	41	7	7	1
1001-1500	2224	1904	86	249	13	92	5	320	14	26	8	13	4
1501-2500	2899	2381	82	94	4	60	3	518	18	32	6	16	3
>2500	2770	2217	80	49	2	22	1	553	20	36	7	6	1
Overall	9023	7013	78	627	9	267	4	2010	22	135	7	42	2

Table 26a: Supplemental oxygen use according to survival status of gestational age group, 2005

Gestational age group (weeks)	All Babies	Babies who survived		Babies who survived and on oxygen at Day 28		Babies who survived and on oxygen at 36 weeks corrected gestation		Babies who died		Babies who died and on oxygen at Day 28		Babies who died and on oxygen at 36 weeks corrected gestation	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<22	5	0	0	0	0	0	0	5	100	0	0	0	0
22-24	173	18	10	17	94	5	28	155	90	4	3	1	1
25-27	607	274	45	144	53	55	20	333	55	25	8	5	2
28-31	2116	1748	83	279	16	105	6	368	17	31	8	11	3
32-36	2956	2540	86	124	5	77	3	416	14	32	8	18	4
>=37	3166	2433	77	63	3	25	1	733	23	43	6	7	1
Overall	9023	7013	78	627	9	267	4	2010	22	135	7	42	2

Table 27: Cerebral ultrasound scanning (CUS) and intraventricular haemorrhage (IVH) in babies with BW 501 - 1500gm, 2005

	Babies in study	Babies with CUS		Babies with CUS who has Grade 1 IVH		Babies with CUS who has Grade 2 IVH		Babies with CUS who has Grade 3 IVH		Babies with CUS who has Grade 4 IVH		Babies with Grade 3 or 4 IVH who died	
	No.	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All centres	3322	2239	67	257	11	258	12	182	8	90	4	164	7

Table 28: Cerebral ultrasound scanning according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies		Babies with ultrasound brain			
			2004		2005	
	2004	2005	No.	%	No.	%
<=500	38	32	5	13	4	13
501-1000	907	1098	522	58	714	65
1001-1500	1846	2224	1133	61	1525	69
<1501	2791	3354	1660	59	2243	67
1501-2500	2315	2899	794	34	1060	37
>2500	2244	2770	474	21	642	23
Total	7350	9023	2928	40	3945	44

Table 29: ROP screening according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies		Babies who survived on discharge				Babies who survived and had ROP screening			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<22	9	5	0	0	0	0	0	0	0	0
22-24	168	173	14	8	18	10	12	86	17	94
25-27	601	607	307	51	274	45	271	88	257	94
28-31	1744	2116	1424	82	1748	83	1123	79	1307	75
<32	2522	2901	1745	69	2040	70	1406	81	1581	78
32-36	2328	2956	1989	85	2540	86	780	39	784	31
>=37	2500	3166	1890	76	2433	77	39	2	40	2
Total	7350	9023	5624	77	7013	78	2225	40	2405	34

Table 29a: ROP screening according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies		Babies who survived on discharge				Babies who survived and had ROP screening			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	No.	%	No.	%
<=500	38	32	0	0	2	6	0	0	0	0
501-1000	907	1098	392	43	509	46	347	89	481	94
1001-1500	747	886	599	80	709	80	513	86	591	83
<1251	1692	2016	991	59	1220	61	860	87	1072	88
1251-1500	1099	1338	968	88	1195	89	653	67	706	59
1501-2500	2315	2899	1907	82	2381	82	673	35	599	25
>2500	2244	2770	1758	78	2217	80	39	2	28	1
Total	7350	9023	5624	77	7013	78	2225	40	2405	34

Table 30: Incidence of retinopathy of prematurity according to birthweight group, 2005

Stages of ROP	501-1000 gm		1001-1500 gm		1501-2500 gm		>2500 gm		Total
	No.	%	No.	%	No.	%	No.	%	
ROP none	329	14	1103	46	698	29	275	11	2405
Stage 1 ROP	75	38	106	53	16	8	2	1	199
Stage 2 ROP	69	62	40	36	2	2	0	0	111
Stage 3 ROP	46	67	21	30	2	3	0	0	69
Stage 4 ROP	3	100	0	0	0	0	0	0	3
Stage 5 ROP	3	60	1	20	1	20	0	0	5
Not applicable / Not Checked	571	9	941	15	2167	35	2480	40	6159

Table 31: Necrotising enterocolitis and confirmed sepsis according to birthweight group, 2005

BW group (grams)	Total Babies	NEC medical Rx		NEC medical Rx with confirmed sepsis		NEC surgical Rx		NEC surgical Rx with confirmed sepsis	
		No.	%	No.	%	No.	%	No.	%
501-1000	1098	118	11	26	22	21	2	12	57
1001-1500	2224	165	7	47	28	20	1	7	35
1501-2500	2899	58	2	11	19	24	1	18	75
> 2500	2770	31	1	10	32	11	0	5	45
Total	8991	372	4	94	34	76	1	42	55

Table 32: Sepsis associated mortality according to birthweight group, 2005

BW group (grams)	Total cases	Cases of confirmed bacterial sepsis		Cases of confirmed bacterial sepsis who died		Cases without confirmed bacterial sepsis		Cases without confirmed bacterial sepsis who died	
		No.	%	No.	%	No.	%	No.	%
501-1000	1098	200	18	58	29	912	83	538	59
1001-1500	2224	299	13	63	21	1947	88	260	13
1501-2500	2899	242	8	72	30	2672	92	455	17
> 2500	2770	229	8	71	31	2549	92	486	19
Total	8991	970	11	264	27	8080	90	1739	22

Table 33.Survival according to gestation (gestational age group), 2004 and 2005

Gestational age group (weeks)	All Babies		Babies who survived			
			2004		2005	
	2004	2005	No.	%	No.	%
<22	9	5	0	0	0	0
22	25	22	0	0	1	5
23	47	51	2	4	6	12
24	96	100	12	13	11	11
25	122	120	38	31	36	30
26	218	231	108	50	95	41
27	261	256	161	62	143	56
28	373	393	259	69	277	70
29	349	414	278	80	332	80
30	496	670	416	84	562	84
31	526	639	471	90	577	90
32	589	812	519	88	714	88
33	518	564	453	87	504	89
34	471	639	403	86	554	87
35	354	426	291	82	357	84
36	396	515	323	82	411	80
>=37	2500	3166	1890	76	2433	77
Total	7350	9023	5624	77	7013	78
22-24	168	173	14	8	18	10
25-27	601	607	307	51	274	45
28-31	1744	2116	1424	82	1748	83
22-31	2513	2896	1745	69	2040	70
32-36	2328	2956	1989	85	2540	86
>=37	2500	3166	1890	76	2433	77

Table 33a: Survival according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies		Babies who survived			
			2004		2005	
	2004	2005	No.	%	No.	%
<=500	38	32	0	0	2	6
501-600	107	115	10	9	7	6
601-700	116	155	18	16	38	25
701-800	177	208	60	34	72	35
801-900	207	277	110	53	162	58
901-1000	300	343	194	65	230	67
1001-1000	284	365	209	74	279	76
1101-1200	332	370	278	84	305	82
1201-1300	373	441	324	87	374	85
1301-1400	419	489	370	88	440	90
1401-1500	438	559	386	88	506	91
1501-2500	2315	2899	1907	82	2381	82
>2500	2244	2770	1758	78	2217	80
Total	7350	9023	5624	77	7013	78
501-1000	907	1098	392	43	509	46
1001-1500	1846	2224	1567	85	1904	86
501-1500	2753	3322	1959	71	2413	73

Table 34: Mean total duration of hospital stay according to gestational age, 2004 and 2005

Gestational age group (weeks)	All Babies		Babies who survived				For survivors, total duration of hospital stay in days			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	Mean	SD	Mean	SD
<22	9	5	0	0	0	0	0	0	0	0
22-24	167	173	14	8	18	10	86	40	91	40
25-27	599	606	307	51	273	45	67	41	75	42
28-31	1741	2116	1424	82	1748	83	39	24	43	27
32-36	2327	2956	1989	85	2540	86	22	18	23	22
>=37	2500	3166	1890	76	2433	77	13	14	14	19
Total	7343	9022	5624	77	7012	78	26	25	27	28

Table 34a: Mean total duration of hospital stay according to birthweight 2004 and 2005

Birthweight group (grams)	All Babies		Babies who survived				For survivors, total duration of hospital stay in days			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	Mean	SD	Mean	SD
<=500	38	32	0	0	2	6	0	0	8	1
501-1000	904	1098	392	43	509	46	68	36	74	34
1001-1500	1846	2223	1567	85	1903	86	39	23	40	24
1501-2500	2311	2899	1907	83	2381	82	19	16	19	19
>2500	2244	2770	1758	78	2217	80	13	14	13	20
Total	7343	9022	5624	77	7012	78	26	25	27	28

5. Additional Tables

Table 35: Use of antibiotic according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		No to antibiotic				Yes to antibiotic				Penicilin			
	2004	2005	2004		2005		2004		2005		2004		2005	
			No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	38	32	12	32	7	22	25	66	25	78	12	32	7	22
501-1000	907	1098	735	81	910	83	172	19	187	17	712	79	885	81
1001-1500	1846	2224	1651	89	1959	88	193	10	264	12	1594	86	1891	85
1501-2500	2315	2899	2100	91	2607	90	212	9	292	10	2018	87	2510	87
>2500	2244	2770	2097	93	2561	92	139	6	209	8	2020	90	2460	89
Total	7350	9023	6595	90	8044	89	741	10	977	11	6356	86	7753	86

Birthweight group (grams)	Aminoglycoside				2nd generation cephalosporin				4th genereation Cephalosporin			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	11	29	6	19	0	0	0	0	0	0	0	0
501-1000	666	73	849	77	46	5	48	4	35	4	63	6
1001-1500	1504	81	1804	81	102	6	83	4	57	3	94	4
1501-2500	1903	82	2400	83	147	6	111	4	39	2	66	2
>2500	1857	83	2318	84	130	6	106	4	36	2	61	2
Total	5941	81	7377	82	425	6	348	4	167	2	284	3

Birthweight group (grams)	Vancomycin				Carbapenem				Others			
	2004		2005		2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<=500	1	3	1	3	2	5	1	3	1	3	0	0
501-1000	206	23	211	19	259	29	292	27	142	16	155	14
1001-1500	277	15	264	12	347	19	373	17	256	14	235	11
1501-2500	209	9	158	5	232	10	285	10	254	11	231	8
>2500	165	7	167	6	196	9	223	8	207	9	204	7
Total	858	12	801	9	1036	14	1174	13	860	12	825	9

Table 36: Use of postnatal steroid for CLD according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		Babies given postnatal steroid for CLD			
			2004		2005	
	2004	2005	No.	%	No.	%
<=500	38	32	0	0	0	0
501-1000	907	1098	111	12	122	13
1001-1500	1846	2224	92	5	96	5
1501-2500	2315	2899	31	1	47	2
>2500	2244	2770	45	2	68	3
Total	7350	9023	279	4	333	5

Table 37: Use of parenteral nutrition according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies in study		Babies given parenteral nutrition			
			2004		2005	
	2004	2005	No.	%	No.	%
<=500	38	32	5	13	4	13
501-1000	907	1098	403	44	475	43
1001-1500	1846	2224	655	35	654	29
<1501	2791	3354	1063	38	1133	34
1501-2500	2315	2899	346	15	336	12
>2500	2244	2770	260	12	203	7
Total	7350	9023	1669	23	1672	19

Table 38: Enteral nutrition feeding on discharge according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies		No Enteral nutrition				Exclusive breastfeeding / breastmilk feeds			
	2004	2005	2004		2005		2004		2005	
			No.	%	No.	%	No.	%	No.	%
<=500	38	32	36	95	29	91	0	0	2	6
501-1000	907	1098	387	43	511	47	0	0	138	13
1001-1500	1846	2224	203	11	272	12	0	0	546	25
1501-2500	2315	2899	326	14	459	16	0	0	883	30
>2500	2244	2770	396	18	499	18	0	0	806	29
Total	7350	9023	1348	18	1770	20	0	0	2375	26

Birthweight group (grams)	Mixed feeds				Exclusive formula feeds			
	2004		2005		2004		2005	
	No.	%	No.	%	No.	%	No.	%
<=500	0	0	1	3	0	0	0	0
501-1000	0	0	355	32	0	0	91	8
1001-1500	0	0	1186	53	0	0	220	10
1501-2500	0	0	1367	47	0	0	188	6
>2500	0	0	1281	46	0	0	184	7
Total	0	0	4190	46	0	0	683	8

Table 39: Mean Discharge weight according to gestational age group, 2004 and 2005

Gestational age group (weeks)	All Babies		Babies who survived				For survivors, total discharge weight in grams			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	Mean	SD	Mean	SD
<22	9	5	0	0	0	0	0	0	0	0
22-24	168	173	14	8	18	10	2041	473	2012	465
25-27	601	607	307	51	274	45	1915	687	2019	641
28-31	1742	2116	1422	82	1748	83	1848	741	1879	500
32-36	2322	2956	1985	85	2540	86	2076	949	2024	473
>=37	2498	3165	1888	76	2432	77	3048	801	3013	623
Total	7340	9022	5616	77	7012	78	2336	982	2331	738

Table 39a: Mean Discharge weight according to birthweight group, 2004 and 2005

Birthweight group (grams)	All Babies		Babies who survived				For survivors, total discharge weight in grams			
			2004		2005		2004		2005	
	2004	2005	No.	%	No.	%	Mean	SD	Mean	SD
<=500	38	32	0	0	2	6			2715	403
501-1000	906	1098	391	43	509	46	1842	540	1920	620
1001-1500	1844	2224	1566	85	1904	86	1848	905	1820	429
1501-2500	2310	2899	1903	82	2381	82	2052	765	2053	407
>2500	2242	2769	1756	78	2216	80	3190	755	3162	513
Total	7340	9022	5616	77	7012	78	2336	982	2331	738

Table 40: Place of discharge, if child alive, according to birthweight group 2005

Birthweight group (grams)	Home	Other Non Peads Wards	Transfer to other hospitals	Social welfare home	Still hospitalized as of first birthday
<=500	2	0	0	0	0
501-1000	458	1	45	3	2
1001-1500	1751	0	140	11	1
1501-2500	2249	1	123	6	2
>2500	2119	5	88	5	0
Total	6579	7	396	25	5

Table 41: Reasons for transfer to other hospitals according to centres, 2005

Reason for transfer	No.	%
Lack of NICU bed	26	7
For stepdown care	178	46
For chronic care	3	1
For surgery / diagnostic services	97	25
Due to social / logistic reason	61	16
Due to other reason	20	5
Total Cases	385	100

Table 42: Post-transfer disposition, 2005

Place of disposition	No.	%
Home	249	86
Transferred again to another hospital	6	2
Death	24	8
Readmitted to your hospital	11	4
Still hospitalized as of first birthday	0	0
Total Cases	290	100

Table 43: HIE according to birthweight group, 2005

Birthweight group (grams)	None	Mild / Moderate	Severe	NA / Unknown	Not applicable
<=500	10	0	0	1	21
501-1000	619	12	12	19	436
1001-1500	1461	37	16	27	683
1501-2000	1019	62	31	25	504
2001-2500	1063	113	40	13	29
2501-3000	984	202	100	12	18
3001-3500	670	184	84	12	18
3501-4000	260	60	27	1	3
4001-4500	70	12	6	0	1
4501-5000	21	4	8	2	1
>5000	9	1	0	0	0
Total	6186	687	324	112	1714

Table 44: Mean highest total serum bilirubin according to birthweight group, 2005

Weight groups in grams	Total No. of babies	Highest total bilirubin umol/l	
		Mean	+/- SD umol/L
501-600	18	177.17	115.24
601-700	48	172.40	51.11
701-800	84	174.99	62.94
801-900	148	183.33	54.42
901-1000	211	179.21	48.73
1001-1100	238	187.26	56.62
1101-1200	256	189.41	57.48
1201-1300	275	198.35	58.45
1301-1400	343	197.10	57.94
1401-1500	376	201.93	60.39
1501-2000	1105	210.25	62.02
2001-2500	693	218.49	64.56
2501-3000	607	209.52	91.20
3001-3500	422	209.86	95.23
>3500	206	201.06	79.10
Total	5030	203.41	69.99

Table 45: Episodes of confirmed bacterial sepsis according to birthweight group and survival status, 2005.

Birthweight group (grams)	All Babies	Overall episodes of confirmed bacterial sepsis		Survivors per BW group		Episodes of confirmed bacterial sepsis among survivors	
		No.	%	No.	%	No.	%
<=500	32	1	3	2	6	0	0
501-1000	1098	200	18	509	46	127	25
1001-1500	2224	299	13	1904	86	217	11
1501-2500	2899	242	8	2381	82	162	7
>2500	2770	229	8	2217	80	147	7
Overall	9023	970	11	7013	78	653	9

Table 46: Mortality rate of confirmed fungal sepsis according to birthweight group, 2005

Birthweight group (grams)	All Babies	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	32	0	0	0	0	32	100	30	94
501-1000	1098	18	2	11	61	1080	98	578	54
1001-1500	2224	14	1	2	14	2210	99	318	14
1501-2500	2899	11	0	5	45	2888	100	513	18
>2500	2770	11	0	3	27	2759	100	550	20
Overall	9023	54	1	21	39	8969	99	1989	22

Table 47: Use of antenatal steroid according to centres, 2005 (Inborn)

Centres	Babies < 32 weeks	Babies < 32 weeks given antenatal steroids		Inborn babies < 32 weeks gestation	Inborn babies < 32 weeks given antenatal steroids	
		No.	%		No.	%
All centres	2901	1645	57	2426	1522	63
2	144	93	65	111	81	73
3	185	133	72	157	123	78
4	68	35	51	61	35	57
5	169	81	48	140	72	51
6	108	32	30	88	30	34
7	196	140	71	176	132	75
8	133	63	47	111	56	50
9	124	98	79	114	93	82
10	62	31	50	49	30	61
11	28	23	82	26	22	85
12	76	47	62	60	40	67
13	82	40	49	64	33	52
14	61	45	74	54	43	80
15	67	17	25	55	17	31
16	147	91	62	124	87	70
17	129	35	27	116	34	29
18	37	25	68	34	25	74
19	122	83	68	84	69	82
20	69	52	75	58	50	86
21	66	25	38	58	24	41
22	112	85	76	96	82	85
23	216	150	69	183	141	77
24	171	85	50	144	83	58
25	82	40	49	61	31	51
26	156	53	34	132	48	36
27	78	40	51	59	38	64
28	13	3	23	11	3	27

Table 47a: Use of antenatal steroid according to centres, 2005 (Outborn)

Centres	Babies < 32 weeks	Babies < 32 weeks given antenatal steroids		Outborn babies < 32 weeks gestation	Outborn babies < 32 weeks given antenatal steroids	
	No.	No.	%	No.	No.	%
All centres	2901	1645	57	475	123	26
2	144	93	65	33	12	36
3	185	133	72	28	10	36
4	68	35	51	7	0	0
5	169	81	48	29	9	31
6	108	32	30	20	2	10
7	196	140	71	20	8	40
8	133	63	47	22	7	32
9	124	98	79	10	5	50
10	62	31	50	13	1	8
11	28	23	82	2	1	50
12	76	47	62	16	7	44
13	82	40	49	18	7	39
14	61	45	74	7	2	29
15	67	17	25	12	0	0
16	147	91	62	23	4	17
17	129	35	27	13	1	8
18	37	25	68	3	0	0
19	122	83	68	38	14	37
20	69	52	75	11	2	18
21	66	25	38	8	1	13
22	112	85	76	16	3	19
23	216	150	69	33	9	27
24	171	85	50	27	2	7
25	82	40	49	21	9	43
26	156	53	34	24	5	21
27	78	40	51	19	2	11
28	13	3	23	2	0	0

Table 48: Use of surfactant in Respiratory Distress Syndrome (RDS) according to centres, 2005

Centres	Babies in study	Babies with RDS		Babies with RDS requiring VS		Babies with RDS requiring VS given surfactant	
	No.	No.	%	No.	%	No.	%
All centres	9023	4225	47	3861	91	2104	54
2	509	209	41	183	88	122	67
3	446	239	54	215	90	144	67
4	248	103	42	101	98	38	38
5	481	200	42	160	80	70	44
6	349	142	41	129	91	107	83
7	671	302	45	292	97	136	47
8	463	181	39	159	88	110	69
9	390	166	43	150	90	60	40
10	213	101	47	97	96	73	75
11	114	41	36	38	93	26	68
12	211	138	65	132	96	68	52
13	276	133	48	130	98	39	30
14	157	100	64	84	84	35	42
15	183	107	58	77	72	47	61
16	368	198	54	179	90	72	40
17	433	146	34	144	99	79	55
18	72	40	56	34	85	30	88
19	295	167	57	153	92	104	68
20	218	126	58	125	99	79	63
21	162	97	60	91	94	71	78
22	428	165	39	164	99	122	74
23	665	397	60	355	89	141	40
24	386	164	42	158	96	128	81
25	309	132	43	130	98	107	82
26	784	335	43	302	90	37	12
27	156	83	53	70	84	54	77
28	36	13	36	9	69	5	56

Table 49: Use of Parenteral nutrition (PN) according to centres, 2005

Centres	Babies in study	Babies with BW 501-1500gm		Babies with BW 501-1500gm given PN		Babies with VS		Babies with VS given PN	
	No.	No.	%	No.	%	No.	%	No.	%
All centres	9023	3322	37	1129	34	7772	86	1561	20
2	509	208	41	90	43	413	81	91	22
3	446	178	40	102	57	359	80	153	43
4	248	64	26	33	52	232	94	39	17
5	481	186	39	61	33	365	76	64	18
6	349	140	40	13	9	270	77	16	6
7	671	219	33	78	36	611	91	96	16
8	463	125	27	52	42	417	90	98	24
9	390	141	36	23	16	319	82	28	9
10	213	70	33	16	23	194	91	18	9
11	114	36	32	7	19	105	92	23	22
12	211	81	38	17	21	195	92	27	14
13	276	91	33	42	46	258	93	70	27
14	157	67	43	25	37	133	85	30	23
15	183	72	39	25	35	135	74	28	21
16	368	132	36	99	75	327	89	117	36
17	433	130	30	37	28	396	91	41	10
18	72	39	54	22	56	48	67	26	54
19	295	124	42	52	42	255	86	56	22
20	218	71	33	41	58	204	94	46	23
21	162	68	42	34	50	144	89	37	26
22	428	139	32	56	40	393	92	71	18
23	665	247	37	42	17	593	89	49	8
24	386	186	48	16	9	296	77	20	7
25	309	87	28	80	92	290	94	238	82
26	784	318	41	54	17	691	88	65	9
27	156	88	56	11	13	106	68	14	13
28	36	15	42	1	7	23	64	0	0

Table 50: Pneumothorax according to centres, 2005

Centres	Babies in study	Babies with VS		Babies with VS and pneumothorax		Babies with VS and pnuemothorax who died	
	No.	No.	%	No.	%	No.	%
All centres	9023	7772	86	532	7	250	47
2	509	413	81	31	8	15	48
3	446	359	80	15	4	5	33
4	248	232	94	8	3	7	88
5	481	365	76	24	7	7	29
6	349	270	77	17	6	12	71
7	671	611	91	36	6	13	36
8	463	417	90	21	5	14	67
9	390	319	82	22	7	12	55
10	213	194	91	6	3	2	33
11	114	105	92	8	8	2	25
12	211	195	92	12	6	5	42
13	276	258	93	4	2	1	25
14	157	133	85	7	5	3	43
15	183	135	74	17	13	9	53
16	368	327	89	29	9	10	34
17	433	396	91	25	6	13	52
18	72	48	67	2	4	2	100
19	295	255	86	18	7	4	22
20	218	204	94	14	7	6	43
21	162	144	89	8	6	2	25
22	428	393	92	25	6	11	44
23	665	593	89	31	5	12	39
24	386	296	77	21	7	13	62
25	309	290	94	25	9	14	56
26	784	691	88	87	13	47	54
27	156	106	68	18	17	8	44
28	36	23	64	1	4	1	100

Table 51: Use of supplemental oxygen on day 28 for VLBW babies (BW 501 - 1000gm and BW 501 - 1500gm) according to centres, 2005

Centres	Babies with BW 501-1000gm	Babies with BW 501-1000gm who survived		Babies with BW 501-1000gm who survived with use of oxygen on day 28		Babies with BW 501-1500gm	Babies with BW 501-1500gm who survived		Babies with BW 501-1500gm who survived with use of oxygen on day 28	
	No.	No.	%	No.	%	No.	No.	%	No.	%
All centres	1098	509	46	235	46	3322	2413	73	484	20
2	65	26	40	10	38	208	149	72	29	19
3	51	18	35	2	11	178	128	72	8	6
4	28	13	46	6	46	64	46	72	13	28
5	59	22	37	6	27	186	129	69	22	17
6	37	16	43	8	50	140	100	71	17	17
7	81	36	44	16	44	219	156	71	39	25
8	40	10	25	0	0	125	76	61	3	4
9	45	20	44	4	20	141	102	72	15	15
10	25	10	40	5	50	70	50	71	14	28
11	14	7	50	3	43	36	28	78	5	18
12	29	17	59	5	29	81	64	79	7	11
13	32	19	59	8	42	91	71	78	10	14
14	21	8	38	8	100	67	47	70	12	26
15	18	6	33	2	33	72	54	75	10	19
16	64	46	72	28	61	132	112	85	38	34
17	42	17	40	11	65	130	86	66	21	24
18	18	8	44	5	63	39	26	67	6	23
19	40	24	60	18	75	124	102	82	53	52
20	20	11	55	8	73	71	46	65	13	28
21	28	11	39	5	45	68	40	59	6	15
22	38	25	66	11	44	139	107	77	17	16
23	84	45	54	16	36	247	191	77	23	12
24	59	33	56	23	70	186	147	79	40	27
25	28	15	54	8	53	87	62	71	16	26
26	100	34	34	12	35	318	216	68	32	15
27	30	12	40	7	58	88	66	75	13	20
28	2	0	0	0		15	12	80	2	17

Table 51a: Use of supplemental oxygen on day 28 for VLBW babies (BW 501 - 1000gm and BW 1001 - 1500gm) according to centres, 2005

Centres	Babies with BW 501-1000gm	Babies with BW 501-1000gm who survived		Babies with BW 501-1000gm who survived with use of oxygen on day 28		Babies with BW 1001-1500gm	Babies with BW 1001-1500gm who survived		Babies with BW 1001-1500gm who survived with use of oxygen on day 28	
	No.	No.	%	No.	%	No.	No.	%	No.	%
All centres	1098	509	46	235	46	2224	1904	86	249	13
2	65	26	40	10	38	143	123	86	19	15
3	51	18	35	2	11	127	110	87	6	5
4	28	13	46	6	46	36	33	92	7	21
5	59	22	37	6	27	127	107	84	16	15
6	37	16	43	8	50	103	84	82	9	11
7	81	36	44	16	44	138	120	87	23	19
8	40	10	25	0	0	85	66	78	3	5
9	45	20	44	4	20	96	82	85	11	13
10	25	10	40	5	50	45	40	89	9	23
11	14	7	50	3	43	22	21	95	2	10
12	29	17	59	5	29	52	47	90	2	4
13	32	19	59	8	42	59	52	88	2	4
14	21	8	38	8	100	46	39	85	4	10
15	18	6	33	2	33	54	48	89	8	17
16	64	46	72	28	61	68	66	97	10	15
17	42	17	40	11	65	88	69	78	10	14
18	18	8	44	5	63	21	18	86	1	6
19	40	24	60	18	75	84	78	93	35	45
20	20	11	55	8	73	51	35	69	5	14
21	28	11	39	5	45	40	29	73	1	3
22	38	25	66	11	44	101	82	81	6	7
23	84	45	54	16	36	163	146	90	7	5
24	59	33	56	23	70	127	114	90	17	15
25	28	15	54	8	53	59	47	80	8	17
26	100	34	34	12	35	218	182	83	20	11
27	30	12	40	7	58	58	54	93	6	11
28	2	0	0	0		13	12	92	2	17

Table 51b: Use of supplemental oxygen at 36 weeks corrected gestation for VLBW babies (BW 501 - 1000gm and BW 501 - 1500gm) according to centres, 2005

Centres	Babies with BW 501-1000gm	Babies with BW 501-1000gm who survived		Babies with BW 501-1000gm who survived with use of oxygen on 36 weeks		Babies with BW 501-1500gm	Babies with BW 501-1500gm who survived		Babies with BW 501-1500gm who survived with use of oxygen on 36 weeks	
	No.	No.	%	No.	%	No.	No.	%	No.	%
All centres	1098	509	46	93	18	3322	2413	73	185	8
2	65	26	40	2	8	208	149	72	6	4
3	51	18	35	0	0	178	128	72	3	2
4	28	13	46	1	8	64	46	72	2	4
5	59	22	37	3	14	186	129	69	5	4
6	37	16	43	4	25	140	100	71	8	8
7	81	36	44	7	19	219	156	71	14	9
8	40	10	25	0	0	125	76	61	1	1
9	45	20	44	2	10	141	102	72	7	7
10	25	10	40	2	20	70	50	71	4	8
11	14	7	50	2	29	36	28	78	2	7
12	29	17	59	1	6	81	64	79	1	2
13	32	19	59	3	16	91	71	78	6	8
14	21	8	38	0	0	67	47	70	1	2
15	18	6	33	1	17	72	54	75	7	13
16	64	46	72	10	22	132	112	85	12	11
17	42	17	40	3	18	130	86	66	6	7
18	18	8	44	2	25	39	26	67	4	15
19	40	24	60	14	58	124	102	82	37	36
20	20	11	55	1	9	71	46	65	1	2
21	28	11	39	2	18	68	40	59	2	5
22	38	25	66	7	28	139	107	77	15	14
23	84	45	54	11	24	247	191	77	14	7
24	59	33	56	6	18	186	147	79	11	7
25	28	15	54	4	27	87	62	71	6	10
26	100	34	34	3	9	318	216	68	8	4
27	30	12	40	2	17	88	66	75	2	3
28	2	0	0	0	0	15	12	80	0	0

Table 51c: Use of supplemental oxygen at 36 weeks corrected gestation for VLBW babies (BW 501 - 1000gm and BW 1001 - 1500gm) according to centres, 2005

Centres	Babies with BW 501-1000gm	Babies with BW 501-1000gm who survived		Babies with BW 501-1000gm who survived with use of oxygen on 36 weeks		Babies with BW 1001-1500gm	Babies with BW 1001-1500gm who survived		Babies with BW 1001-1500gm who survived with use of oxygen on 36 weeks	
	No.	No.	%	No.	%	No.	No.	%	No.	%
All centres	1098	509	46	93	18	2224	1904	86	92	5
2	65	26	40	2	8	143	123	86	4	3
3	51	18	35	0	0	127	110	87	3	3
4	28	13	46	1	8	36	33	92	1	3
5	59	22	37	3	14	127	107	84	2	2
6	37	16	43	4	25	103	84	82	4	5
7	81	36	44	7	19	138	120	87	7	6
8	40	10	25	0	0	85	66	78	1	2
9	45	20	44	2	10	96	82	85	5	6
10	25	10	40	2	20	45	40	89	2	5
11	14	7	50	2	29	22	21	95	0	0
12	29	17	59	1	6	52	47	90	0	0
13	32	19	59	3	16	59	52	88	3	6
14	21	8	38	0	0	46	39	85	1	3
15	18	6	33	1	17	54	48	89	6	13
16	64	46	72	10	22	68	66	97	2	3
17	42	17	40	3	18	88	69	78	3	4
18	18	8	44	2	25	21	18	86	2	11
19	40	24	60	14	58	84	78	93	23	29
20	20	11	55	1	9	51	35	69	0	0
21	28	11	39	2	18	40	29	73	0	0
22	38	25	66	7	28	101	82	81	8	10
23	84	45	54	11	24	163	146	90	3	2
24	59	33	56	6	18	127	114	90	5	4
25	28	15	54	4	27	59	47	80	2	4
26	100	34	34	3	9	218	182	83	5	3
27	30	12	40	2	17	58	54	93	0	0
28	2	0	0	0		13	12	92	0	0

Table 52: Cerebral ultrasound scanning (CUS) and intraventricular haermorrhage (IVH) in babies with BW 501 - 1500gm according to centre, 2005

Centres	Babies in study	Babies with CUS		Babies with CUS who has Grade 1 IVH		Babies with CUS who has Grade 2 IVH		Babies with CUS who has Grade 3 IVH		Babies with CUS who has Grade 4 IVH		Babies with Grade 3 or 4 IVH who died	
	No.	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
All centres	3322	2239	67	257	11	258	12	182	8	90	4	164	7
2	208	164	79	14	9	6	4	4	2	5	3	8	5
3	178	131	74	16	12	6	5	6	5	2	2	8	6
4	64	51	80	3	6	5	10	4	8	2	4	2	4
5	186	107	58	9	8	22	21	27	25	5	5	8	7
6	140	99	71	10	10	11	11	8	8	7	7	12	12
7	219	173	79	20	12	29	17	14	8	5	3	12	7
8	125	87	70	8	9	3	3	7	8	1	1	7	8
9	141	117	83	10	9	15	13	8	7	8	7	10	9
10	70	37	53	6	16	7	19	4	11	3	8	4	11
11	36	28	78	1	4	0	0	0	0	0	0	0	0
12	81	63	78	7	11	10	16	9	14	4	6	5	8
13	91	44	48	5	11	12	27	5	11	1	2	5	11
14	67	19	28	0	0	0	0	1	5	1	5	2	11
15	72	45	63	9	20	6	13	4	9	1	2	3	7
16	132	91	69	30	33	16	18	11	12	2	2	8	9
17	130	109	84	29	27	39	36	3	3	2	2	3	3
18	39	26	67	2	8	1	4	4	15	2	8	5	19
19	124	107	86	5	5	12	11	7	7	2	2	6	6
20	71	46	65	2	4	3	7	2	4	5	11	5	11
21	68	43	63	6	14	3	7	1	2	0	0	1	2
22	139	112	81	11	10	1	1	3	3	3	3	3	3
23	247	164	66	8	5	9	5	10	6	4	2	13	8
24	186	127	68	17	13	17	13	18	14	5	4	6	5
25	87	74	85	9	12	3	4	1	1	6	8	5	7
26	318	110	35	17	15	18	16	19	17	12	11	23	21
27	88	58	66	3	5	3	5	2	3	2	3	0	0
28	15	7	47	0	0	1	14	0	0	0	0	0	0

Table 53: Retinopathy of prematurity (ROP) (Babies < 32 weeks gestation) according to centres, 2005

Centres	Babies in study	Babies who survived		Babies who survived and had ROP screening		Babies who survived and had ROP screening with Grade 3 ROP		Babies who survived and had ROP screening with Grade 4 ROP		Babies who survived and had ROP screening with Grade 3 or 4 ROP	
	No.	No.	%	No.	%	No.	%	No.	%	No.	%
All centres	2901	2040	70	1581	78	58	4	3	0	61	4
2	144	91	63	69	76	4	6	0	0	4	6
3	185	138	75	90	65	2	2	0	0	2	2
4	68	48	71	41	85	5	12	0	0	5	12
5	169	118	70	85	72	1	1	0	0	1	1
6	108	72	67	54	75	1	2	0	0	1	2
7	196	134	68	110	82	3	3	0	0	3	3
8	133	83	62	70	84	0	0	0	0	0	0
9	124	82	66	40	49	6	15	0	0	6	15
10	62	45	73	32	71	3	9	1	3	4	13
11	28	18	64	18	100	0	0	1	6	1	6
12	76	58	76	48	83	1	2	0	0	1	2
13	82	62	76	50	81	3	6	0	0	3	6
14	61	42	69	28	67	0	0	0	0	0	0
15	67	49	73	37	76	1	3	0	0	1	3
16	147	122	83	90	74	4	4	0	0	4	4
17	129	88	68	76	86	5	7	0	0	5	7
18	37	20	54	15	75	0	0	0	0	0	0
19	122	102	84	99	97	0	0	0	0	0	0
20	69	47	68	44	94	0	0	0	0	0	0
21	66	36	55	31	86	0	0	0	0	0	0
22	112	86	77	77	90	2	3	0	0	2	3
23	216	158	73	114	72	8	7	0	0	8	7
24	171	135	79	114	84	5	4	1	1	6	5
25	82	57	70	51	89	1	2	0	0	1	2
26	156	85	54	57	67	3	5	0	0	3	5
27	78	54	69	35	65	0	0	0	0	0	0
28	13	10	77	6	60	0	0	0	0	0	0

Table 54: Retinopathy of prematurity (ROP) (Babies with BW < 1250gm) according to centres, 2005

Centres	Babies with BW < 1250gm	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	1944	1159	60	1026	89	61	6	3	0
2	114	64	56	56	88	4	7	0	0
3	95	54	57	47	87	2	4	0	0
4	45	28	62	25	89	5	20	0	0
5	100	55	55	49	89	0	0	0	0
6	68	35	51	29	83	1	3	0	0
7	137	79	58	74	94	3	4	0	0
8	70	30	43	24	80	0	0	0	0
9	83	45	54	34	76	6	18	0	0
10	33	16	48	16	100	3	19	1	6
11	18	11	61	11	100	0	0	1	9
12	51	36	71	32	89	1	3	0	0
13	55	38	69	30	79	3	10	0	0
14	42	24	57	19	79	0	0	0	0
15	41	26	63	26	100	1	4	0	0
16	97	74	76	69	93	4	6	0	0
17	75	40	53	39	98	5	13	0	0
18	29	15	52	11	73	0	0	0	0
19	70	51	73	51	100	0	0	0	0
20	40	24	60	23	96	0	0	0	0
21	51	26	51	20	77	0	0	0	0
22	83	60	72	55	92	2	4	0	0
23	141	84	60	75	89	8	11	0	0
24	105	72	69	68	94	5	7	1	1
25	51	33	65	33	100	1	3	0	0
26	193	103	53	81	79	7	9	0	0
27	50	31	62	26	84	0	0	0	0
28	7	5	71	3	60	0	0	0	0

Table 55: Cephalhaematoma, Sub-aponeurotic haemorrhage, Erb's palsy and Birth Trauma according to centres, 2005

Centres	Babies in study	Babies with Cephalhaematoma		Babies with Sub-aponeurotic heamorrhage		Babies with Erb's palsy		Babies with Birth trauma	
	No.	No.	%	No.	%	No.	%	No.	%
All centres	9023	47	1	126	1	24	0	276	3
2	509	5	1	11	2	1	0	20	4
3	446	0	0	4	1	0	0	5	1
4	248	1	0	5	2	1	0	13	5
5	481	1	0	4	1	1	0	5	1
6	349	0	0	2	1	1	0	3	1
7	671	2	0	2	0	2	0	14	2
8	463	1	0	20	4	1	0	22	5
9	390	8	2	2	1	3	1	15	4
10	213	0	0	0	0	0	0	3	1
11	114	6	5	4	4	3	3	13	11
12	211	1	0	2	1	0	0	4	2
13	276	1	0	2	1	1	0	7	3
14	157	0	0	3	2	0	0	6	4
15	183	0	0	2	1	3	2	4	2
16	368	3	1	12	3	0	0	20	5
17	433	2	0	5	1	1	0	15	3
18	72	0	0	3	4	0	0	3	4
19	295	2	1	0	0	0	0	9	3
20	218	0	0	5	2	0	0	10	5
21	162	0	0	0	0	1	1	2	1
22	428	2	0	3	1	0	0	5	1
23	665	1	0	6	1	3	0	16	2
24	386	0	0	6	2	0	0	10	3
25	309	2	1	14	5	0	0	17	6
26	784	7	1	9	1	2	0	24	3
27	156	2	1	0	0	0	0	11	7
28	36	0	0	0	0	0	0	0	0

Table 56: Necrotising enterocolitis (NEC) (Babies with BW 501 - 1500gm) according to centres, 2005

Centres	Babies with BW 501-1500gm	Babies with NEC (Medical Rx)		Babies with NEC (Surgical Rx)		Babies with any NEC		Babies with any NEC who died	
		No.	%	No.	%	No.	%	No.	%
All centres	3322	283	9	41	1	324	10	110	34
2	208	20	10	5	2	25	12	6	24
3	178	20	11	5	3	25	14	6	24
4	64	9	14	0	0	9	14	1	11
5	186	18	10	0	0	18	10	5	28
6	140	9	6	0	0	9	6	4	44
7	219	24	11	2	1	26	12	9	35
8	125	8	6	1	1	9	7	4	44
9	141	2	1	3	2	5	4	3	60
10	70	5	7	0	0	5	7	3	60
11	36	8	22	0	0	8	22	2	25
12	81	3	4	3	4	6	7	3	50
13	91	1	1	0	0	1	1	0	0
14	67	7	10	0	0	7	10	2	29
15	72	6	8	2	3	8	11	2	25
16	132	9	7	0	0	9	7	1	11
17	130	24	18	3	2	27	21	9	33
18	39	2	5	2	5	4	10	2	50
19	124	3	2	1	1	4	3	0	0
20	71	8	11	0	0	8	11	4	50
21	68	3	4	1	1	4	6	2	50
22	139	8	6	0	0	8	6	1	13
23	247	9	4	1	0	10	4	6	60
24	186	16	9	3	2	19	10	5	26
25	87	14	16	2	2	16	18	8	50
26	318	41	13	7	2	48	15	20	42
27	88	4	5	0	0	4	5	2	50
28	15	2	13	0	0	2	13	0	0

Table 57: Confirmed bacterial sepsis according to centres, 2005

Centres	Babies in study	No. who died		Babies with confirmed sepsis		Babies with confirmed bacterial sepsis who died	
	No.	No.	%	No.	%	No.	%
All centres	9023	2010	22	909	10	256	28
2	509	125	25	30	6	7	23
3	446	81	18	49	11	8	16
4	248	44	18	20	8	3	15
5	481	130	27	67	14	11	16
6	349	126	36	48	14	17	35
7	671	148	22	101	15	25	25
8	463	112	24	42	9	10	24
9	390	85	22	41	11	17	41
10	213	51	24	28	13	9	32
11	114	19	17	4	4	0	0
12	211	38	18	19	9	10	53
13	276	38	14	10	4	1	10
14	157	35	22	20	13	6	30
15	183	42	23	13	7	3	23
16	368	52	14	44	12	6	14
17	433	79	18	31	7	4	13
18	72	23	32	4	6	1	25
19	295	37	13	24	8	2	8
20	218	42	19	23	11	6	26
21	162	48	30	12	7	5	42
22	428	84	20	34	8	15	44
23	665	113	17	33	5	15	45
24	386	85	22	20	5	1	5
25	309	109	35	113	37	46	41
26	784	219	28	64	8	28	44
27	156	37	24	10	6	0	0
28	36	8	22	5	14	0	0

Table 57a: Babies with confirmed bacterial sepsis according to birthweight group and according to centres, 2005

Centres	Babies with BW 501-1500 gm	Babies with BW 501-1500 gm with confirmed bacterial sepsis		Babies with BW > 1500 gm	Babies with BW > 1500 gm with confirmed bacterial sepsis		Total Babies with BW > 500gm	Babies with BW > 500gm with confirmed bacterial sepsis	
	No.	No.	%	No.	No.	%	No.	No.	%
All centres	3322	457	14	5669	448	8	8991	908	10
2	208	14	7	299	16	5	507	30	6
3	178	26	15	267	28	10	445	49	11
4	64	13	20	183	8	4	247	20	8
5	186	34	18	294	33	11	480	67	14
6	140	23	16	208	25	12	348	48	14
7	219	53	24	449	37	8	668	101	15
8	125	15	12	334	29	9	459	42	9
9	141	13	9	245	20	8	386	41	11
10	70	12	17	143	15	10	213	28	13
11	36	3	8	78	1	1	114	4	4
12	81	9	11	130	7	5	211	19	9
13	91	6	7	185	5	3	276	10	4
14	67	9	13	89	11	12	156	20	13
15	72	10	14	111	5	5	183	13	7
16	132	24	18	232	20	9	364	44	12
17	130	13	10	302	20	7	432	31	7
18	39	4	10	32	1	3	71	4	6
19	124	24	19	170	6	4	294	24	8
20	71	14	20	147	9	6	218	23	11
21	68	6	9	92	7	8	160	12	8
22	139	18	13	289	16	6	428	34	8
23	247	21	9	414	13	3	661	33	5
24	186	12	6	200	8	4	386	20	5
25	87	46	53	221	64	29	308	112	36
26	318	28	9	466	35	8	784	64	8
27	88	6	7	68	5	7	156	10	6
28	15	1	7	21	4	19	36	5	14

Table 57b: Confirmed bacterial sepsis in very low birth weight babies (501 - 1500gm) according to centres, 2005

Centres	Babies with BW 501-1000gm	Babies with BW 501-1000gm with confirmed sepsis		Babies with BW 1001-1500gm	Babies with BW 1001-1500gm with confirmed sepsis	
	No.	No.	%	No.	No.	%
All centres	1098	182	17	2224	279	13
2	65	6	9	143	9	6
3	51	4	8	127	20	16
4	28	5	18	36	8	22
5	59	10	17	127	25	20
6	37	6	16	103	18	17
7	81	27	33	138	35	25
8	40	5	13	85	9	11
9	45	8	18	96	9	9
10	25	8	32	45	5	11
11	14	1	7	22	2	9
12	29	7	24	52	3	6
13	32	3	9	59	3	5
14	21	3	14	46	6	13
15	18	2	11	54	6	11
16	64	16	25	68	7	10
17	42	4	10	88	8	9
18	18	2	11	21	1	5
19	40	6	15	84	12	14
20	20	10	50	51	4	8
21	28	2	7	40	4	10
22	38	6	16	101	12	12
23	84	13	15	163	6	4
24	59	5	8	127	7	6
25	28	11	39	59	37	63
26	100	9	9	218	19	9
27	30	3	10	58	3	5
28	2	0	0	13	1	8

Table 58: Fungal sepsis in very low birth weight babies (501 - 1500gm) according to centres, 2005

Centres	Babies with BW 501-1000gm	Babies with BW 501-1000gm with fungal sepsis		Babies with BW 1001-1500gm	Babies with BW 1001-1500gm with fungal sepsis	
	No.	No.	%	No.	No.	%
All centres	1098	18	2	3322	32	1
2	65	0	0	208	0	0
3	51	2	4	178	3	2
4	28	0	0	64	0	0
5	59	0	0	186	0	0
6	37	1	3	140	2	1
7	81	1	1	219	1	0
8	40	0	0	125	1	1
9	45	2	4	141	3	2
10	25	0	0	70	0	0
11	14	1	7	36	1	3
12	29	0	0	81	1	1
13	32	0	0	91	0	0
14	21	0	0	67	0	0
15	18	1	6	72	2	3
16	64	1	2	132	1	1
17	42	0	0	130	1	1
18	18	2	11	39	2	5
19	40	4	10	124	9	7
20	20	0	0	71	1	1
21	28	0	0	68	0	0
22	38	0	0	139	0	0
23	84	1	1	247	2	1
24	59	1	2	186	1	1
25	28	0	0	87	0	0
26	100	1	1	318	1	0
27	30	0	0	88	0	0
28	2	0	0	15	0	0

Table 59: Perinatal and neonatal death and mortality rate according to centres, 2005

Centres	No. Stillbirths	No. of Live births	Total Births	Inborn deaths < 7 days	Inborn deaths < 28 days	PMR per 1000 TBs	NMR per 1000 LBs
All centres	2063	224815	226878	1142	1468	14.13	6.53
2	114	10007	10121	71	83	18.28	8.29
3	68	9029	9097	50	61	12.97	6.76
4	54	6218	6272	30	41	13.39	6.59
5	119	10089	10208	77	91	19.20	9.02
6	142	12715	12857	73	86	16.72	6.76
7	135	15738	15873	87	111	13.99	7.05
8	104	10913	11017	63	78	15.16	7.15
9	69	9782	9851	51	66	12.18	6.75
10	40	6346	6386	27	37	10.49	5.83
11	26	4025	4051	9	12	8.64	2.98
12	41	5043	5084	18	24	11.61	4.76
13	43	5344	5387	21	28	11.88	5.24
14	35	5500	5535	23	31	10.48	5.64
15	73	6731	6804	25	32	14.40	4.75
16	90	10810	10900	29	40	10.92	3.70
17	58	8975	9033	48	62	11.73	6.91
18	17	3193	3210	12	18	9.03	5.64
19	35	5071	5106	22	26	11.16	5.13
20	66	6240	6306	24	33	14.27	5.29
21	46	4950	4996	28	38	14.81	7.68
22	85	8785	8870	46	60	14.77	6.83
23	136	14637	14773	58	77	13.13	5.26
24	90	11120	11210	50	64	12.49	5.76
25	86	6832	6918	40	65	18.21	9.51
26	221	19873	20094	136	174	17.77	8.76
27	45	5027	5072	19	24	12.62	4.77
28	25	1822	1847	5	6	16.24	3.29

Table 60: Survival of extremely preterm (22 - 27 weeks' gestation) and very preterm (28 - 31 weeks' gestation) according to centres, 2005

Centres	Extremely preterm babies (gestation 22-27 weeks)	Extremely preterm who survived		Very preterm babies (gestation 28-31 weeks)	Very preterm who survived		Extremely and Very preterm babies	Extremely and Very preterm who survived	
	No.	No.	%	No.	No.	%	No.	No.	%
All centres	780	292	37	2116	1748	83	2896	2040	70
2	35	7	20	109	84	77	144	91	63
3	41	14	34	144	124	86	185	138	75
4	28	13	46	40	35	88	68	48	71
5	40	12	30	127	106	83	167	118	71
6	23	7	30	85	65	76	108	72	67
7	60	22	37	136	112	82	196	134	68
8	35	6	17	98	77	79	133	83	62
9	37	12	32	87	70	80	124	82	66
10	16	7	44	46	38	83	62	45	73
11	6	0	0	22	18	82	28	18	64
12	19	10	53	57	48	84	76	58	76
13	26	13	50	56	49	88	82	62	76
14	15	4	27	45	38	84	60	42	70
15	17	10	59	49	39	80	66	49	74
16	52	32	62	95	90	95	147	122	83
17	31	10	32	98	78	80	129	88	68
18	18	8	44	19	12	63	37	20	54
19	32	15	47	90	87	97	122	102	84
20	19	9	47	49	38	78	68	47	69
21	26	8	31	40	28	70	66	36	55
22	27	16	59	85	70	82	112	86	77
23	56	21	38	160	137	86	216	158	73
24	43	20	47	128	115	90	171	135	79
25	17	5	29	65	52	80	82	57	70
26	35	1	3	121	84	69	156	85	54
27	23	10	43	55	44	80	78	54	69
28	3	0	0	10	10	100	13	10	77

Table 61: Survival of extremely low birth weight (BW 501- 1000gm) and very low birthweight (BW 1001 - 1500gm) according to centres, 2005

Centres	ELBW babies (BW501 - 1000gm)	ELBW who survived		VLBW babies (BW1001 - 1500gm)	VLBW who survived		ELBW + VLBW	ELBW + VLBW who survived	
	No.	No.	%	No.	No.	%	No.	No.	%
All centres	1098	509	46	2224	1904	86	3322	2413	73
2	65	26	40	143	123	86	208	149	72
3	51	18	35	127	110	87	178	128	72
4	28	13	46	36	33	92	64	46	72
5	59	22	37	127	107	84	186	129	69
6	37	16	43	103	84	82	140	100	71
7	81	36	44	138	120	87	219	156	71
8	40	10	25	85	66	78	125	76	61
9	45	20	44	96	82	85	141	102	72
10	25	10	40	45	40	89	70	50	71
11	14	7	50	22	21	95	36	28	78
12	29	17	59	52	47	90	81	64	79
13	32	19	59	59	52	88	91	71	78
14	21	8	38	46	39	85	67	47	70
15	18	6	33	54	48	89	72	54	75
16	64	46	72	68	66	97	132	112	85
17	42	17	40	88	69	78	130	86	66
18	18	8	44	21	18	86	39	26	67
19	40	24	60	84	78	93	124	102	82
20	20	11	55	51	35	69	71	46	65
21	28	11	39	40	29	73	68	40	59
22	38	25	66	101	82	81	139	107	77
23	84	45	54	163	146	90	247	191	77
24	59	33	56	127	114	90	186	147	79
25	28	15	54	59	47	80	87	62	71
26	100	34	34	218	182	83	318	216	68
27	30	12	40	58	54	93	88	66	75
28	2	0	0	13	12	92	15	12	80

Table 62: Survival of cases with ventilatory support (VS) according to centres, 2005

Centres	Babies in study	No. who survived		Babies with ventilatory support		Babies with VS who survived	
	No.	No.	%	No.	%	No.	%
All centres	9023	7013	78	7772	86	6256	80
2	509	384	75	413	81	317	77
3	446	365	82	359	80	310	86
4	248	204	82	232	94	199	86
5	481	351	73	365	76	309	85
6	349	223	64	270	77	182	67
7	671	523	78	611	91	501	82
8	463	351	76	417	90	331	79
9	390	305	78	319	82	255	80
10	213	162	76	194	91	146	75
11	114	95	83	105	92	90	86
12	211	173	82	195	92	161	83
13	276	238	86	258	93	228	88
14	157	122	78	133	85	109	82
15	183	141	77	135	74	102	76
16	368	316	86	327	89	284	87
17	433	354	82	396	91	326	82
18	72	49	68	48	67	35	73
19	295	258	87	255	86	231	91
20	218	176	81	204	94	172	84
21	162	114	70	144	89	109	76
22	428	344	80	393	92	327	83
23	665	552	83	593	89	499	84
24	386	301	78	296	77	232	78
25	309	200	65	290	94	195	67
26	784	565	72	691	88	510	74
27	156	119	76	106	68	79	75
28	36	28	78	23	64	17	74

Table 63: Duration of hospital stay for babies of BW 501 - 750 gm according to centres, 2005

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	360	71	20	95	33	289	80	5	15
2	21	5	24	90	36	16	76	14	41
3	24	2	8	80	4	22	92	2	4
4	15	3	20	112	37	12	80	7	17
5	21	2	10	99	31	19	90	2	4
6	10	1	10	113	0	9	90	1	2
7	27	4	15	89	17	23	85	10	19
8	13	1	8	89	0	12	92	1	1
9	13	1	8	101	0	12	92	0	1
10	4	0	0	0	0	4	100	12	9
11	6	1	17	122	0	5	83	12	27
12	5	2	40	87	26	3	60	21	29
13	10	2	20	82	16	8	80	1	1
14	7	0	0	0	0	7	100	2	4
15	6	2	33	113	30	4	67	4	6
16	20	10	50	69	26	10	50	8	15
17	14	2	14	108	2	12	86	7	13
18	4	0	0	0	0	4	100	3	5
19	10	3	30	129	65	7	70	4	10
20	7	3	43	94	33	4	57	5	8
21	11	2	18	107	6	9	82	3	8
22	14	5	36	114	59	9	64	10	20
23	24	5	21	95	26	19	79	10	20
24	24	10	42	93	34	14	58	4	6
25	8	1	13	151	0	7	88	7	15
26	34	3	9	86	20	31	91	3	5
27	8	1	13	74	0	7	88	0	0
28	0	0	0	0	0	0	0	0	0

Table 63a: Duration of hospital stay for babies of BW 751 - 1000 gm according to centres, 2005

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	738	438	59	71	33	300	41	10	20
2	44	21	48	73	31	23	52	7	16
3	27	16	59	50	26	11	41	10	13
4	13	10	77	64	33	3	23	7	6
5	38	20	53	69	23	18	47	3	7
6	27	15	56	74	29	12	44	11	26
7	54	32	59	80	32	22	41	10	11
8	27	9	33	67	27	18	67	10	16
9	32	19	59	76	30	13	41	15	19
10	21	10	48	72	20	11	52	4	6
11	8	6	75	95	68	2	25	20	26
12	24	15	63	71	22	9	38	14	35
13	22	17	77	66	18	5	23	2	1
14	14	8	57	56	9	6	43	8	8
15	12	4	33	70	27	8	67	4	3
16	44	36	82	66	44	8	18	8	8
17	28	15	54	73	27	13	46	6	9
18	14	8	57	57	23	6	43	11	13
19	30	21	70	117	71	9	30	23	26
20	13	8	62	64	12	5	38	5	4
21	17	9	53	61	15	8	47	4	5
22	24	20	83	82	24	4	17	12	13
23	60	40	67	66	21	20	33	13	25
24	35	23	66	70	31	12	34	14	19
25	20	14	70	71	22	6	30	17	17
26	66	31	47	59	16	35	53	18	36
27	22	11	50	64	16	11	50	4	9
28	2	0	0	0	0	2	100	2	1

Table 63b: Duration of hospital stay for babies of BW 1001 - 1250 gm according to centres, 2005

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	885	708	80	51	25	177	20	15	34
2	55	46	84	48	14	9	16	3	5
3	45	38	84	48	29	7	16	12	19
4	20	19	95	47	20	1	5	27	0
5	46	38	83	59	39	8	17	6	5
6	37	24	65	53	27	13	35	42	88
7	55	44	80	62	24	11	20	4	4
8	29	22	76	48	13	7	24	6	5
9	38	27	71	53	21	11	29	14	17
10	9	7	78	48	13	2	22	2	1
11	4	4	100	49	8	0	0	0	0
12	25	21	84	52	17	4	16	67	105
13	24	20	83	41	13	4	17	3	3
14	20	16	80	45	18	4	20	8	5
15	25	22	88	63	46	3	12	18	30
16	30	28	93	48	28	2	7	1	1
17	33	24	73	48	12	9	27	22	27
18	10	7	70	57	17	3	30	3	4
19	33	30	91	76	50	3	9	1	1
20	21	14	67	41	11	7	33	11	17
21	21	15	71	46	20	6	29	25	24
22	45	35	78	54	20	10	22	12	20
23	65	51	78	50	20	14	22	18	24
24	47	40	85	44	16	7	15	5	6
25	25	20	80	57	14	5	20	37	50
26	95	70	74	42	17	25	26	8	20
27	21	20	95	48	14	1	5	60	0
28	7	6	86	43	11	1	14	0	0

Table 63c: Duration of hospital stay for babies of BW 1251 - 1500 gm according to centres, 2005

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	1338	1195	89	34	22	143	11	12	33
2	88	77	88	38	33	11	13	5	6
3	82	72	88	30	20	10	12	7	12
4	16	14	88	36	12	2	13	6	8
5	81	69	85	39	15	12	15	8	20
6	66	60	91	34	14	6	9	4	7
7	83	76	92	40	16	7	8	22	39
8	56	44	79	38	15	12	21	11	24
9	57	54	95	38	33	3	5	19	31
10	36	33	92	27	64	3	8	3	3
11	18	17	94	32	9	1	6	32	0
12	27	26	96	38	21	1	4	0	0
13	35	32	91	25	10	3	9	4	5
14	26	23	88	33	8	3	12	13	13
15	29	26	90	31	14	3	10	1	2
16	38	38	100	34	24	0	0	0	0
17	55	45	82	33	10	10	18	18	27
18	11	11	100	27	8	0	0	0	0
19	51	48	94	53	25	3	6	6	8
20	30	21	70	29	10	9	30	6	4
21	19	14	74	29	8	5	26	23	11
22	56	47	84	38	11	9	16	40	111
23	98	95	97	34	14	3	3	1	1
24	80	74	93	32	18	6	8	9	17
25	34	27	79	39	9	7	21	21	28
26	123	112	91	24	17	11	9	6	7
27	37	34	92	30	9	3	8	21	20
28	6	6	100	43	19	0	0	0	0

Table 63d: Duration of hospital stay for babies of BW 1501 - 2500 gm according to centres, 2005

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	2899	2381	82	19	19	518	18	10	23
2	150	121	81	21	34	29	19	12	37
3	174	154	89	16	13	20	11	12	27
4	89	78	88	15	16	11	12	5	9
5	152	117	77	17	11	35	23	8	14
6	104	61	59	21	28	43	41	7	12
7	220	175	80	21	17	45	20	8	15
8	158	132	84	19	13	26	16	8	27
9	136	118	87	19	15	18	13	25	61
10	79	63	80	23	50	16	20	7	12
11	39	34	87	19	15	5	13	11	15
12	67	59	88	19	18	8	12	17	24
13	92	82	89	16	13	10	11	18	38
14	44	35	80	17	12	9	20	8	21
15	60	51	85	22	14	9	15	4	5
16	127	111	87	18	14	16	13	17	24
17	141	124	88	16	13	17	12	11	21
18	21	15	71	22	10	6	29	1	1
19	111	104	94	32	23	7	6	3	4
20	82	76	93	17	12	6	7	4	4
21	52	42	81	17	11	10	19	16	21
22	124	108	87	21	13	16	13	5	8
23	198	175	88	15	11	23	12	7	11
24	111	85	77	14	9	26	23	4	5
25	101	68	67	26	31	33	33	11	18
26	220	158	72	13	11	62	28	13	25
27	38	28	74	20	9	10	26	6	7
28	9	7	78	31	21	2	22	1	1

Table 63e: Duration of hospital stay for babies of BW > 2500 gm according to centres, 2005

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	2770	2217	80	13	20	553	20	10	26
2	149	114	77	13	15	35	23	12	21
3	93	83	89	11	10	10	11	7	12
4	94	80	85	9	8	14	15	7	8
5	142	105	74	20	22	37	26	9	18
6	104	62	60	17	18	42	40	14	30
7	229	192	84	13	14	37	16	10	21
8	176	142	81	13	12	34	19	7	14
9	109	84	77	13	12	25	23	5	12
10	64	49	77	11	11	15	23	7	7
11	39	33	85	13	12	6	15	22	31
12	63	50	79	12	16	13	21	13	24
13	93	85	91	9	8	8	9	10	9
14	45	40	89	8	4	5	11	32	63
15	51	36	71	6	62	15	29	5	7
16	105	93	89	11	12	12	11	26	71
17	161	144	89	15	36	17	11	7	9
18	11	8	73	11	5	3	27	12	13
19	59	52	88	24	44	7	12	40	93
20	65	54	83	12	17	11	17	4	5
21	40	32	80	12	9	8	20	1	1
22	165	129	78	16	24	36	22	17	49
23	216	186	86	9	9	30	14	5	8
24	89	69	78	13	12	20	22	3	3
25	120	70	58	15	15	50	42	13	23
26	246	191	78	10	17	55	22	7	10
27	30	25	83	19	17	5	17	12	5
28	12	9	75	28	23	3	25	5	7

Appendix 1

MONTHLY BIRTH CENSUS

Hospital :……

Month :…….. Year :…….

Total Births :……. Live Births:…… 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 Live Births	No. Admitted to Neonatal Unit	**No who died in delivery room
SVD				
Breech				
Forceps				
Ventouse				
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.*

NATIONAL NEONATAL REGISTRY

Centre Name: _____

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

☐ Inborn ☐ Outborn

☐ 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 Malaysian
☐ Chinese ☐ Orang Asli ☐ Bumiputra Sarawak, specify: _____ ☐ Non-citizen

7. Maternal Age: _____ **8. GPA :** G _____ P _____ A _____

9. Insulin dependent diabetes in mother: ☐ Yes ☐ No ☐ NA

SECTION 2 : BIRTH HISTORY

Drugs Used In Labour

10. Antenatal Steroid: ☐ Yes ☐ No

11. Intrapartum Antibiotic: ☐ Yes ☐ No

12. Birth Weight (grams): _____ **13. Gestation (weeks):** _____

14. Growth Status: ☐ SGA ☐ AGA ☐ LGA

15. Gender: ☐ Male ☐ Female ☐ Indeterminate

16. Place of Birth:
☐ University Hospital ☐ District Hospital with Specialist ☐ Home
☐ General Hospital ☐ District Hospital without Specialist ☐ Others, specify: _____
☐ Private Hospital ☐ Private Maternity Home _____

17. Multiplicity: ☐ Singleton ☐ Twin ☐ Triplet ☐ Others, specify: _____

18. Mode of Delivery: ☐ SVD ☐ Breech ☐ Forceps ☐ Ventouse ☐ Caesarean Section ☐ Unknown

19. CRIB Score for birth weight < 1,500 g: ☐ Score : _____ ☐ NA ☐ Moribund

SECTION 3 : NEONATAL EVENT

20. Ventilatory Support: (Check all that apply) ☐ Yes → ☐ CPAP ☐ IMV ☐ HFOV ☐ Others, specify: _____
☐ HFPPV ☐ IMV + PTV ☐ Nitric Oxide _____
☐ No

21. Total Duration of Ventilatory Support: _____ (in days)

22. Antibiotics: (Check all that apply) ☐ Yes → ☐ Penicillin ☐ 3rd Cephalosporin ☐ Carbapenem
☐ Aminoglycoside ☐ 4th Cephalosporin ☐ Others, specify: _____
☐ 2nd Cephalosporin ☐ Vancomycin _____
☐ No

23. Surfactant: ☐ Yes ☐ No If yes, given ☐ ≤ 2 hrs ☐ > 2 hrs

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

SECTION 4 : OUTCOME

29. Date of Discharge (dd/mm/yy) : ☐☐/☐☐/☐☐ **30. Weight (grams) on Discharge or Death:** _____

31. Total Duration of hospital stay (Neonatal / Paeds Care): _____ (in days)

32. Outcome: ☐ Alive ☐ Dead

33. If Child Alive:

Place of Discharge: ☐ Home ☐ Other Non Paeds Ward ☐ Social welfare home ☐ Still hospitalized as of 1st birthday
☐ Transferred to Other Hospitals

Reasons: ☐ Lack of NICU bed ☐ Stepdown care ☐ Chronic care
☐ Surgery / Diagnostic Services ☐ Social / Logistic reason
☐ Other Reasons (Specify): _____

34.Post Transfer Disposition (please fill this item if place transferred to is not NNR Network):

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

b Duration of stay in the hospital transferred to: _____ (in completed days)

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SECTION 5 : PROBLEMS / DIAGNOSES

Mandatory fields for diagnoses / procedures:

RDS
- ☐ Yes
- ☐ No

PDA
- ☐ No PDA
- ☐ Indomethacin/Ibuprofen > 24hrs
- ☐ Ligation
- ☐ Not treated
- ☐ NA / Unknown

Pneumothorax
- ☐ Yes
- ☐ No

NEC (Stage 2 and above)
- ☐ None
- ☐ Medical Rx
- ☐ Surgical Rx
- ☐ NA / Unknown

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

Highest total bilirubin

_____ umol/l

☐ NA

Supplemental oxygen at:

Day 28:
☐ Yes ☐ No

36 weeks corrected age:
☐ Yes ☐ No

Seizures
- ☐ None
- ☐ Suspected
- ☐ Definite
- ☐ NA / Unknown

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

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

_____

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

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

Congenital Anomalies
- ☐ None
- ☐ Down syndrome
- ☐ Edward syndrome
- ☐ Patau syndrome
- ☐ Other syndrome

_____

- ☐ IEM, State

type _____

☐ **Multiple Congenital Abnormalities**

Specify abnormalities :

_____

_____

_____

_____

_____

Isolated Congenital Anomalies : (single anormaly)

CVS
- ☐ Cyanotic
- ☐ Acyanotic

CNS
- ☐ Hydrocephalus
- ☐ Others,check ICD 10

_____

Neural Tube Defect
- ☐ Spina bifida
- ☐ Anencephaly
- ☐ Others, check ICD 10

- ☐ Skeletal dysplasia, specify

_____

- ☐ Respiratory specify

_____

- ☐ GIT, specify :

_____

- ☐ Hydrops, specify :

_____

- ☐ Renal, specify :

_____

Cleft :
- ☐ Lip
- ☐ Palate
- ☐ Lip and Palate

☐ Others, please specify :

_____

Other Diagnoses :

Respiratory
- ☐ Meconium aspiration syndrome
- ☐ Transient tachypnoea newborn
- ☐ Pulmonary haemorrhage
- ☐ Pulmonary interstitial
- ☐ Pneumonia

Central Nervous System
- ☐ Neonatal encephalopathy
- ☐ Neonatal meningitis

Birth Trauma :
- ☐ Bruises, superficial
- ☐ Cephalhaematoma
- ☐ Subaponeurotic haemorrhage
- ☐ Erb's paralysis

Renal :
- ☐ Renal failure, unspecified (due to any cause)

Haematology
- ☐ DIVC
- ☐ Polycythaemia neonatorum
- ☐ Anaemia of Prematurity

Cardiovascular
- ☐ Persistent Foetal Circulation

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

_____

Others :

Please refer to ICD 10

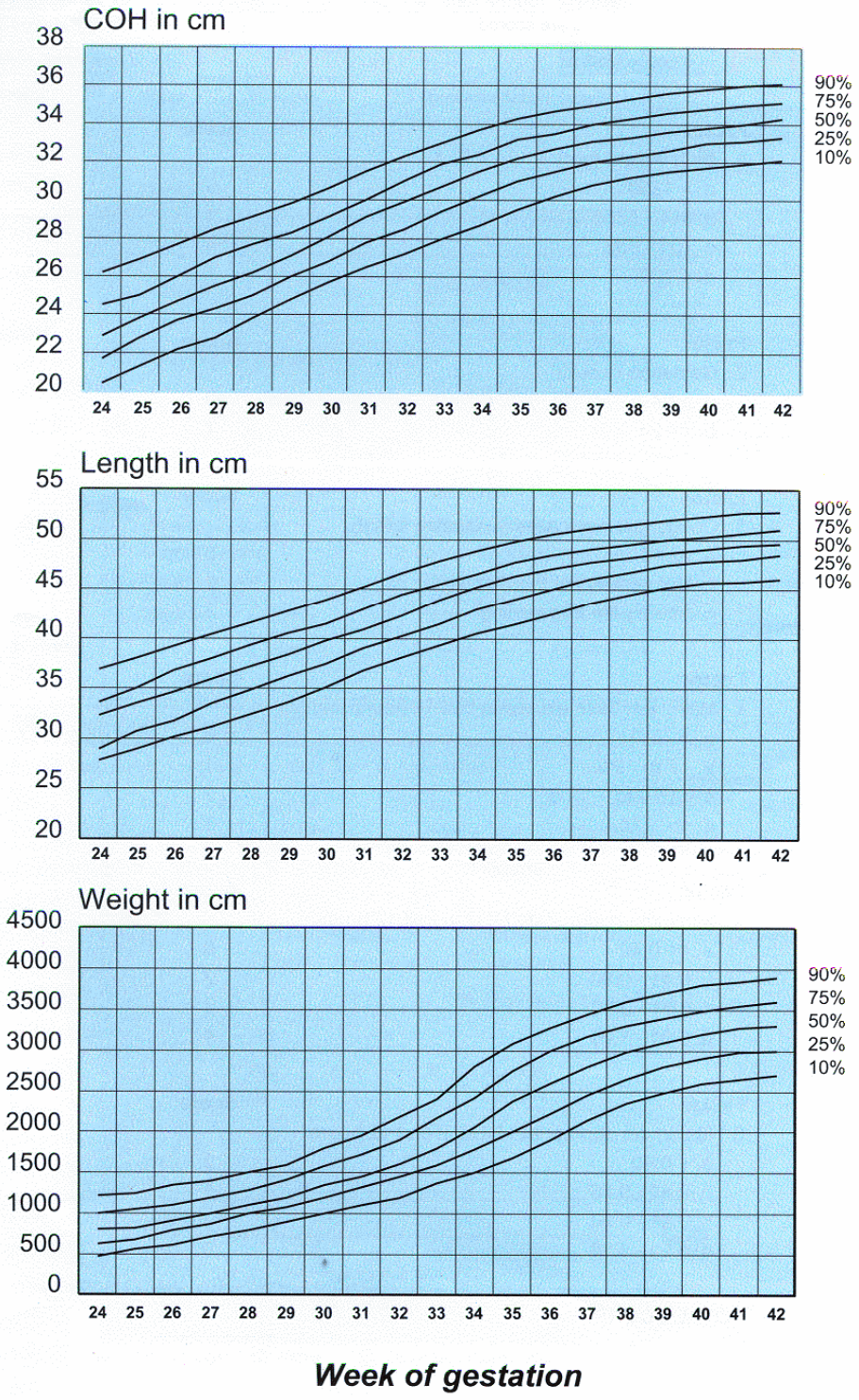
_____

Name : _____

Signature : _____ Date (dd/mm/yy) : | | | |

Intrauterine growth charts (both sexes) APPENDIX 1

Lubchenco et al Pediatrics 1966 37: 403



CRIB Score (APPENDIX 2)

CRIB Score

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 date 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

Factor	Score
2. Gestation (week)	
a. > 24	0
b. <= 24	1

Factor	Score
3. Congenital anomalies (excluding lethal)	
a. None	0
b. Not acutely life threatening	1
c. Acutely life threatening	3

Factor	Score
4. Maximum base excess in first 12 hours (mmol/l)	
a. > - 7.0	0
b. - 7 to - 9.9	1
c. - 10.0 to - 14.9	2
d. <= - 15.0	3

Factor	Score
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

Factor	Score
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:	_____

TRAINING MANUAL 1ST JANUARY 2005

INTRODUCTION

This registry aims to standardise and formalize neonatal data collection to provide information that will help to identify the strengths and weaknesses of respective neonatal units in the country and to enable steps to be taken to improve on areas of deficiency.

OBJECTIVES OF THE NEONATAL REGISTRY

8. Determine the frequency and distribution of critically ill neonates in Malaysia. These are useful measures of the health burden arising of neonatal critical illness and its care in the country.
9. To study the mortality and some morbidity outcomes of babies admitted to NICU in participating hospitals.
10. To calculate the perinatal, neonatal, and stillbirth mortality rates of inborn babies.
11. To compare outcomes between various centres.
12. To develop indicators for standard of care in various areas eg. Expected survival rate of infants ventilated for RDS.
13. To study in further detail outcome of very low birth weight babies.
14. Stimulate and facilitate research on neonatal critical illness and its management.

METHODOLOGY

Inclusion criteria

A. <u>All babies admitted to a Neonatal Unit who have any of the following criteria</u>
   1. Have a gestation of <32 weeks ie up to 31 weeks + 6 days.
   2. Have a birth weight of 1500 gms or below
   3. Are ventilated.

B. <u>All neonatal deaths</u> (ie newborn babies (<28days) who die in the Neonatal Unit (NNU), delivery room [(includes OT, labour room) and other wards]

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

Data Collection Technique

The Case Report Forms (CRF) consists of 4 pages of forms. The first page has 4 sections. Section 1 consists of Patient Particulars, Section 2 consists of Birth History, Section 3 consists of Neonatal Events and Section 4 consists of Outcome.

The second page, which has Section 5, has a list of problems/ diagnoses and procedures that require mandatory response as to their presence or absence. The third page has the Intrauterine growth charts (both sexes) and the last page is the scoring sheet for CRIB score. Babies discharged /transferred out to non-paediatric wards in the same hospital or to other hospitals will have one set of CRFs completed until discharge. Readmission of the same babies into the NNU will require a new set of CRFs.

A baby who is transferred between neonatal and paediatric wards under the same department will be considered to be the same admission and the discharge CRF is to be completed after complete discharge from the hospital.

A first time admission to the NNU concerned will be considered as a new case (even if it has been previously admitted else where) while a subsequent admission to the same NNU will be considered as a readmission. This will be accordingly indicated on the 1st sheet of the CRF. Section 2 (Birth History) will not be required again for a readmission while for Section 3 (Neonatal Event) only events occurring during the said admission need to be recorded.
For Section 4 (Outcome) only information pertaining to the respective admission and for Section 5 only Diagnoses and Problems that are encountered or still being encountered during this said admission need to be entered in the data sheet.

Hard copy CRFs will be prepared. Completed CRFs should be sent to the NRU after a defined period. (See enclosed on monthly census and tracking of CRF forms).

When computer facilities are available at the participating site, data can be entered directly into the database software.

Confidentiality

Patient Data
All data are confidential. The data collection center requires the Hospital RN of the patient to facilitate communication between the data center and the participating Paediatricians should any data clarification be required.

Hospital Identification
A code will be given to each participating site. This code will only be known by the individual site and the data center. Hospital identification by code will not be disclosed in any report or publication. The code will be randomly assigned and all individual hospital data will be anonymous. Comparisons of hospital will only use codes and not the hospital names.

Secretariat

National Neonatal Registry
C/o Department of Paediatric
Selayang Hospital
Lebuhraya Selayang – Kepong
68100 Batu Caves
Selangor Darul Ehsan

Contact Person:

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   Ext: 4173 / 5050
2. Sr. Jennifer Loong
   Tel:- 03-6135 2008
   Fax:- 03-6135 2008

Case Report Form

(Please Refer Appendix 2)

DATA DEFINITION AND DATA STANDARDS

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 (unless in the ambulance – born before arrival)

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

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

SECTION 1 : Patient Particulars

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

SECTION 2 : Birth History

10. ***Antenatal Steroid****:* 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, not topical antibiotics.

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

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 dates to be selected if done earlier than 25 weeks if there is a discrepancy with LMP dates. Otherwise use LMP dates 2) New expanded Ballard scoring. If there is no definite estimate but baby is referred to as term baby, enter 40

14. ***Growth status:*** based on Lubchenco charts. (Appendix 1) SGA<10^{th} centile; AGA 10-90^{th} centile; LGA >90the 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 pertain to availability of specialist post even if this post is not filled.

17. ***Multiplicity:*** To indicate as singleton, twin, triplet or others ie quadruplets, etc.

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

19. ***CRIB Score*****:** Apply scoring sheet (Appendix 2) for all babies at less than 31 weeks' gestation or 1500 gm BW or lower, add up the scores (obtained within 12 hours of birth) and state the total score. Indicate 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 Event

20. ***Ventilatory support*:** 'Yes' or 'No'. If 'Yes' to 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 labeled as 'prongs' does not count as CPAP, but should be counted as 'Supplemental oxygen'. Do not assume 'prongs' means nasal cannula: score as CPAP if there is pressure recorded, otherwise score as supplemental oxygen
    2. **IMV** – Intermittent Mandatory Ventilation given via a mechanical ventilator. Exclude manual handbagging during resuscitation at birth.
    3. **IMV+PTV** – Patient – triggered ventilation is inclusive of synchronized mandatory ventilation (SIMV) and other Assist-Control modes
    4. **HFPPV** – High frequency positive pressure ventilation of rate >120/min
    5. **HFOV** – High frequency oscillatory ventilation as delivered by an oscillator.
    6. **Nitric Oxide** – Gas used as a pulmonary vasodilator and administered via a ventilator
    7. **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 Steroid for CLD*:** Indicate given or not for chronic lung disease (CLD). Steroids given for other purposes e.g. hypotension and laryngeal oedema will not be 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 / breastmilk feeds', 'Exclusive formula feeds' or 'Mixed feeds'

27. ***ROP screening:*** Indicate whether procedure 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) of Discharge or Death:*** Weight on Death is the last weight taken when the baby is alive. Enter the exact weight in grams.

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

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

33. ***If Child Alive, state Place of discharge to*:** Home, Other Non-Paed Ward, Social Welfare home or 'Still hospitalised as of 1st birthday'. If transferred to other hospitals, tick the most important reason

34. ***Post transfer disposition*.** If a case is transferred to another hospital in the NNR network, complete the CRF up to current status and send form with the baby. The referral centre would complete a new CRF and this will be analysed together with the CRF of the referring hospital. If the case is transferred to another hospital out of the NNR network the referring unit must get the 'outcome' and 'duration of stay' information from the unit that the case was referred to.

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

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 arterious (PDA). State if absent (No) or how treated. More than 1 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 1 response. If no NEC or only stage 1 tick '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 :** Suspect (History of perinatal stress, systemic signs of ill health ie temperature instability, lethargy, apnoea, GIT manifestations ie poor feeding, increased volume of gastric aspirate, vomiting, mild abdominal distension, fecal occult blood with no anal fissure) **Stage 2 :** Confirmed (Any of 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 of features of stages 1 or 2 plus: deterioration in vital signs, evidence of shock or severe sepsis, or marked gastrointestinal hemorrhage, or abdominal radiograph shows any of features of stage 2 plus pneumoperitoneum)
Hypoxic ischaemic encephalopathy (HIE)	**Applies only to infants >2000 g with** 1) History of perinatal event consistent with injury (fetal 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 ie during feeds. 'Blow-by' oxygen dose not count unless it is the mode of oxygen administration used in a transport situation. Do not score oxygen given as part of a hyperoxia test.
Seizures	Confirmed as witnessed by 2 or more clinicians or diagnosed by EEG. Used synonymously with fits or convulsions
Infections An individual case may have > 1 episode of infection ie a confirmed bacterial sepsis (for which organism should be stated) and an episode of clinical sepsis. Tick both in this situation. If 2 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 prelabour 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. Include congenital pneumonia if blood culture was positive. State organism as indicated or specify others
Intraventricular heamorrhage (IVH) State if 'None' or Grade 1 to 4. If ultrasound is not done state 'Not applicable /Not checked'. If present state if VP shunt/reservoir was inserted	Definition of the grades: **Grade 1 :** Isolated germinal matrix haemorrhage **Grade 2 :** Intraventricular haemorrhage with normal ventricular size **Grade 3 :** Intraventricular haemorrhage with acute 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	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 fulfil 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 findings)
Disseminated intravascular coagulation (DIVC)	Clinical bleeding and confirmed by prolonged PT, APTT and low platelets
Polycythaemia neonatorum	Venous or arterial haematocrit above 65%
Anaemia of prematurity	Defined as Hb <8 gm% in a growing premie
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 eg Rubella, CMV, herpes, and varicella or state unspecified

Tracking And Monthly Returns Of Case Report Forms

Track 1

Tracking CRFs (Admissions in month of October 2004)

Name	***Hospital RN***	***Date of Birth***	***Date of admission***	***Criteria of inclusion***	***Date discharged***	***CRF status***	***Comment***
THY		1st October	1st October	VS	20th October	√	
NFR		2nd October	2nd October	LRD	2nd October	√	
YHT		6th October	6th October	ELBW		Still in ward as of 31st October	
THD		15th October	15th October	VS	26th October	√	
ERT		20th October	20th October	VLBW	28th October	Transferred HKL (CRF sent with case)	
TEN		25th October	26th October	VS		Still in ward	
YTE		26th October	26th October	Died	28th October	√	
REW		29th October	29th October	VP		Still in ward as of 31st October	

Abrreviations:
√ : CRF completed and attached
Died: Died in NNU
ELBW: Extremely Low Birth Weight
LRD: Labour Room Death
VLBW: Very Low Birth Weight
VP: Very premature (<32 weeks)
VS: Ventilatory support

- **Please try to be as current as possible in registering cases in the study. Look at admissions in your neonatal ward and delivery suite and fill up this tracking form immediately every working day. Do remember to include cases that have been admitted on your off days, public holidays and weekends too.**

- The 'Tracking CRFs' list of admissions in a month should be sent to NRU within the following 1month after the month admitted e.g. list of admissions from 1st to 31st

October 2004 should be sent to NRU by the 30th November 2004 with the status of the CRF stated.

- The completed CRFs of patients on this list who are discharged between 1st October to 31st October should be submitted with this form to NRU

- Also patients admitted in the previous months and discharged between 1st to 31st October should also have their CRFs completed and sent together to the NRU by the 30th November.

An accompanying record (as below) of these cases should be filled and sent together.

Track 2

CRFs From Previous Months

Name	***Hospital RN***	***Date admission***	***Criteria***	***Date discharged***
GTH	12345	3rd May	VLBW	15th October
SMH	34562	7th July	VLBW	17th October
YIM	56432	2nd September	ELBW	20th October

Nurse coordinators or abstractors should refer to their 'Tracking CRFs' admission list of the earlier months and write under the Comment column 'CRF sent in November' for the respective case. *If there are no tracking forms of earlier admissions prior to 1st October 2004 just fill up this Track 2 form as the cases are discharged.*

Track 3

Preliminary Close-out report (in addition to Track 1 and Track 2 Forms for the month January 2005). CRF for case as of 28th January 2005 to be filled and sent by 28th February 2005 for purpose of calculating perinatal and neonatal mortality rates

Please look back at your earlier tracking admission forms for the previous months and select all those where status of CRFs is still not completed and sent as of 28th January 2005

Name	***Hospital RN***	***Date of admission***	***Status of case***	***Comments***
BGR	76854	1st July 2004	Still in ward > 1 month	CRF incomplete (flagged by sending a hotostat copy)
GHU	98765	3rd January 2004	> 1 year	CRF completed and attached

** As the flagged cases get discharged even after the close-out date , complete the original CRF and send the CRFs at the end of the following month as in other cases..

Track 4

(Form to be submitted in addition to Track 1 and 2 Forms for the month of April 2005 by 31st May 2005)

Final close-out as of 30th April 2005 for purpose of Report Writing

Name	***Hospital RN***	***Date of admission***	***Status of case***	***Comments***
MHT	65743	5th August 2004	Still in ward	CRF incomplete (flagged by sending a hotostat copy)
YJU	67543	23rd March 2003	> 1 year	CRF completed and attached

** As the flagged cases get discharged even after the close-out date, complete the original CRF and send the CRFs at the end of the following month as in other cases..

By the end of each month the following should be submitted
1. Birth census record of previous month
2. Track 1 form of previous month's admissions
3. Track 2 form of previous month's additional discharges
4. Completed CRFs of previous month's discharges

In addition to 1,2,3,4 for the month of February, following must be submitted
5. Track 3 form on close-out record
6. Completed and flagged CRFs as of 28th January

In addition to 1,2,3,4 for the month of May, the following must be submitted,
7. Track 4 form on close-out record
8. Completed or flagged CRFs as of 30th April

Please duplicate and keep in your centre a set of all these forms and CRFs before sending them to NRU.

Centre Name: ……

Track 1

Admissions in Month / Year ……..

Tracking CRFs

Name	***Hospital RN***	***DOB***	***DOA***	***Criteria of inclusion***	***DOD***	***CRF attached***	***Comment***

Track 2

Centre Name:……

Additional Discharges for
Month / Year: ……

CRFs of admissions from previous months

Name	***Hospital RN***	***DOA***	***Criteria***	***DOD***

Track 3

Centre Name: ……..

Cases as of 28th January 2005
Form to be submitted by 28th February 2005

Preliminary Close-out report

(Form to be submitted in addition to Track 1 and Track 2 Forms for the month of January 2005. Completed or flagged CRFs should be submitted together).

Name	***Hospital RN***	***Date of admission***	***Status of case***	***Comments***

** As the flagged cases get discharged even after the close-out date, complete the original CRF and send the CRFs at the end of the following month as in other cases..

Track 4

Centre name: ……..

Cases as of 30th April 2005
Form to be submitted by 31st May 2005

Final close-out as of 30th April 2005 for purpose of Report Writing

(Form to be submitted in addition to Track 1 and 2 Forms for the month of April 2005 Completed or Flagged CRFs should also be submitted together)

Name	***Hospital RN***	***Date of admission***	***Status of case***	***Comments***

** As the flagged cases get discharged even after the close-out date, complete the original CRF and send the CRFs at the end of the following month as in other cases.

Papers written and presented.

1. Overview of outcome of critically ill babies in NICUS, 2004 and 2005. NL Lim, TL Soo and MNNR. Paper presented at 5th MNNR Forum in December 2006.
2. Outcome of critically ill term babies, 2004 and 2005. A Padma andM NNR. Paper presented at 5th MNNR Forum in December 2006.
3. Mortality and morbidity outcomes according to socio-economic status of various states, 2004 and 2005. Hans V Rostenberge and MNNR. Paper presented at 5th MNNR Forum in December 2006.
4. Outcomes of inborn vs outborn babies, 2004 and 2005. Jimmy Lee and MNNR. Paper presented at 5th MNNR Forum in December 2006.
5. Outcomes of extremely low birthweight babies, 2004 and 2005. IGS Cheah and MNNR. Paper presented at 5th MNNR Forum in December 2006.
6. Congenital anomalies among ill babies in NICUs, 2004 and 2005. MK Thong and MNNR. Paper presented at 5th MNNR Forum in December 2006.
7. Use of antenatal steroids among preterm babies in NICUs, 2004 and 2005. Ismail H and MNNR. Paper presented at 5th MNNR Forum in December 2006.
8. Intravenous Compared to Oral Indomethacin For Patent Ductus Arteriousus. Is One Better Than The Other? BH Choo, NLLim and MNNR. Paper presented at the 14th Annual Perinatal Congress in March 2007
9. Highest Total Serum Bilirubin Levels among Sick Babies in Neonatal Intensive Care Units. Are Safe Levels Achievable? WT Lim, NLLim and MNNR. Paper presented at the 14th Annual Perinatal Congress in March 2007

ABBREVIATIONS

BPD	Bronchopulmonary Dysplasia
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