8. NEONATAL INTENSIVE CARE

The information presented in this chapter was obtained from the Neonatal Intensive Care Units' (NICUS) Data Collection (see Chapter 3, Data sources).

Registration rate

There were 2,257 infants registered in NICUS in 2005. The most common reasons for registration of an infant were assisted ventilation for four hours or more (47.4 percent) and gestational age less than 29 weeks (16.2 percent). Infants generally met more than one of the registration criteria.

The NICUS registration rate in 2005 was 23.8 per 1,000 livebirths, which decreased slightly since 2004 (24.8 per 1,000 live births). Table 65 shows the registration rate according to the mothers' health area of residence. The relatively low registration rates from the health areas adjoining the New South Wales border reflect the fact that some infants are preferentially referred interstate. The registration rate in health areas with low numbers of births should be interpreted with caution.

Eighty–three of the 2,257 infants (3.7 per cent) registered in NICUS were born to Aboriginal or Torres Strait Islander mothers. There were 2,558 livebirths to Aboriginal or Torres Strait Islander women recorded by the NSW and ACT Midwives Data Collections for 2005. The registration rate for these infants was 32.4 per 1,000 livebirths and has decreased since 2004. Seventy–eight of the 2,070 mothers (3.8 per cent) were Aboriginal or Torres Strait Islander, of whom 17 (21.4 per cent) were residents of the Greater Western and North Coast Health Areas (Table 66). Seventeen of the 349 mothers (4.9 per cent) of infants less than 29 weeks and/or less than 1,000 grams were Aboriginal or Torres Strait Islander.

Maternal characteristics

There were 2,070 mothers of the 2,257 infants registered in NICUS during 2005. Nearly 90 per cent of the mothers were residents of the Sydney South West, Sydney West, Hunter & New England, Northern Sydney & Central Coast and South Eastern Sydney & Illawarra Health Areas. The distribution of the mothers' health area of residence for infants less than 29 weeks and/or less than 1,000 grams was similar to those for the whole group. Of the 348 mothers of infants in this group just over three quarters (78.7 per cent) were residents of the Sydney South West, Sydney West, Hunter & New England, Northern Sydney & Central Coast, and South Eastern Sydney & Illawarra Health Areas.

The age of mothers of NICUS infants ranged from 15 to 54 years, with a mean age of 29.9 years. The mean maternal age was similar across all gestational age groups and has remained constant since 1992. In 2005, 23.2 percent of mothers were aged 35 years or more (range 13.7 per cent in 1992 to 23.2 per cent in 2005). In 2005, 4.9 per cent of mothers were aged less than 20 years (range 4.7 per cent in 2004 to 6.8 per cent in 2000) (Table 67). The health area of residence with the highest proportion of teenage mothers was Hunter & New England.

There were 1,804 mothers (87.1 per cent) who had an antenatal complication. The most common antenatal complications were preterm labour (43.6 per cent), pregnancy induced hypertension (16.9 per cent), fetal distress (17.2 per cent), antepartum haemorrhage (17.2 per cent), and intrauterine growth restriction (9.6 percent). Antenatal complications were more frequent in mothers delivering at less than 37 weeks compared with at term. Even so, 56 per cent of mothers giving birth at term had an antenatal complication (Table 68).

TABLE 65

NICUS REGISTRATIONS BY HEALTH AREA OF RESIDENCE, NSW & ACT 2005

Health Area	Total NICUS registrants		Total NSW & ACT live births	Registrants per 1,000 live births
	No.	%	No.	
Sydney South West	474	21.0	19846	23.9
South Eastern Sydney & Illawarra	295	13.1	14770	20.0
Sydney West	435	19.3	17246	25.2
Northern Sydney & Central Coast	263	11.7	13876	19.0
Hunter & New England	361	16.0	10497	34.4
North Coast	93	4.1	4870	19.1
Greater Southern	123	5.5	4826	25.5
Greater Western	76	3.4	4002	19.0
ACT	118	5.2	4120	28.6
Overseas	6	0.3	0	0.0
Interstate	13	0.6	770	16.9
Not Stated	0	0.0	113	0.0
TOTAL	2257	100.0	94936#	23.8

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research. NSW Midwives Data Collection 2005. Centre for Epidemiology and Research, NSW Department of Health. ACT Maternal Perinatal Data Collection 2004, ACT Health.
Excludes 32 babies reported to the MDC in 2005 for whom the birth outcome was not known.

Administration of corticosteroids to the mother prior to preterm birth improves the outcome for the infant. In 2005, 87 per cent of mothers of infants born at less than 28 weeks received corticosteroids (Figure 5, Table 69). Nearly 90 per cent of mothers of 28–31 weeks gestation infants received antenatal corticosteroids. The overall proportion of mothers receiving antenatal corticosteroids increased from 45 per cent in 1992 to 74.1 per cent in 2001.

TABLE 66

MOTHERS OF NICUS REGISTRANTS BY HEALTH AREA OF RESIDENCE AND ABORIGINALITY, NSW & ACT 2005

Health Area	Non–Aboriginal		Aboriginal		TOTAL	
	No.	%	No.	%	No.	%
Sydney South West	423	98.1	8	1.9	431	20.8
South Eastern Sydney & Illawarra	265	98.1	5	1.9	270	13.0
Sydney West	397	99.0	4	1.0	401	19.4
Northern Sydney & Central Coast	235	99.6	1	0.4	236	11.4
Hunter & New England	307	91.1	30	8.9	337	16.3
North Coast	76	89.4	9	10.6	85	4.1
Greater Southern	105	93.8	7	6.3	112	5.4
Greater Western	66	89.2	8	10.8	74	3.6
ACT	104	96.3	4	3.7	108	5.2
Interstate	8	80.0	2	20.0	10	0.5
Overseas	6	100.0	0	0.0	6	0.3
TOTAL	1992	96.2	78	3.8	2070	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 67

MOTHERS OF NICUS REGISTRANTS BY HEALTH AREA OF RESIDENCE AND MATERNAL AGE, NSW & ACT 2005

Health Area	Maternal age (years)							
	Less than 20		20–34		35+		TOTAL#	
Sydney South West	15	3.5	306	71.0	110	25.5	431	20.9
South Eastern Sydney & Illawarra	5	1.9	186	69.1	78	29.0	269	13.0
Sydney West	20	5.0	304	76.0	76	19.0	400	19.4
Northern Sydney & Central Coast	3	1.3	161	68.2	72	30.5	236	11.4
Hunter & New England	33	9.8	245	72.7	59	17.5	337	16.3
North Coast	4	4.7	61	71.8	20	23.5	85	4.1
Greater Southern	5	4.5	83	74.1	24	21.4	112	5.4
Greater Western	4	5.5	57	78.1	12	16.4	73	3.5
ACT	6	5.6	77	71.3	25	23.1	108	5.2
Interstate	2	20.0	5	50.0	3	30.0	10	0.5
Overseas	0	0.0	5	83.3	1	16.7	6	0.3
Not stated	0	0.0	0	0.0	0	0.0	3	0.1
TOTAL	97	4.7	1490	72.1	480	23.2	2070	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research
Total includes 3 mothers where the maternal age was not stated..

TABLE 68

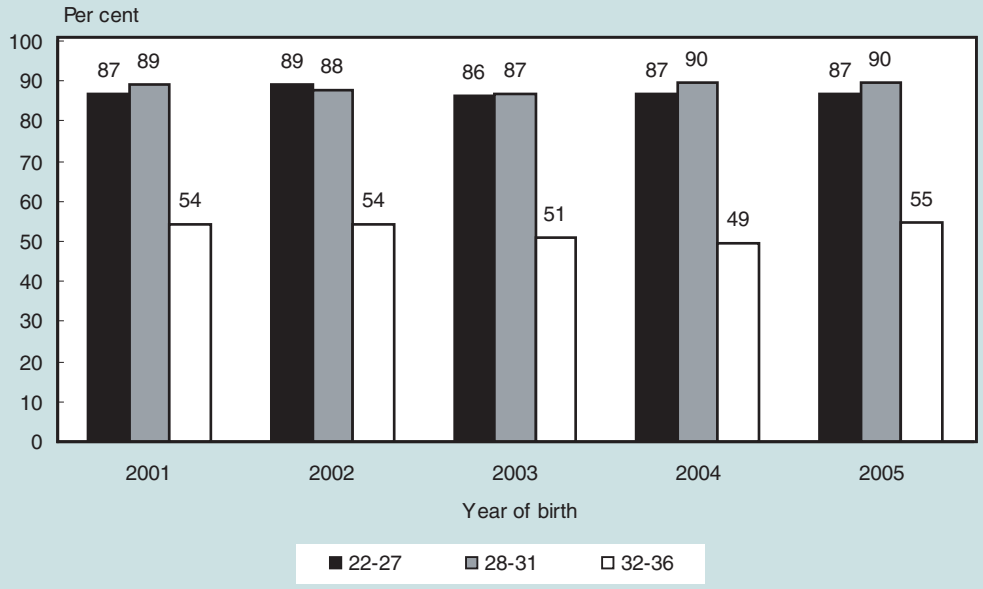
MOTHERS OF NICUS REGISTRANTS BY ANTENATAL COMPLICATIONS AND GESTATIONAL AGE, NSW & ACT 2005

Antenatal complication	Gestational age (weeks)											
	22–27		28–31		32–36		37–41		42+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Preterm labour	166	76.9	335	61.8	392	53.8	10	1.7	0	0.0	903	43.6
Pregnancy induced hypertension	33	15.3	113	20.8	157	21.6	46	8.0	0	0.0	349	16.9
Antepartum haemorrhage	77	35.6	140	25.8	122	16.8	18	3.1	0	0.0	357	17.2
Intrauterine growth restriction	20	9.3	60	11.1	93	12.8	26	4.5	0	0.0	199	9.6
Fetal distress	29	13.4	90	16.6	119	16.3	118	20.5	0	0.0	356	17.2
Fetal diagnosis of anomaly	1	0.5	11	2.0	58	8.0	90	15.6	0	0.0	160	7.7
Gestational diabetes	6	2.8	38	7.0	47	6.5	33	5.7	1	12.5	125	6.0
Chorioamnionitis	53	24.4	56	10.3	40	5.5	12	2.1	0	0.0	161	7.8
Any complication	216	100.0	542	100.0	719	98.8	326	56.6	1	12.5	1804	87.1
TOTAL MOTHERS	216	100.0	542	100.0	728	100.0	576	100.0	8	100.0	2070	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

FIGURE 5

MOTHERS OF NICUS REGISTRANTS BY ANTENATAL CORTICOSTEROID ADMINISTRATION AND GESTATIONAL AGE, NSW & ACT 2001–2005



Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 69

MOTHERS OF NICUS REGISTRANTS BY ANTENATAL CORTICOSTEROID ADMINISTRATION AND GESTATIONAL AGE, NSW & ACT 2001–2005

Year	Corticosteroid Administration	Gestational age (weeks) 22–27 No.	22–27 %	28–31 No.	28–31 %	32–36 No.	32–36 %	TOTAL No.	TOTAL %
2001	No	33	13.3	57	10.8	260	45.6	350	25.9
	Yes	216	86.7	473	89.2	310	54.4	999	74.1
	TOTAL	249	100.0	530	100.0	570	100.0	1349	100.0
2002	No	27	10.7	63	12.3	279	45.8	369	26.9
	Yes	225	89.3	449	87.7	330	54.2	1004	73.1
	TOTAL	252	100.0	512	100.0	609	100.0	1373	100.0
2003	No	31	13.9	68	13.1	311	49.1	410	29.8
	Yes	192	86.1	451	86.9	322	50.9	965	70.2
	TOTAL	223	100.0	519	100.0	633	100.0	1375	100.0
2004	No	30	13.2	56	10.3	361	50.7	447	30.1
	Yes	197	86.8	490	89.7	351	49.3	1038	69.9
	TOTAL	227	100.0	546	100.0	712	100.0	1485	100.0
2005	No	28	13.0	57	10.5	328	45.1	413	27.8
	Yes	188	87.0	485	89.5	400	54.9	1073	72.2
	TOTAL	216	100.0	542	100.0	728	100.0	1486	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

Transfer status, labour and delivery

Infants are admitted to a neonatal intensive care unit after:

- delivery that has been booked to occur in a tertiary centre;
- delivery in a tertiary centre following maternal transfer;
- delivery in a non–tertiary centre followed by infant transfer to a tertiary centre.

Thirty–six per cent of all births were booked at a tertiary centre, ranging from 36.2 per cent for the 22–27 week gestational age group to 39.6 per cent for the 32–36 weeks gestational age group (Table 70). Maternal transfer was most common at gestations less than 32 weeks. The rate of maternal transfer was similar for infants born before 28 weeks gestation (52.7 per cent) and for those born at 28–31 weeks gestation (56.1 per cent). The overall rate of maternal transfer was 33.1 per cent.

Nearly 30 per cent of infants were transferred to a tertiary centre following birth. There were 4.4 per cent (73/2,257) of infants transferred from one tertiary centre to another during the first day of life for assisted ventilation and/or major surgery. Transfer following birth was most common in the 37–plus weeks gestational age group (60.1 per cent). Forty–seven infants (47/1,362; 3.5 per cent) greater than 31 weeks gestation were discharged home prior to the admission that qualified them for registration in NICUS.

The inverse relationship between gestational age groups and the proportion of births in a tertiary centre is shown in Figure 6 and Table 71. The proportion of infants born in a tertiary centre increased from 60 per cent in 1992 to 74.8 per cent 2000. In 2005, 88.9 per cent of infants less than 32 weeks gestation were born in a tertiary centre compared with 71.2 per cent of 32–36 week gestation infants and 50 per cent of term infants.

The pattern of transfer status (Table 72) and place of birth by birth weight (Table 73) is similar to that of gestational age, with the majority (89 per cent) of the very low birth weight infants (less than 1,500 grams) born in a tertiary centre.

Spontaneous onset of labour was more common among mothers of infants less than 28 weeks gestation (Table74). Augmentation and induction of labour were most common in term and post–term births. Similarly spontaneous onset of labour occurred in the majority (60.1 per cent) of all mothers of infants less than 2,500 grams birthweight (Table 75). As expected, augmentation, or induction of labour was most common in mothers of infants with a birthweight of 2,500 grams or more (27.7 per cent).

Prolonged rupture of membranes (greater than 24 hours) was more common at lower gestations, affecting 24.7 per cent of infants less than 28 weeks gestation (Table 76).

The proportion of mothers who gave birth by elective caesarean section (caesarean section without labour) was 40.3 per cent in 2005, previously ranging from 27 per cent in 1992 to 38.4 per cent in 2003 (Tables 77 and 78). The most common type of delivery was caesarean section (58.5 per cent in 1993 to 59.7 per cent in 2004), followed by 33.7 per cent for normal vaginal delivery (previously 41.9 per cent in 1993 to 35.6 per cent in 2003) and 3.2 per cent for vaginal breech delivery (7 per cent in 1998 to 4.2 per cent in 2003). The high rate of caesarean section and breech delivery in the NICUS cohort is related to the high proportion of preterm births. The rate of caesarean section in term and post–term births was 44.3 per cent, compared with 30.3 per cent for all livebirths in NSW and the ACT in 2005.

Continued on page 62

TABLE 70

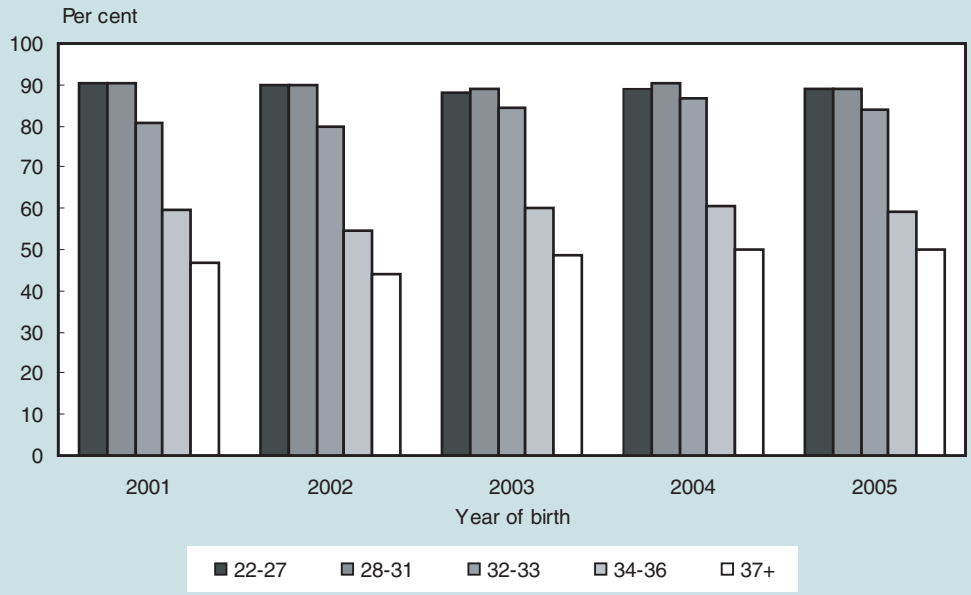
NICUS REGISTRANTS BY BOOKING STATUS, TRANSFER STATUS AND GESTATIONAL AGE, NSW & ACT 2005

Booking status and transfer status	Gestational age (weeks) 22–27		28–31		32–36		37–41		42+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Booked at tertiary hosp	88	36.2	215	33.0	308	39.6	184	31.9	6	75.0	801	35.5
Transfer before birth	128	52.7	366	56.1	227	29.2	26	4.5	0	0.0	747	33.1
Transfer after birth	27	11.1	67	10.3	220	28.3	349	60.6	2	25.0	665	29.5
Booked at non tertiary hosp	0	0.0	4	0.6	23	3.0	17	3.0	0	0.0	44	1.9
TOTAL	243	100.0	652	100.0	778	100.0	576	100.0	8	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

FIGURE 6

NICUS REGISTRANTS BY TERTIARY HOSPITAL BIRTH AND GESTATIONAL AGE, NSW & ACT 2001–2005



Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 71

NICUS REGISTRANTS BY PLACE OF BIRTH (LEVEL OF OBSTETRIC HOSPITAL) AND GESTATIONAL AGE, NSW & ACT 2005

Place of birth	Gestational age (weeks) 22–27		28–31		32–33		34–36		37+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Level 1	1	0.4	0	0.0	2	0.5	0	0.0	1	0.2	4	0.2
Level 2	0	0.0	3	0.5	1	0.3	3	0.8	9	1.5	16	0.7
Level 3	0	0.0	11	1.7	7	1.8	10	2.5	29	5.0	57	2.5
Level 4	8	3.3	24	3.7	14	3.7	39	9.9	92	15.8	177	7.8
Level 5	10	4.1	23	3.5	20	5.2	40	10.1	68	11.6	161	7.1
Level 6	216	88.9	580#	89.0	321	83.8	233	59.0	292	50.0	1642	72.8
Private hospital	3	1.2	9	1.4	13	3.4	64	16.2	80	13.7	169	7.5
Born before arrival	0	0.0	2	0.3	3	0.8	2	0.5	2	0.3	9	0.4
Interstate–Overseas	5	2.1	0	0.0	2	0.5	4	1.0	11	2.0	22	1.0
TOTAL	243	100.0	652	100.0	383	100.0	395	100.0	584	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
368/580 (63.4%) babies not born in a level 6 hospital were 30–31 weeks gestation.

TABLE 72

NICUS REGISTRANTS BY BOOKING STATUS, TRANSFER STATUS AND BIRTH WEIGHT, NSW & ACT 2005

Booking status and transfer status	Birth weight (grams) Less than 1,000		1,000–1,499		1,500–2,499		2,500+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Booked at tertiary hosp	92	36.5	164	34.3	281	36.9	264	34.5	801	35.5
Transfer before birth	137	54.4	258	54.0	289	37.9	63	8.2	747	33.1
Transfer after birth	23	9.1	51	10.7	177	23.2	414	54.1	665	29.5
Booked at non tertiary hosp	0	0.0	5	1.0	15	2.0	24	3.1	44	1.9
TOTAL	252	100.0	478	100.0	762	100.0	765	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 73

NICUS REGISTRANTS BY PLACE OF BIRTH (LEVEL OF OBSTETRIC HOSPITAL) AND BIRTH WEIGHT, NSW & ACT 2005

Place of birth	Birth weight (grams) <1,000		1,000–1,499		1,500–2,499		2,500+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Level 1	1	0.4	0	0.0	2	0.3	1	0.1	4	0.2
Level 2	0	0.0	2	0.4	5	0.7	9	1.2	16	0.7
Level 3	0	0.0	7	1.5	20	2.6	30	3.9	57	2.5
Level 4	5	2.0	18	3.8	49	6.4	105	13.7	177	7.8
Level 5	11	4.4	18	3.8	51	6.7	81	10.6	161	7.1
Level 6	229	90.9	421	88.1	588	77.2	404	52.8	1642	72.8
Private hospital	2	0.8	10	2.1	37	4.9	120	15.7	169	7.5
Born before arrival	1	0.4	0	0.0	6	0.8	2	0.3	9	0.4
Interstate–Overseas	3	1.2	2	0.4	4	0.5	13	1.7	22	1.0
TOTAL	252	100.0	478	100.0	762	100.0	765	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 74

MOTHERS OF NICUS REGISTRANTS BY ONSET OF LABOUR AND GESTATIONAL AGE, NSW & ACT 2005

Onset of labour	Gestational age (weeks) 22–27		28–31		32–36		37–41		42+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Spontaneous	134	62.0	270	49.8	318	43.7	230	39.9	4	50.0	956	46.2
Augmented	12	5.6	19	3.5	26	3.6	46	8.0	0	0.0	103	5.0
Induced	3	1.4	3	0.6	47	6.5	143	24.8	4	50.0	200	9.7
No labour	67	31.0	250	46.1	337	46.3	157	27.3	0	0.0	811	39.2
TOTAL	216	100.0	542	100.0	728	100.0	576	100.0	8	100.0	2070	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 75

MOTHERS OF NICUS REGISTRANTS BY ONSET OF LABOUR AND BIRTH WEIGHT, NSW & ACT 2005

Onset of labour	Birth weight (grams) Less than 1,000		1,000–1,499		1,500–2,499		2,500+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Spontaneous	111	49.8	181	44.6	361	53.0	303	39.9	956	46.2
Augmented	10	4.5	12	3.0	31	4.5	50	6.6	103	5.0
Induced	2	0.9	6	1.5	32	4.7	160	21.1	200	9.7
No labour	100	44.8	207	51.0	257	37.7	247	32.5	811	39.2
TOTAL	223	100.0	406	100.0	681	100.0	760	100.0	2070	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 76

NICUS REGISTRANTS BY DURATION OF RUPTURE OF MEMBRANES AND GESTATIONAL AGE, NSW & ACT 2005

Duration of rupture of membranes	Gestational age (weeks) 22–27		28–31		32–36		37–41		42+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Less than 24 hours	183	75.3	519	79.6	694	89.2	554	96.2	8	100.0	1958	86.8
24 hours–7 days	35	14.4	70	10.7	45	5.8	20	3.5	0	0.0	170	7.5
8+ days	25	10.3	63	9.7	39	5.0	2	0.3	0	0.0	129	5.7
TOTAL	243	100.0	652	100.0	778	100.0	576	100.0	8	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 77

NICUS REGISTRANTS BY TYPE OF DELIVERY AND GESTATIONAL AGE, NSW & ACT 2005

Type of delivery	Gestational age (weeks)											
	22–27		28–31		32–36		37–41		42+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Normal vaginal	92	37.9	190	29.1	212	27.2	262	45.5	4	50.0	760	33.7
Forceps	7	2.9	9	1.4	14	1.8	19	3.3	0	0.0	49	2.2
Forceps rotation	0	0.0	2	0.3	0	0.0	2	0.3	0	0.0	4	0.2
Vacuum extraction	1	0.4	1	0.2	13	1.7	33	5.7	3	37.5	51	2.3
Vaginal breech	20	8.2	30	4.6	20	2.6	2	0.3	0	0.0	72	3.2
Elective Caesarean	75	30.9	296	45.4	379	48.7	160	27.8	0	0.0	910	40.3
Emergency Caesarean	48	19.8	124	19.0	140	18.0	98	17.0	1	12.5	411	18.2
TOTAL	243	100.0	652	100.0	778	100.0	576	100.0	8	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 78

NICUS REGISTRANTS BY TYPE OF DELIVERY AND BIRTH WEIGHT, NSW & ACT 2005

Type of delivery	Birth weight (grams)									
	Less than 1,000		1,000–1,499		1,500–2,499		2,500+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Normal vaginal	72	28.6	115	24.1	266	34.9	307	40.1	760	33.7
Forceps	6	2.4	4	0.8	13	1.7	26	3.4	49	2.2
Forceps rotation	0	0.0	0	0.0	2	0.3	2	0.3	4	0.2
Vacuum extraction	1	0.4	1	0.2	5	0.7	44	5.8	51	2.3
Vaginal breech	19	7.5	20	4.2	28	3.7	5	0.7	72	3.2
Elective Caesarean	113	44.8	247	51.7	292	38.3	258	33.7	910	40.3
Emergency Caesarean	41	16.3	91	19.0	156	20.5	123	16.1	411	18.2
TOTAL	252	100.0	478	100.0	762	100.0	765	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

(Continued from page 59)

Infant characteristics

Three quarters of the infants (74.1 per cent) were preterm (less than 37 weeks gestation), 39.7 per cent were very preterm (less than 32 weeks gestation) and 10.8 per cent were extremely preterm (less than 28 weeks gestation) (Figure 7). The proportion of infants in each gestational age group has remained relatively constant (Table 79). Almost all liveborn infants at 25–31 weeks gestation were admitted to a NICU, nearly two–thirds at 32 weeks gestation, and one–fifth at 33–34 weeks gestation (Table 80).

Sixty–six per cent of infants had a low birth weight (less than 2,500 grams), 32.3 per cent had a very low birth weight (less than 1,500 grams) and 11.2 per cent had an extremely low birth weight (less than 1,000 grams). The proportion of infants in each birth weight group has remained relatively constant (Table 81). Almost all liveborn infants 600–1500 grams birth weight were admitted to a NICU (Table 82).

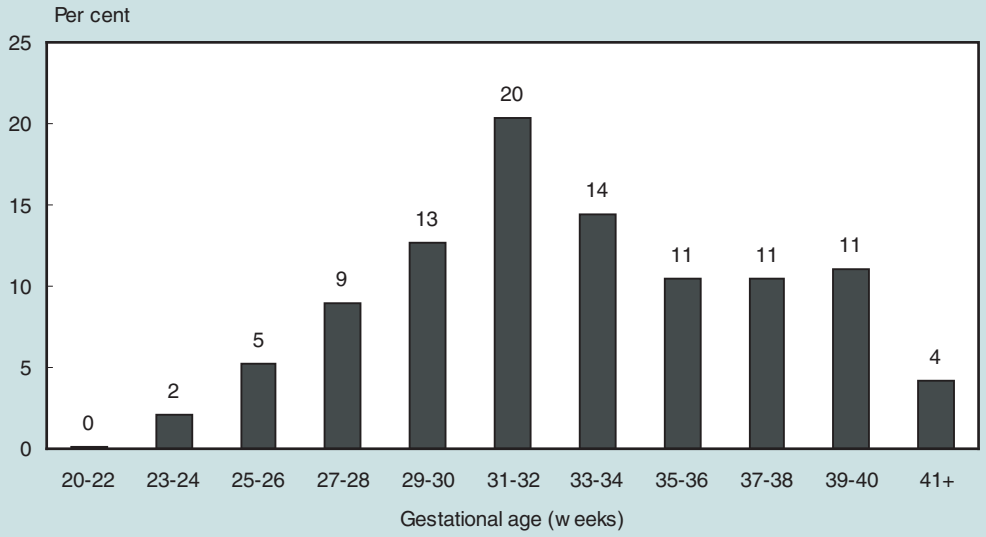
Overall, 58.2 per cent of infants were male. The ratio of males to females remains at 3:2 in most gestational age groups (Table 83).

The overall proportion of the infants who had a major congenital anomaly decreased from 22 per cent in 1992 to 15.6 per cent in 2005. Congenital anomalies were more common among term infants (37–plus weeks gestational age), of whom 34.8 per cent had a major congenital anomaly and 3.1 per cent had a minor congenital anomaly (Table 84).

Continued on page 66

FIGURE 7

NICUS REGISTRANTS BY GESTATIONAL AGE, NSW & ACT 2005



Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 79

NICUS REGISTRANTS BY GESTATIONAL AGE, NSW & ACT 2001–2005

Gestational age (weeks)	Year of birth									
	2001		2002		2003		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%
22–27	277	13.8	282	14.0	253	12.0	264	11.8	243	10.8
28–31	640	31.8	604	30.0	608	28.8	649	29.0	652	28.9
32–36	611	30.4	640	31.8	678	32.1	764	34.2	778	34.5
37–41	473	23.5	480	23.8	561	26.5	555	24.8	576	25.5
42+	9	0.4	8	0.4	14	0.7	4	0.2	8	0.4
TOTAL	2010	100.0	2014	100.0	2114	100.0	2236	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 80

BIRTHS BY NICUS REGISTRATION AND GESTATIONAL AGE, NSW & ACT 2005

Gestational age (weeks)	NSW & ACT NICUS Stillbirths No.	Live births No.	Registrations No.	Rate per 1,000 live births	% of cohort
Less than 21	62	11	0	0.0	0.0
21	69	26	0	0.0	0.0
22	48	40	1	25.0	0.1
23	31	39	7	179.5	0.3
24	29	60	40	666.7	1.8
25	25	55	53	963.6	2.4
26	29	45	65	1444.4	2.9
27	14	86	77	895.3	3.4
28	12	124	123	991.9	5.5
29	13	117	117	1000.0	5.2
30	11	168	169	1006.0	7.5
31	18	247	243	983.8	10.8
32	16	369	215	582.7	9.5
33	13	486	168	345.7	7.4
34	19	889	158	177.7	7.0
35	14	1359	122	89.8	5.4
36	17	2448	115	47.0	5.1
37	20	5471	95	17.4	4.2
38	24	15377	143	9.3	6.3
39	30	23044	120	5.2	5.3
40	30	27150	131	4.8	5.8
41	21	15535	87	5.6	3.9
42	2	1640	8	4.9	0.4
43	0	135	0	0.0	0.0
44	0	3	0	0.0	0.0
45	0	1	0	0.0	0.0
46	0	1	0	0.0	0.0
Not stated	1	10	0	0.0	0.0
TOTAL	568	94936#	2257	23.8	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research 2005 NSW Midwives Data Collection 2005. Centre for Epidemiology and Research, NSW Department of Health. ACT Maternal Perinatal Data Collection 2004, ACT Health.
Excludes 32 babies reported to the MDC in 2005 for whom the birth outcome was not known.

TABLE 81

NICUS REGISTRANTS BY BIRTH WEIGHT, NSW & ACT 2001–2005

Birth weight (grams)	Year of birth 2001		2002		2003		2004		2005	
	No.	%	No.	%	No.	%	No.	%	No.	%
Less than 400	2	0.1	2	0.1	2	0.1	1	0.0	0	0.0
400–499	5	0.2	7	0.3	9	0.4	5	0.2	5	0.2
500–599	30	1.5	21	1.0	24	1.1	25	1.1	19	0.8
600–699	49	2.4	53	2.6	38	1.8	35	1.6	51	2.3
700–799	49	2.4	63	3.1	54	2.6	54	2.4	53	2.3
800–899	72	3.6	58	2.9	60	2.8	66	3.0	54	2.4
900–999	63	3.1	81	4.0	80	3.8	77	3.4	70	3.1
1,000–1,249	219	10.9	181	9.0	197	9.3	232	10.4	233	10.3
1,250–1,499	274	13.6	264	13.1	257	12.2	279	12.5	245	10.9
1,500–1,749	231	11.5	228	11.3	215	10.2	257	11.5	244	10.8
1,750–1,999	159	7.9	163	8.1	185	8.8	174	7.8	211	9.3
2,000–2,499	251	12.5	273	13.6	258	12.2	280	12.5	307	13.6
2,500–2,999	215	10.7	205	10.2	244	11.5	280	12.5	249	11.0
3,000–3,499	195	9.7	195	9.7	228	10.8	227	10.2	277	12.3
3,500–3,999	132	6.6	158	7.8	176	8.3	153	6.8	147	6.5
4,000+	64	3.2	62	3.1	87	4.1	91	4.1	92	4.1
TOTAL	2010	100.0	2014	100.0	2114	100.0	2236	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 82

BIRTHS BY NICUS REGISTRATION AND BIRTH WEIGHT, NSW & ACT 2005

Birth weight (grams)	NSW & ACT Stillbirths No.	NSW & ACT Live births No.	NICUS Registrations No.	NICUS Rate per 1,000 live births	NICUS % of cohort
Less than 400	151	53	0	0.0	0.0
400–499	61	41	5	122.0	0.2
500–599	37	61	19	311.5	0.8
600–699	34	69	51	739.1	2.3
700–799	18	55	53	963.6	2.4
800–899	12	55	54	981.8	2.4
900–999	15	68	70	1029.4	3.1
1,000–1,249	23	238	233	979.0	10.3
1,250–1,499	19	275	245	890.9	10.9
1,500–1,749	13	462	244	528.1	10.8
1,750–1,999	19	704	211	299.7	9.4
2,000–2,499	49	3631	307	84.5	13.6
2,500–2,999	45	14303	249	17.4	11.0
3,000–3,499	36	33954	277	8.2	12.3
3,500–3,999	25	29367	147	5.0	6.5
4,000+	11	11600	92	7.9	4.1
TOTAL	568	94936#	2257	23.8	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research. NSW Midwives Data Collection 2005. Centre for Epidemiology and Research, NSW Department of Health ACT Maternal Perinatal Data Collection 2004, ACT Health.
Excludes 32 babies reported to the MDC in 2005 for whom the birth outcome was not known.

TABLE 83

NICUS REGISTRANTS BY GENDER AND GESTATIONAL AGE, NSW & ACT 2005

Sex	Gestational age (weeks) 22–27 No.	22–27 %	28–31 No.	28–31 %	32–36 No.	32–36 %	37–41 No.	37–41 %	42+ No.	42+ %	TOTAL No.	TOTAL %
Male	129	53.1	369	56.6	455	58.5	355	61.6	6	75.0	1314	58.2
Female	114	46.9	283	43.4	323	41.5	221	38.4	2	25.0	943	41.8
TOTAL	243	100.0	652	100.0	778	100.0	576	100.0	8	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 84

NICUS REGISTRANTS BY CONGENITAL ANOMALIES AND GESTATIONAL AGE, NSW & ACT 2005

Congenital anomaly	Gestational age (weeks) 22–27 No.	22–27 %	28–31 No.	28–31 %	32–36 No.	32–36 %	37–41 No.	37–41 %	42+ No.	42+ %	TOTAL No.	TOTAL %
None	222	91.4	614	94.2	665	85.5	356	61.8	7	87.5	1864	82.6
Minor	4	1.6	6	0.9	13	1.7	18	3.1	0	0.0	41	1.8
Major	17	7.0	32	4.9	100	12.9	202	35.1	1	12.5	352	15.6
TOTAL	243	100.0	652	100.0	778	100.0	576	100.0	8	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

(Continued from page 62)

The overall proportion of infants born following a multiple pregnancy was 21 per cent in 2005 (range 14.5 per cent in 1993 to 22.4 per cent in 2001). In 2005, most of the infants (79 per cent) were from a singleton pregnancy, 18.3 per cent were from a twin pregnancy, 2.3 per cent were from a triplet pregnancy and 0.3 per cent were from a quadruplet pregnancy. The higher than expected rate of multiple births among the 2005 NICUS cohort reflects the high proportion of multiple pregnancies resulting in preterm birth with 20.2 per cent of infants less than 37 weeks gestation (Table 85). Multiple births represented 3.3 per cent of all NSW/ACT livebirths in 2005.

Table 86 shows the median, 25th and 75th percentiles for one– and five–minute Apgar scores according to gestational age groups. For infants 28–42 weeks gestational age, the median one–minute Apgar score was seven. The median five–minute score was nine for infants 28–42 weeks gestational age. The proportion of infants with a one–minute Apgar score of 0–4 has decreased from 38.7 per cent in 1992 to 23.5 per cent in 2005. Similarly the proportion of infants with a five–minute Apgar score of 0–4 has decreased from 10.8 per cent in 1992 to 6.2 per cent in 2005 (Table 87).

Infants with major congenital anomalies (n=352) were excluded from the analysis of morbidity and mortality.

The majority of infants without a major congenital anomaly (1,651/1,905; 86.7 per cent) in the 2005 NICUS cohort received assisted ventilation (intermittent mandatory ventilation and/or continuous positive airways pressure) (Table 88).

The main indication for assisted ventilation for most infants was respiratory distress syndrome (Figure 8). The main indication for assisted ventilation varied with gestational age. Respiratory distress syndrome, immature lung, and transient tachypnoea were more common in the preterm groups, whereas perinatal asphyxia, meconium aspiration, pulmonary hypertension and apnoea were more common in term infants (Figure 8, Table 89).

The overall proportion of ventilated infants who received surfactant was 36.5 in 2005 (range 33.8 per cent in 1992 to 51.8 per cent in 1998) (Table 90). In 2005, 52.1 per cent of the infants who received surfactant were less than 32 weeks gestational age. Nearly half (52.4 per cent) of ventilated infants with a diagnosis of respiratory distress syndrome received surfactant.

Proven systemic infection has decreased from 21.5 per cent in 1992 to 10.4 per cent of infants in 2005. Infection was most common among infants less than 28 weeks gestation (35.8 per cent) (Table 91).

Overall, the incidence of treated patent ductus arteriosus (PDA) was 14.2 per cent in 2005 (range 10.7 in 1994 to15.6 per cent in 2004). In 2005, 96.3 per cent of the infants treated for PDA were less than 32 weeks gestational age (Table 92). The majority of infants with a PDA requiring treatment received indomethacin only (12.6 per cent). Surgical treatment of PDA was predominantly performed on infants less than 28 weeks gestation (6.7 per cent). Some infants (5.8 per cent) were treated with both indomethacin and surgery.

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TABLE 85

NICUS REGISTRANTS BY PLURALITY AND GESTATIONAL AGE, NSW & ACT 2005

Plurality	Gestational age (weeks)											
	22–27		28–31		32–36		37–41		42+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Singleton	180	74.1	438	67.2	598	76.9	560	97.2	8	100.0	1784	79.0
Twins	55	22.6	177	27.1	166	21.3	16	2.8	0	0.0	414	18.3
Triplets	8	3.3	33	5.1	12	1.5	0	0.0	0	0.0	53	2.3
Quads	0	0.0	4	0.6	2	0.3	0	0.0	0	0.0	6	0.3
TOTAL	243	100.0	652	100.0	778	100.0	576	100.0	8	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 86

NICUS REGISTRANTS BY APGAR SCORE AND GESTATIONAL AGE, NSW & ACT 2005

Apgar score	Gestational age (weeks) 22–27 Median (25%,75%)		28–31 Median (25%,75%)		32–36 Median (25%,75%)		37+ Median (25%,75%)	
One–minute Apgar	5	(3,7)	7	(5,8)	7	(5,9)	7	(5,9)
Five–minute Apgar	8	(6,8)	9	(8,9)	9	(8,9)	9	(7,9)

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 87

NICUS REGISTRANTS BY APGAR SCORE AT ONE AND FIVE MINUTES, NSW & ACT 2001–2005

Apgar score	Year of birth 2001 No.	2001 %	2002 No.	2002 %	2003 No.	2003 %	2004 No.	2004 %	2005 No.	2005 %
ONE MINUTE										
0–4	516	25.7	475	23.6	475	22.5	533	23.8	531	23.5
5–7	744	37.0	692	34.4	750	35.5	735	32.9	759	33.6
8+	735	36.6	830	41.2	886	41.9	959	42.9	960	42.5
Not stated	15	0.7	17	0.8	3	0.1	9	0.4	7	0.3
TOTAL	2010	100.0	2014	100.0	2114	100.0	2236	100.0	2257	100.0
FIVE MINUTES										
0–4	143	7.1	139	6.9	110	5.2	135	6.0	141	6.2
5–7	425	21.1	394	19.6	382	18.1	437	19.5	437	19.4
8+	1429	71.1	1469	72.9	1618	76.5	1656	74.1	1673	74.1
Not stated	13	0.6	12	0.6	4	0.2	8	0.4	6	0.3
TOTAL	2010	100.0	2014	100.0	2114	100.0	2236	100.0	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 88

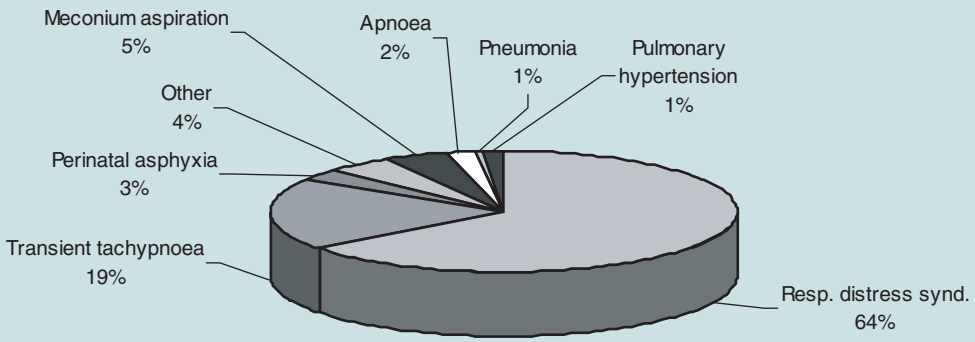
NICUS REGISTRANTS BY ASSISTED VENTILATION AND GESTATIONAL AGE, NSW & ACT 2001–2005#

Year	Assisted ventilation	Gestational age (weeks) 22–27 No.	22–27 %	28–31 No.	28–31 %	32–36 No.	32–36 %	37+ No.	37+ %	TOTAL No.	TOTAL %
2001	No	2	0.7	126	20.7	61	11.6	3	1.1	192	11.4
	Yes	265	99.3	482	79.3	464	88.4	277	98.9	1488	88.6
	TOTAL	267	100.0	608	100.0	525	100.0	280	100.0	1680	100.0
2002	No	2	0.7	90	16.3	50	9.0	4	1.4	146	8.8
	Yes	267	99.3	463	83.7	504	91.0	284	98.6	1518	91.2
	TOTAL	269	100.0	553	100.0	554	100.0	288	100.0	1664	100.0
2003	No	1	0.4	104	17.9	98	16.0	75	20.1	278	15.4
	Yes	234	99.6	476	82.1	515	84.0	298	79.9	1523	84.6
	TOTAL	235	100.0	580	100.0	613	100.0	373	100.0	1801	100.0
2004	No	0	0.0	78	12.9	83	12.8	62	17.2	223	12.1
	Yes	239	100.0	525	87.1	563	87.2	298	82.8	1625	87.9
	TOTAL	239	100.0	603	100.0	646	100.0	360	100.0	1848	100.0
2005	No	1	0.4	115	18.5	90	13.3	48	12.6	254	13.3
	Yes	225	99.6	505	81.5	588	86.7	333	87.4	1651	86.7
	TOTAL	226	100.0	620	100.0	678	100.0	381	100.0	1905	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

FIGURE 8

NICUS REGISTRANTS BY MAIN INDICATION FOR ASSISTED VENTILATION, NSW & ACT 2005#



Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies or not ventilated excluded.

TABLE 89

NICUS REGISTRANTS BY MAIN INDICATION FOR ASSISTED VENTILATION AND GESTATIONAL AGE, NSW & ACT 2005#

Indication	Gestational age (weeks) 22–27		28–31		32–36		37+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Transient tachypnoea of newborn	2	0.9	79	15.6	167	28.4	69	20.7	317	19.2
Hyaline membrane disease	221	98.2	393	77.8	368	62.6	82	24.6	1064	64.4
Meconium aspiration	0	0.0	1	0.2	4	0.7	70	21.0	75	4.5
Pneumonia	0	0.0	0	0.0	3	0.5	9	2.7	12	0.7
Pulmonary hypertension	0	0.0	2	0.4	5	0.9	15	4.5	22	1.3
Immature lung	2	0.9	11	2.2	7	1.2	0	0.0	20	1.2
Apnoea	0	0.0	9	1.8	12	2.0	9	2.7	30	1.8
Congenital anomaly	0	0.0	0	0.0	2	0.3	1	0.3	3	0.2
Other	0	0.0	5	1.0	10	1.7	25	7.5	40	2.4
Perinatal	0	0.0	2	0.4	2	0.3	10	3.0	14	0.8
Newborn encephalopathy	0	0.0	3	0.6	8	1.4	43	12.9	54	3.3
TOTAL	225	100.0	505	100.0	588	100.0	333	100.0	1651	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies or not ventilated excluded.

TABLE 90

NICUS REGISTRANTS BY SURFACTANT ADMINISTRATION AND GESTATIONAL AGE, NSW & ACT 2001–2005[#]

Year	Surfactant administration	Gestational age (weeks) 22–27 No.	%	28–31 No.	%	32–36 No.	%	37+ No.	%	TOTAL No.	%
2001	No	56	21.1	275	57.1	326	70.3	222	80.1	879	59.1
	Yes	209	78.9	207	42.9	138	29.7	55	19.9	609	40.9
	TOTAL	265	100.0	482	100.0	464	100.0	277	100.0	1488	100.0
2002	No	66	24.7	275	59.4	366	72.6	241	84.9	948	62.5
	Yes	201	75.3	188	40.6	138	27.4	43	15.1	570	37.5
	TOTAL	267	100.0	463	100.0	504	100.0	284	100.0	1518	100.0
2003	No	45	19.2	257	54.0	354	68.7	239	80.2	895	58.8
	Yes	189	80.8	219	46.0	161	31.3	59	19.8	628	41.2
	TOTAL	234	100.0	476	100.0	515	100.0	298	100.0	1523	100.0
2004	No	41	17.2	303	57.7	406	72.1	248	83.2	998	61.4
	Yes	198	82.8	222	42.3	157	27.9	50	16.8	627	38.6
	TOTAL	239	100.0	525	100.0	563	100.0	298	100.0	1625	100.0
2005	No	42	18.7	308	61.0	430	73.1	268	80.5	1048	63.5
	Yes	183	81.3	197	39.0	158	26.9	65	19.5	603	36.5
	TOTAL	225	100.0	505	100.0	588	100.0	333	100.0	1651	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies and babies not ventilated excluded.

TABLE 91

NICUS REGISTRANTS BY PROVEN SYSTEMIC INFECTION AND GESTATIONAL AGE, NSW & ACT 2005[#]

Infection	Gestational age (weeks) 22–27 No.	%	28–31 No.	%	32–36 No.	%	37+ No.	%	TOTAL No.	%
No	145	64.2	542	87.4	656	96.8	363	95.3	1706	89.6
Yes	81	35.8	78	12.6	22	3.2	18	4.7	199	10.4
TOTAL	226	100.0	620	100.0	678	100.0	381	100.0	1905	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

TABLE 92

NICUS REGISTRANTS BY TREATED PATENT DUCTUS ARTERIOSUS (PDA) AND GESTATIONAL AGE, NSW & ACT 2005[#]

PDA–Treatment for PDA	Gestational age (weeks) 22–27 No.	%	28–31 No.	%	32–36 No.	%	TOTAL No.	%
No treated PDA	103	45.6	534	86.1	670	98.8	1307	85.8
Indomethacin only	108	47.8	76	12.3	8	1.2	192	12.6
Surgery only	2	0.9	1	0.2	0	0.0	3	0.2
Indomethacin & surgery	13	5.8	9	1.5	0	0.0	22	1.4
TOTAL	226	100.0	620	100.0	678	100.0	1524	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

Continued from page 66

Overall, the incidence of necrotising enterocolitis (NEC) was 2.9 per cent in 2005 (range 9.8 per cent in 1992 to 2.2 per cent in 2000). The diagnosis of NEC was made radiologically or at surgery in 53.6 per cent of infants and clinically in the remainder. NEC was more common at the lower gestational age groups and 87.5 per cent of the infants with NEC were born at less than 32 weeks gestation (Table 93).

The overall incidence of major surgery was 3.5 per cent in 2005 (range 7.7 per cent in 1992 to 3.1 per cent in 2000). In 2005, 87.5 per cent of the infants who required major surgery were less than 32 weeks gestation (Table 94). The most common surgical procedures amongst these infants were for patent ductus arteriosus and necrotising enterocolitis.

In 2005, the incidence of intraventricular haemorrhage (IVH) among preterm infants (less than 37 weeks gestational age) was 14 per cent (range 20.5 per cent in 1993 to 12.9 per cent in 2003). In 2005, confirmed IVH was most common among infants less than 28 weeks gestation (42 per cent); 29.5 per cent of these infants had severe IVH (grade 3 or 4). Four infants less than 32 weeks gestation with severe IVH required surgical drainage for post haemorrhagic hydrocephalus (4/53, 7.5 per cent). Of the surviving infants born before 32 weeks gestation, 95 per cent had a head ultrasound examination to detect IVH (Table 95).

The proportion of infants with severe grades (Grades 3, 4 or 5) of retinopathy of prematurity (ROP) was 4.3 per cent in 2005 (range 7.5 per cent in 1992 to 2.8 per cent in 2004). In 2005, five infants with Grade 3 ROP were 28–31 weeks gestation and 74.2 per cent of the infants less than 28 weeks gestation with severe ROP received laser therapy. Importantly, 25.2 per cent of surviving infants of 28–31 weeks gestational age did not have an eye examination recorded (Table 96).

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TABLE 93

NICUS REGISTRANTS BY NECROTISING ENTEROCOLITIS (NEC) AND GESTATIONAL AGE, NSW & ACT 2005#

NEC–Treatment for NEC	Gestational age (weeks) 22–27		28–31		32–36		37+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
No NEC	194	85.8	603	97.3	672	99.1	380	99.7	1849	97.1
Clinical diagnosis	12	5.3	9	1.5	4	0.6	1	0.3	26	1.4
X–ray diagnosis	6	2.7	3	0.5	1	0.1	0	0.0	10	0.5
Surgery for NEC	14	6.2	5	0.8	1	0.1	0	0.0	20	1.1
TOTAL	226	100.0	620	100.0	678	100.0	381	100.0	1905	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

TABLE 94

NICUS REGISTRANTS BY MAJOR SURGERY AND GESTATIONAL AGE, NSW & ACT 2005#

Major surgery	Gestational age (weeks) 22–27		28–31		32–36		37+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
No	197	87.2	604	97.4	670	98.8	368	96.6	1839	96.5
Yes	29	12.8	16	2.6	8	1.2	13	3.4	66	3.5
TOTAL	226	100.0	620	100.0	678	100.0	381	100.0	1905	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

TABLE 95

NICUS REGISTRANTS BY INTRAVENTRICULAR HAEMORRHAGE (IVH) AND GESTATIONAL AGE, NSW & ACT 2005#

Head ultrasound	Gestational age (weeks) 22–27		28–31		32–36		TOTAL	
	No.	%	No.	%	No.	%	No.	%
No IVH	121	50.8	485	80.7	250	38.7	856	57.6
Grade 1	43	18.1	59	9.8	19	2.9	121	8.1
Grade 2	21	8.8	6	1.0	2	0.3	29	2.0
Grade 3	15	6.3	10	1.7	2	0.3	27	1.8
Grade 4	25	10.5	3	0.5	1	0.2	29	2.0
Hydrocephalus requiring drainage	3	1.3	1	0.2	2	0.3	6	0.4
Not examined & lived	0	0.0	35	5.8	370	57.3	405	27.3
Not examined & died	13	5.5	3	0.5	2	0.3	18	1.2
TOTAL	238	100.0	601	100.0	646	100.0	1485	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

TABLE 96

NICUS REGISTRANTS BY RETINOPATHY OF PREMATURITY (ROP) AND GESTATIONAL AGE, NSW & ACT 2005#

Retinopathy of prematurity (ROP)	Gestational age (weeks) 22–27		28–31		TOTAL	
	No.	%	No.	%	No.	%
No ROP	64	28.3	415	66.9	479	56.6
Grade 1	37	16.4	13	2.1	50	5.9
Grade 2	34	15.0	13	2.1	47	5.6
Grade 3	28	12.4	5	0.8	33	3.9
Grade 4	1	0.4	0	0.0	1	0.1
Grade 5	2	0.9	0	0.0	2	0.2
Treatment with laser therapy	23	10.2	3	0.5	26	3.1
Not examined & lived	2	0.9	156	25.2	158	18.7
Not examined & died	58	25.7	18	3.1	76	9.0
TOTAL	226	100.0	620	100.0	846	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

(Continued from page 70)

Service utilisation

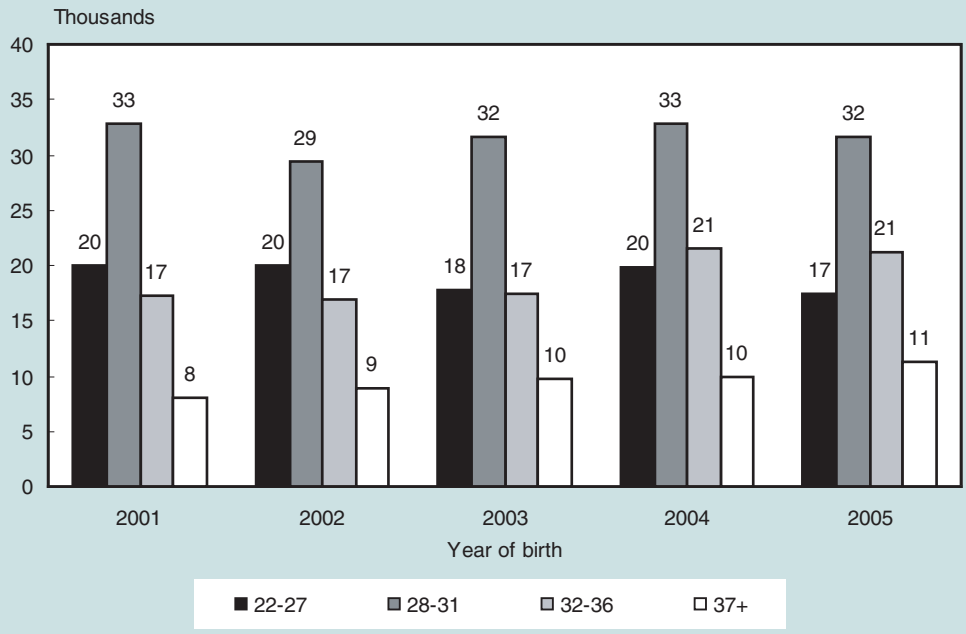
Indicators of service utilisation collected as part of NICUS include length of stay in tertiary and non–tertiary centres, days on assisted ventilation, and days in oxygen (Figures 9, 10 and 11 and Table 97). On an individual basis, infants born at less than 28 weeks gestation consumed most resources. However, as a group those born at 28–31 weeks gestation consumed more bed days than any other group. In 2005, the total cohort used 62,761 bed days in a tertiary centre in NSW and the ACT (range 46,090 in 1993 to 62,852 in 2004); as well as 19,497 in a non–tertiary centre (level 2 neonatal unit) in NSW and the ACT (14,288 in 1992 to 21,352 in 2004). Even when these infants leave the neonatal intensive care unit, they still require substantial resources.

In 2005, NICUS registrants used 17,750 days of assisted ventilation (range 15,282 in 1993 to 18,557 in 2004) and 24,436 days of oxygen therapy (range 22,526 in 1992 to 30,802 in 2001). In 2005, 44 (2.3 per cent) infants were discharged home on oxygen therapy (range 2.1 per cent in 1992 to 5.1 per cent in 1998). The proportion of infants less than 28 weeks gestation discharged home on oxygen therapy was 10.6 per cent (range 7.5 per cent in1992 to 21.3 per cent in 2002) (Table 98).

Continued on page 76

FIGURE 9

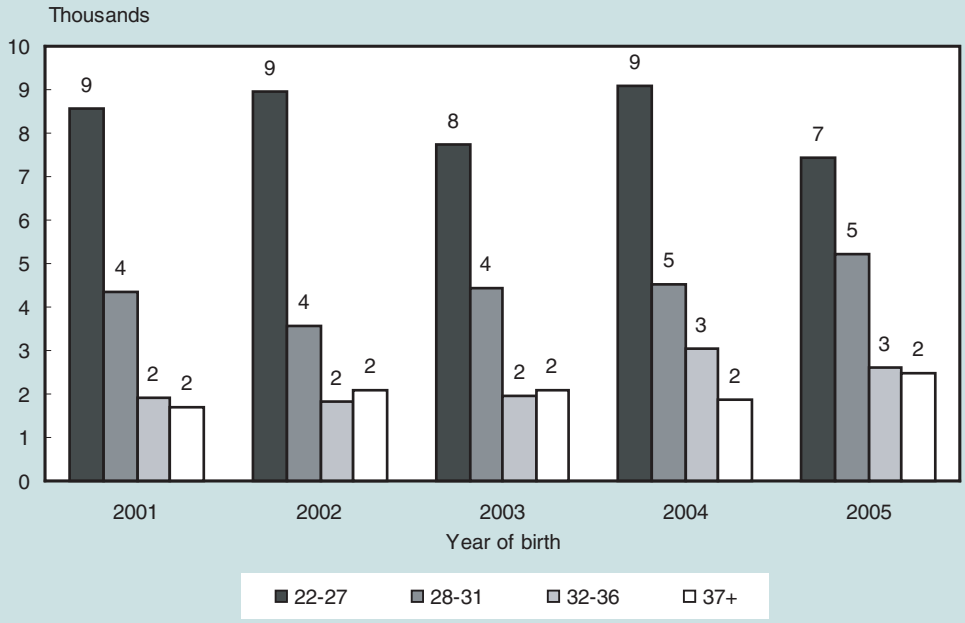
NICUS REGISTRANTS BY TOTAL NUMBER OF DAYS IN HOSPITAL AND GESTATIONAL AGE, NSW & ACT 2005



Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

FIGURE 10

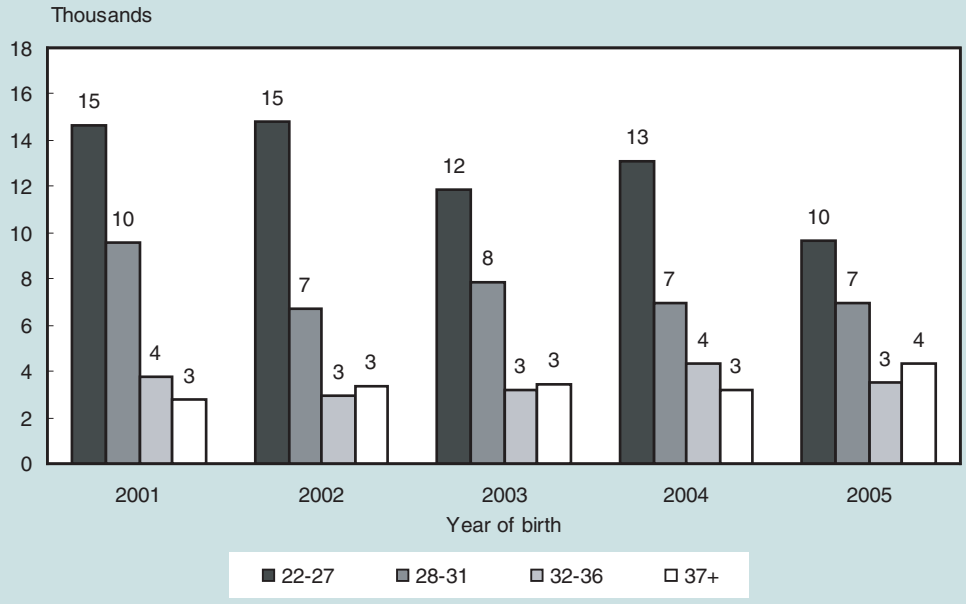
NICUS REGISTRANTS BY TOTAL NUMBER OF DAYS OF ASSISTED VENTILATION AND GESTATIONAL AGE, NSW & ACT 2001–2005



Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

FIGURE 11

NICUS REGISTRANTS BY TOTAL NUMBER OF DAYS OF OXYGEN THERAPY AND GESTATIONAL AGE, NSW & ACT 2001–2005



Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 97

NICUS REGISTRANTS BY SERVICE UTILISATION INDICATORS AND GESTATIONAL AGE, NSW & ACT 2005

Indicators	Gestational age (weeks) 22–27	28–31	32–36	37+	TOTAL
Non–tertiary hospital stay (days)					
Minimum	0	0	0	0	0
Maximum	190	366	69	51	366
Sum	2218	9566	6669	1044	19497
Median	0	13	4	0	0
25th percentile	0	0	0	0	0
75th percentile	14	27	15	2	15
Tertiary hospital stay (days)					
Minimum	1	0	0	0	0
Maximum	251	660	345	700	700
Sum	15252	22796	14516	10197	62761
Median	66	31	12	9	16
25th percentile	27	15	7	5	7
75th percentile	91	47	22	17	36
Total hospital stay (days)					
Minimum	1	0	0	0	0
Maximum	363	562	345	700	700
Sum	17406	31602	21137	11241	81386
Median	77	46	23	10	27
25th percentile	32	37	15	6	12
75th percentile	98	59	32	20	47
Mechanical ventilation (days)					
Minimum	0	0	0	0	0
Maximum	89	115	89	236	236
Sum	2309	1239	1161	1988	6696
Median	3	0	0	1	0
25th percentile	1	0	0	0	0
75th percentile	12	1	1	3	2
Continuous Positive Airways Pressure (days)					
Minimum	0	0	0	0	0
Maximum	77	224	139	32	224
Sum	5122	3991	1458	482	11054
Median	20	2	1	0	1
25th percentile	3	0	0	0	0
75th percentile	36	7	2	1	4
Assisted ventilation (days)					
Minimum	0	0	0	0	0
Maximum	115	297	154	256	297
Sum	7430	5230	2619	2471	17750
Median	27	3	1	2	2
25th percentile	8	1	0	0	1
75th percentile	46	8	3	4	6
Oxygen (days)					
Minimum	0	0	0	0	0
Maximum	324	365	177	534	534
Sum	9681	6918	3482	4355	24436
Median	19	2	1	2	2
25th percentile	4	1	1	1	1
75th percentile	66	7	4	6	7

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

TABLE 98

NICUS REGISTRANTS BY HOME OXYGEN ADMINISTRATION AND GESTATIONAL AGE, NSW & ACT 2001–2005#

Year	Home oxygen	Gestational age (weeks) 22–27		28–31		32–36		37+		TOTAL	
		No.	%	No.	%	No.	%	No.	%	No.	%
2001	No	217	81.3	579	95.2	524	99.8	277	98.9	1597	95.1
	Yes	50	18.7	29	4.8	1	0.2	3	1.1	83	4.9
	TOTAL	267	100.0	608	100.0	525	100.0	280	100.0	1680	100.0
2002	No	211	78.4	540	97.6	551	99.5	283	98.3	1585	95.3
	Yes	58	21.6	13	2.4	3	0.5	5	1.7	79	4.7
	TOTAL	269	100.0	553	100.0	554	100.0	288	100.0	1664	100.0
2003	No	200	85.1	556	95.9	611	99.7	371	99.5	1738	96.5
	Yes	35	14.9	24	4.1	2	0.3	2	0.5	63	3.5
	TOTAL	235	100.0	580	100.0	613	100.0	373	100.0	1801	100.0
2004	No	194	81.2	591	98.0	644	99.7	358	99.4	1787	96.7
	Yes	45	18.8	12	2.0	2	0.3	2	0.6	61	3.3
	TOTAL	239	100.0	603	100.0	646	100.0	360	100.0	1848	100.0
2005	No	202	89.4	603	97.3	677	99.9	379	99.5	1861	97.7
	Yes	24	10.6	17	2.7	1	0.1	2	0.5	44	2.3
	TOTAL	226	100.0	620	100.0	678	100.0	381	100.0	1905	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

(Continued from page 72)

Survival

Infants with a major congenital anomaly have been excluded from the analysis of survival, with the exception of data reported in Table 102.

The six–month survival rate for all infants without a major congenital anomaly in the 2005 cohort was 94 per cent (range 87.8 per cent in 1992 to 94.4 per cent in 2004). Survival of infants born at less than 25 weeks gestation was 38.3 per cent (range 33.3 per cent in 2003 to 54.8 per cent in 1993). There was a trend for survival to improve with gestational age (Figure 12 and Table 99). There was no difference in the survival rate between term (94.8 per cent) and preterm infants (93.8 per cent). Among infants who died, 68.4 per cent of deaths occurred during the first week of life (range 62.5 per cent in 1998 to 76.2 per cent in 2002) with a further 21.1 per cent occurring during the first month of life (Table 99).

The six–month survival rate improved with increasing birth weight, ranging from 31.3 per cent for infants in the 500–599 gram group to 93.5 per cent for the 900–999 gram group. Six–month survival continued to improve with increasing birth weight to a maximum of 98.7 per cent for infants of 1,500–1,749 grams birth weight and then decreased slightly (Table 100).

The majority of infants registered in NICUS were born at a tertiary centre. Although the gestational age is the most important risk factor for mortality, disease severity is also important. At each gestational age group those with severe disease are more likely to be transferred to a neonatal intensive care unit.

In 2005, the six–month survival rate for 22–27 week infants born in a tertiary centre (74.4 per cent) was significantly higher than for those born in a non–tertiary centre (60.9 per cent). Place of birth did not significantly affect survival for infants in any of the other gestational age groups (Table 101).

The six–month survival rate was similar for males (94.4 per cent) and females (93.5 per cent) overall, and for all gestational age groups: less than 28 weeks (70.3 per cent versus 75.9 per cent); 28–31 weeks (96.5 per cent versus 95.9 per cent); 32–36 weeks (98.5 per cent versus 98.6 per cent); and 37–41 weeks gestation groups (96.2 percent versus 92 per cent).

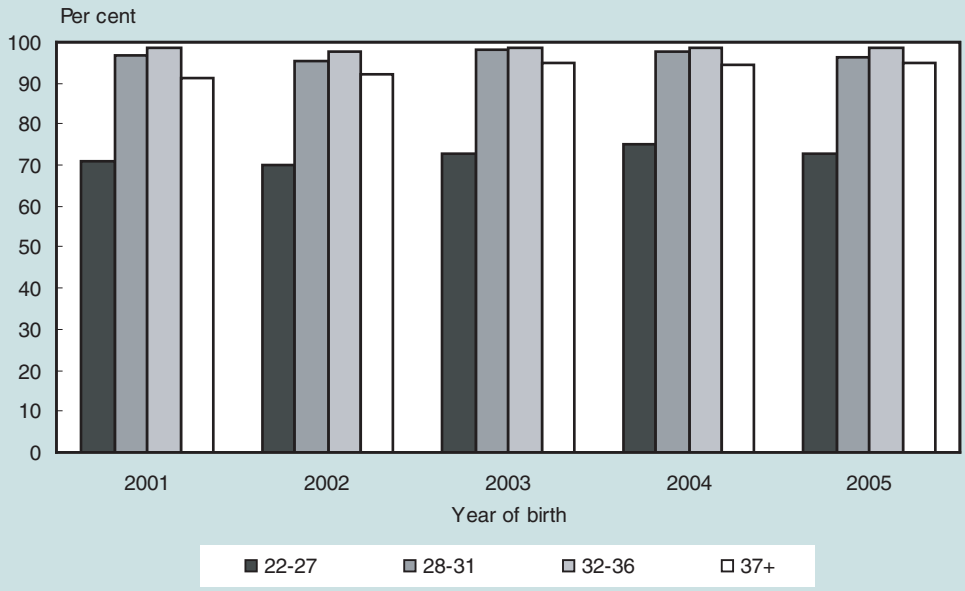
The six–month survival rate was 94 per cent (n=1,384) for singleton infants and 93.8 per cent (n=433) for multiple gestation infants. In 2005 plurality did not significantly influence survival in any of the gestational age groups.

As expected the overall survival rate was generally lower (92.3 per cent) in the presence of a major congenital anomaly (Table 102).

Post–mortem examinations were performed on 29/114 infants (25.4 per cent) who died in the 2005 cohort (Figure 13 and Table 103). Post–mortem examinations were

FIGURE 12

NICUS REGISTRANTS BY 6–MONTHS SURVIVAL AND GESTATIONAL AGE, NSW & ACT 2001–2005#



Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

most commonly not requested for infants 22–27 weeks gestation (57.4 per cent). The highest rate of refusal was in the 28–31 week group (30.4 per cent) and the highest rate of post–mortems done was in the 32–36 week (60 per cent).

TABLE 99

NICUS REGISTRANTS BY DURATION OF SURVIVAL AND GESTATIONAL AGE, NSW & ACT 2005#

Gestational age (weeks)	Alive at 6 months		Age at death (days) 0–7		8–28		28+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
22	0	0.0	1	100.0	0	0.0	0	0.0	1	0.1
23	2	28.6	4	57.1	1	14.3	0	0.0	7	0.4
24	16	41.0	16	41.0	4	10.3	3	7.7	39	2.0
25	31	66.0	11	23.4	3	6.4	2	4.3	47	2.5
26	50	84.7	6	10.2	3	5.1	0	0.0	59	3.1
27	66	90.4	4	5.5	2	2.7	1	1.4	73	3.8
28	107	93.9	5	4.4	1	0.9	1	0.9	114	6.0
29	106	93.0	4	3.5	3	2.6	1	0.9	114	6.0
30	158	97.5	1	0.6	1	0.6	2	1.2	162	8.5
31	226	98.3	4	1.7	0	0.0	0	0.0	230	12.1
32	198	97.5	3	1.5	0	0.0	2	1.0	203	10.7
33	144	98.6	2	1.4	0	0.0	0	0.0	146	7.7
34	139	98.6	2	1.4	0	0.0	0	0.0	141	7.4
35	98	99.0	1	1.0	0	0.0	0	0.0	99	5.2
36	89	100.0	0	0.0	0	0.0	0	0.0	89	4.7
37	61	98.4	0	0.0	1	1.6	0	0.0	62	3.3
38	82	93.2	5	5.7	1	1.1	0	0.0	88	4.6
39	70	97.2	1	1.4	1	1.4	0	0.0	72	3.8
40	85	93.4	5	5.5	1	1.1	0	0.0	91	4.8
41	56	91.8	3	4.9	2	3.3	0	0.0	61	3.2
42	7	100.0	0	0.0	0	0	0	0.0	7	0.4
TOTAL	1791	94.0	78	4.1	24	1.3	12	0.6	1905	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

TABLE 100

NICUS REGISTRANTS BY DURATION OF SURVIVAL AND BIRTH WEIGHT, NSW & ACT 2005#

Birth weight (grams)	Alive at 5 months		Age at death (days) 0–7		8–28		28+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Less than 400	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
400–499	2	40.0	3	60.0	0	0.0	0	0.0	5	0.3
500–599	5	31.3	7	43.8	2	12.5	2	12.5	16	0.8
600–699	25	50.0	17	34.0	5	10.0	3	6.0	50	2.6
700–799	33	73.3	9	20.0	2	4.4	1	2.2	45	2.4
800–899	39	84.8	4	8.7	2	4.3	1	2.2	46	2.4
900–999	58	93.5	3	4.8	1	1.6	0	0.0	62	3.3
1,000–1,249	210	94.6	5	2.3	5	2.3	2	0.9	222	11.7
1,250–1,499	226	97.0	5	2.2	1	0.4	1	0.4	233	12.2
1,500–1,749	227	98.7	2	0.9	0	0.0	1	0.4	230	12.1
1,750–1,999	184	97.4	4	2.1	0	0.0	1	0.5	189	9.9
2,000–2,499	260	97.4	7	2.6	0	0.0	0	0.0	267	14.0
2,500–2,999	172	97.7	3	1.7	1	0.6	0	0.0	176	9.2
3,000–3,499	180	97.8	1	0.5	3	1.6	0	0.0	184	9.7
3,500–3,999	98	93.3	6	5.7	1	1.0	0	0.0	105	5.5
4,000+	72	96.0	2	2.7	1	1.3	0	0.0	75	3.9
TOTAL	1791	94.0	78	4.1	24	1.3	12	0.6	1905	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

TABLE 101

NICUS REGISTRANTS BY DURATION OF SURVIVAL, PLACE OF BIRTH AND GESTATIONAL AGE, NSW & ACT 2005[#]

Gestational age (weeks)	Place of birth	Alive at 6 months		Age at death (days) 0–7		8–28		28+		TOTAL	
		No.	%	No.	%	No.	%	No.	%	No.	%
22–27	Non tertiary	14	60.9	7	30.4	1	4.3	1	4.3	23	10.2
	Tertiary	151	74.4	35	17.2	12	5.9	5	2.5	203	89.8
	Sub–total	165	73.0	42	18.6	13	5.8	6	2.7	226	100.0
28–31	Non tertiary	65	100.0	0	0.0	0	0.0	0	0.0	65	10.5
	Tertiary	530	95.8	14	2.5	5	0.9	4	0.7	553	89.5
	Sub–total	595	96.3	14	2.3	5	0.8	4	0.7	618	100.0
32–36	Non tertiary	186	98.4	3	1.6	0	0.0	0	0.0	189	28.0
	Tertiary	479	98.8	4	0.8	0	0.0	2	0.4	485	72.0
	Sub–total	665	98.7	7	1.0	0	0.0	2	0.3	674	100.0
37–41	Non tertiary	190	93.1	10	4.9	4	2.0	0	0.0	204	54.8
	Tertiary	162	96.4	4	2.4	2	1.2	0	0.0	168	45.2
	Sub–total	352	94.6	14	3.8	6	1.6	0	0.0	372	100.0
42+	Tertiary	6	100.0	0	0.0	0	0.0	0	0.0	6	100.0
	Sub–total	6	100.0	0	0.0	0	0.0	0	0.0	6	100.0
TOTAL		1783	94.0	77	4.1	24	1.3	12	0.6	1896	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded. Babies born before arrival excluded.

TABLE 102

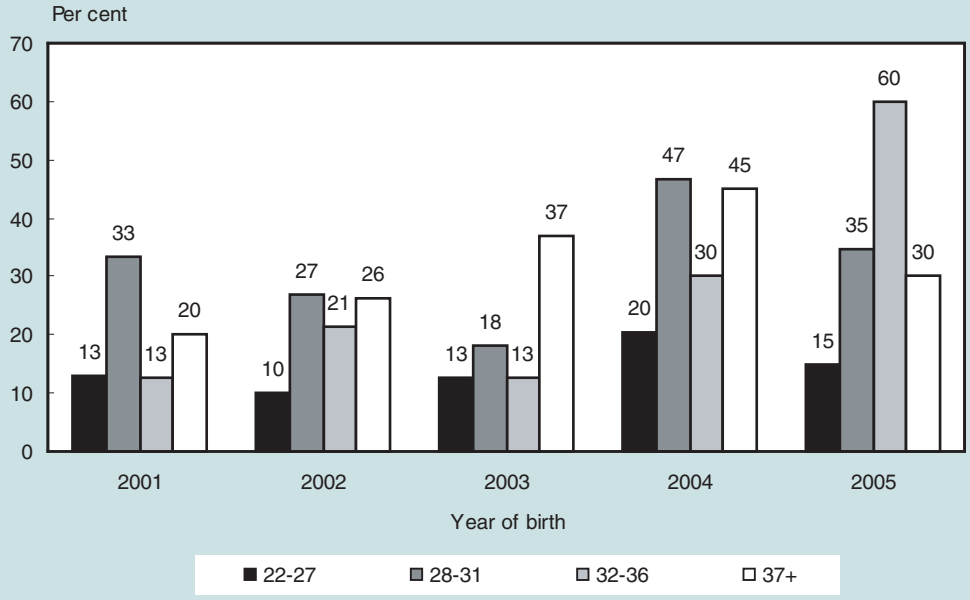
NICUS REGISTRANTS BY DURATION OF SURVIVAL, MAJOR CONGENITAL ANOMALY AND GESTATIONAL AGE, NSW & ACT 2005

Gestational age (weeks)	Major congenital anomaly	Alive at 6 months		Age at death (days) 0–7		8–28		28+		TOTAL	
		No.	%	No.	%	No.	%	No.	%	No.	%
22–27	No	165	73.0	42	18.6	13	5.8	6	2.7	226	93.0
	Yes	14	82.4	3	17.6	0	0.0	0	0.0	17	7.0
	Sub–total	179	73.7	45	18.5	13	5.3	6	2.5	243	100.0
28–31	No	597	96.3	14	2.3	5	0.8	4	0.6	620	95.1
	Yes	21	65.6	6	18.8	3	9.4	2	6.3	32	4.9
	Sub–total	618	94.8	20	3.1	8	1.2	6	0.9	652	100.0
32–36	No	668	98.5	8	1.2	0	0.0	2	0.3	678	87.1
	Yes	81	81.0	9	9.0	7	7.0	3	3.0	100	12.9
	Sub–total	749	96.3	17	2.2	7	0.9	5	0.6	778	100.0
37–41	No	354	94.7	14	3.7	6	1.6	0	0.0	374	64.9
	Yes	175	86.6	16	7.9	9	4.5	2	1.0	202	35.1
	Sub–total	529	91.8	30	5.2	15	2.6	2	0.3	576	100.0
42+	No	7	100.0	0	0.0	0	0.0	0	0.0	7	87.5
	Yes	1	100.0	0	0.0	0	0.0	0	0.0	1	12.5
	Sub–total	8	100.0	0	0.0	0	0.0	0	0.0	8	100.0
TOTAL		2083	92.3	112	5.0	43	1.9	19	0.8	2257	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.

FIGURE 13

NICUS REGISTRANT DEATHS BY POST–MORTEM EXAMINATION AND GESTATIONAL AGE, NSW & ACT 2001–2005#



Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.

TABLE 103

NICUS REGISTRANTS BY POST–MORTEM EXAMINATION AND GESTATIONAL AGE, NSW & ACT 2005#

Post–mortem	Gestational age (weeks)									
	22–27		28–31		32–36		37+		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%
Not requested	35	57.4	8	34.8	2	20.0	10	50.0	55	48.2
Refused	17	27.9	7	30.4	2	20.0	4	20.0	30	26.3
Done	9	14.8	8	34.8	6	60.0	6	30.0	29	25.4
TOTAL	61	100.0	23	100.0	10	100.0	20	100.0	114	100.0

Source: NICUS Data Collection. NSW Centre for Perinatal Health Services Research.
Babies with major congenital anomalies excluded.