

V08.4 Special Report: Late Preterm Births, Comparative Analysis 2006-2008

I. Introduction

The NPIC/QAS V07.1 Quarterly Report included an aggregate profile of CY 2006 Preterm Births occurring at our member hospitals. We have decided to update this analysis and provide a comparison of calendar year 2006 to 2008 data using the NPIC/QAS Trend Database. In order to provide the most valid comparison it is important to compare the same subset of hospitals for the two years.

The Trend Database is used in our standard quarterly reporting and is a subset of 38 NPIC/QAS hospitals that have been members for the five year period profiled in the V08.4 Quarterly Report (2004-2008).

II. Literature Overview of Topic

In the United States preterm delivery is the leading cause of neonatal mortality.¹ In the November 2008 March of Dimes Premature Birth Report card, the United States received a grade of “D”. No state received an “A” when comparing its 2005 preterm birth rate to the Healthy People 2010 objective of 7.6 percent.² Only one state, Vermont, received a “B” and eighteen states received a grade of “F”. There has been a small drop in the rate of preterm births from 12.8 to 12.7 percent according to the National Vital Statistics Reports preliminary data.³ This preliminary data goes on to show a recent decline from 9.1 to 9.0 percent between 2006 to 2007 in late preterm births (34 to 36 6/7 weeks of completed gestation) which had previously risen since 1990.

Many organizations are looking at medical based complications, psychosocial implications and genetic links for the cause of preterm births; mostly the causes are unknown. Preterm births have been linked to complications such as bacterial infections, inflammation, hormone changes, as well as such risk factors as nonwhite race, age, obstetrical history of previous preterm birth and smoking, to name a few. The March of Dimes, The International Preterm Birth Collaborative (PREBIC), Association of Women’s Health, Obstetric and Neonatal Nurses (AWHONN) and The American College of Obstetricians/Gynecologists (ACOG) are a few of the organizations looking at this important issue.

When compared with a term infant, the late preterm infant is at risk for thermoregulation challenges, feeding difficulties, late neonatal sepsis, prolonged physiological jaundice, hypoglycemia, respiratory problems and possible neurodevelopment differences.⁴ Physically, we know that the infant’s lungs and brain are among the last organs to mature during pregnancy. Research suggests that even “healthy” late preterm infants appear to be at risk for developmental delays through the first 5 years of life.⁵ Outcomes of the late preterm infant are not the same as for the term infant. Rates of neonatal intensive care unit admission, length of stay and neonatal morbidities are higher when compared with term infants⁶ and even breastfeeding has been shown to be more difficult for the late preterm infant.⁷

Many hospital newborn practices and guidelines do not address the unique needs of the late preterm infant. In most cases the late preterm infant is treated exactly the same as the term infant. Organizations such as PREBIC, AWHONN, and the March of Dimes mentioned above, in addition to the American Academy of Pediatrics and National Institute of Child Health and Human

Development, are recommending the development of guidelines to address the care of this growing and vulnerable population.

We hope this analysis will give you some indication of the profile of Late Preterm Delivery Rates for the NPIC/QAS Trend Database.

III. Comparative 2006 and 2008 Analysis

Figure 1 CY 2006 and Figure 2 CY 2008 are flow charts which describe the steps used to determine the population for this analysis. The charts show inborn neonates who are linked to a mother, using the mother's medical record number that appears on the baby's record in the NPIC/QAS data submission; and the number of inborns who do not have this link. The next line of boxes display only the inborns who are linked to a mother, by the type of data used to determine the gestational age. The first box shows linked inborns with numeric gestational age on the data submission. The next box shows linked inborns whose gestational age was determined using the ICD-9-CM code for gestational age, 765.2x. The final box on this line shows the linked neonates who do not have the numeric gestational age or the ICD-9-CM code on their records and for purposes of this analysis, have been defaulted to ≥ 37 weeks gestation.

Table 1 in each analysis displays the top 10 associated diagnosis codes for neonates in the 33-34 weeks gestational age category. (The diagnosis code V30xx indicating a live born neonate and codes for extreme immaturity (765.0), other preterm infants (765.1) and weeks of gestation (765.2) are excluded from this list.) Using these same ten diagnosis codes, we analyzed the distribution of neonates in the 35-36 and 37-42 week gestational age categories for each calendar year in order to display the change in clinical profile as the gestational age of the neonate increases.

Table 2 looks at the coded cases in Table 1 by gestational age category. The count of cases, percent of total cases in the gestational age category, average length of stay (ALOS), and average APGAR score at one and five minutes are displayed. The table also shows the All Patient Refined DRG (APR-DRG) subclass distribution, the percent of cases by delivery type, and whether they were coded as an induction and/or an operative vaginal delivery. The final section of this table is a charge analysis which details the percent of cases in each gestational age category with special care charges/days (Neonatal Intensive Care Unit (NICU) and/or Neonatal Intermediate Care (NINT)), the percent with NINT only or NICU only days or charges, and the average total charges, ancillary charges, and accommodation area charges.

IV. Summary Comments

Using the Trend Database for the CY 2006 and 2008 analysis of late preterm infants allows us to look at changes to this subset of neonates over time at the same 38 hospitals. While there may be improvements in the submission of gestational age data and linking of mother/baby records, we would not expect to see a significant change during this relatively short period.

The Summary Table below shows an overall increase in volume of inborn neonates of 1.5 % during this period with no change in the distribution of the reference gestational age group (33-34 weeks), a slight decrease in the ≥ 37 week category (.7%) but a notable increase in the 35-36 week gestational age category (9.3%)

Interestingly, the top ten associated diagnosis categories are exactly the same for both calendar years but the order of their ranking is different. The percentage of cases falling into one of these top ten associated diagnosis categories drops between 2006 and 2008 for the lower gestational age

categories (33-34 weeks and 35-36 weeks) suggesting an change in coding behavior or change in clinical profile from 2006-2008. For the term comparison group, the percent of cases included in the top 10 referenced codes jumped 33.5%.

Other metrics suggest the late preterm infants in the 35-36 week category and term infants ≥ 37 with one of the referenced dx codes had a less complex clinical profile with decreases in ALOS, percent falling into an APR-DRG subclass .3 or .4 (major or extreme complications) and percent with a special care stay.

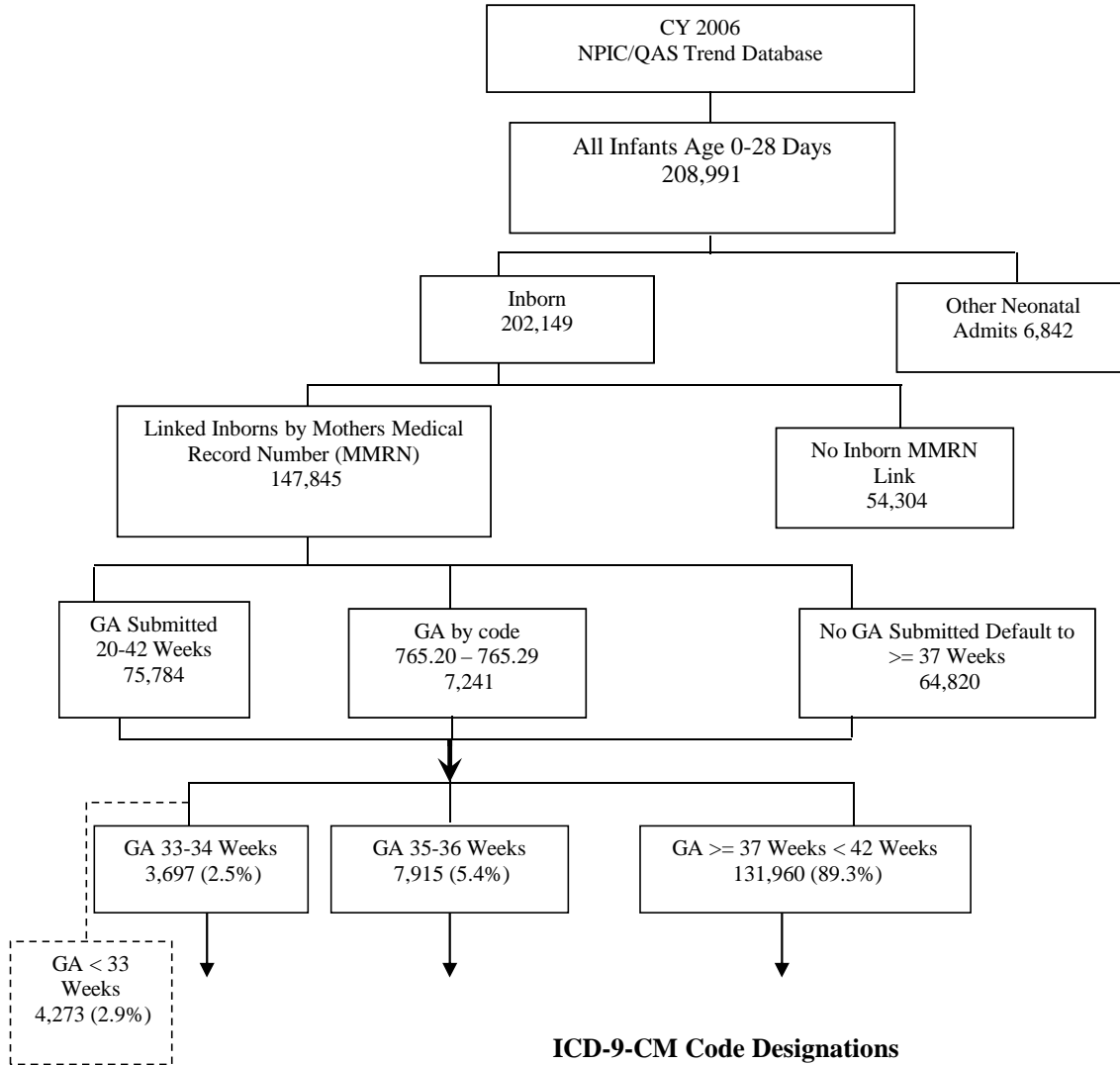
Late Preterm Birth Analysis Summary Table			
	2006	2008	% Change 2006-2008
Total inborn in the analysis	202,149	205,223	1.5%
Percent GA 33-34 weeks	2.5%	2.5%	0.0%
Percent GA 35-36 weeks	5.4%	5.9%	9.3%
Percent GA ≥ 37 weeks	89.3%	88.7%	-0.7%
Cases with one of the top ten associated Dx codes			
Percent of Total			
33-34 weeks	73.1%	66.1%	-9.6%
35-36 weeks	50.3%	46.2%	-8.2%
≥ 37 weeks	26.0%	34.7%	33.5%
ALOS for cases with one of the top ten Dx codes			
33-34 weeks	11.5	11.8	2.6%
35-36 weeks	5.5	5.0	-9.1%
≥ 37 weeks	3.5	3.0	-14.3%
Percent with major or extreme complications (APR DRG subclass .3 or .4)			
33-34 weeks	33.8%	34.1%	0.9%
35-36 weeks	30.0%	25.2%	-16.0%
≥ 37 weeks	7.3%	4.9%	-32.9%
Percent with special care charges/days (NICU and/or NINT)			
33-34 weeks	91.2%	93.8%	2.9%
35-36 weeks	51.8%	43.7%	-15.6%
≥ 37 weeks	13.5%	8.5%	-37.0%

We welcome your comments about this analysis. Please email Sandra Boyle, Director of Membership Services at sboyle@npic.org or Julie Shocksnyder, Associate Vice President at jshocksnyder@npic.org; or you may call either of them at (401) 274-0650.

V. References

- ¹ American Academy of Pediatrics & The American College of Obstetricians and Gynecologists. (2007). *Guidelines for Perinatal Care 6th ed.* Washington, DC: author.
- ² March of Dimes News desk. (2008, November 12). Nation Gets A "D" As March of Dimes releases Premature Birth Report Card. HYPERLINK "http://www.marchofdimes.com/aboutus/22684_42538.asp" http://www.marchofdimes.com/aboutus/22684_42538.asp .
- ³ US Department of health and Human Services, CDC. (2009, Vol. 57, No.12). Births: Preliminary Data for 2007. *National Vital Statistics Reports* .
- ⁴ Darcy, A. (2009). Complications of the late preterm infant. *Journal Perinatal Neonatal Nursing* ,23(1). pp. 78-86.
- ⁵ Morse, S. Z. (2009). Early school-age outcomes of late preterm infants. . *Pediatrics* , 123(4). pp. e622-9.
- ⁶ Lubow, J. H. (2009). Indications for delivery and short-term neonatal outcomes in late preterm as compared with term births. *American Journal of Obstetrics & Gynecology* , pp. e30-33.
- ⁷ Walker, M. (2008). Breastfeeding the late preterm infant. *Journal of Obstetric, Gynecologic & Neonatal Nursing* , 37(6). pp. 692-701.

**Figure 1
Late Preterm Infants Analysis
CY 2006**



ICD-9-CM Code Designations

- 765.20 Unspecified weeks of GA
- 765.21 < 24 weeks GA
- 765.22 24 completed weeks of GA
- 765.23 25-26 completed weeks of GA
- 765.24 27-28 completed weeks of GA
- 765.25 29-30 completed weeks of GA
- 765.26 31-32 completed weeks of GA
- 765.27 33-34 completed weeks of GA
- 765.28 35-36 completed weeks of GA
- 765.29 37 or more completed weeks of GA

Table 1
CY 2006 NPIC/QAS Trend Database
Top Ten Associated Diagnosis for Late Preterm and Term Births

Gestational age 33-34 weeks				
Ranking of DX Codes (top 10 DX codes) (excluding V30XX- Live born & 765.x)		Count	% of total	ALOS
774.2	Neonatal jaundice associated with preterm delivery	989	36.6%	10.2
769	Respiratory Distress Syndrome	498	18.4%	14.8
779.3	Feeding problems in newborn	219	8.1%	8.6
775.6	Neonatal hypoglycemia	204	7.5%	9.8
771.81	Septicemia (sepsis) of newborn	183	6.8%	8.9
V29.0	Observation for suspected infectious condition	174	6.4%	4.7
770.6	Transitory tachypnea of newborn	137	5.1%	8.2
V05.3	Need for other prophylactic vaccination: viral hepatitis	122	4.5%	3.0
770.89	Other Respiratory problems after birth	110	4.1%	7.3
770.81	Primary Apnea of Newborn	67	2.5%	6.7
Top 10 DX Codes (GA 33-34 wks) Subtotal		2703	73.1%	11.5
Cases with only V30XX or V30XX and 765XX		163	4.4%	4.3
All Others		831	22.5%	11.5
Total (GA 33-34 wks)		3697	100.0%	11.5

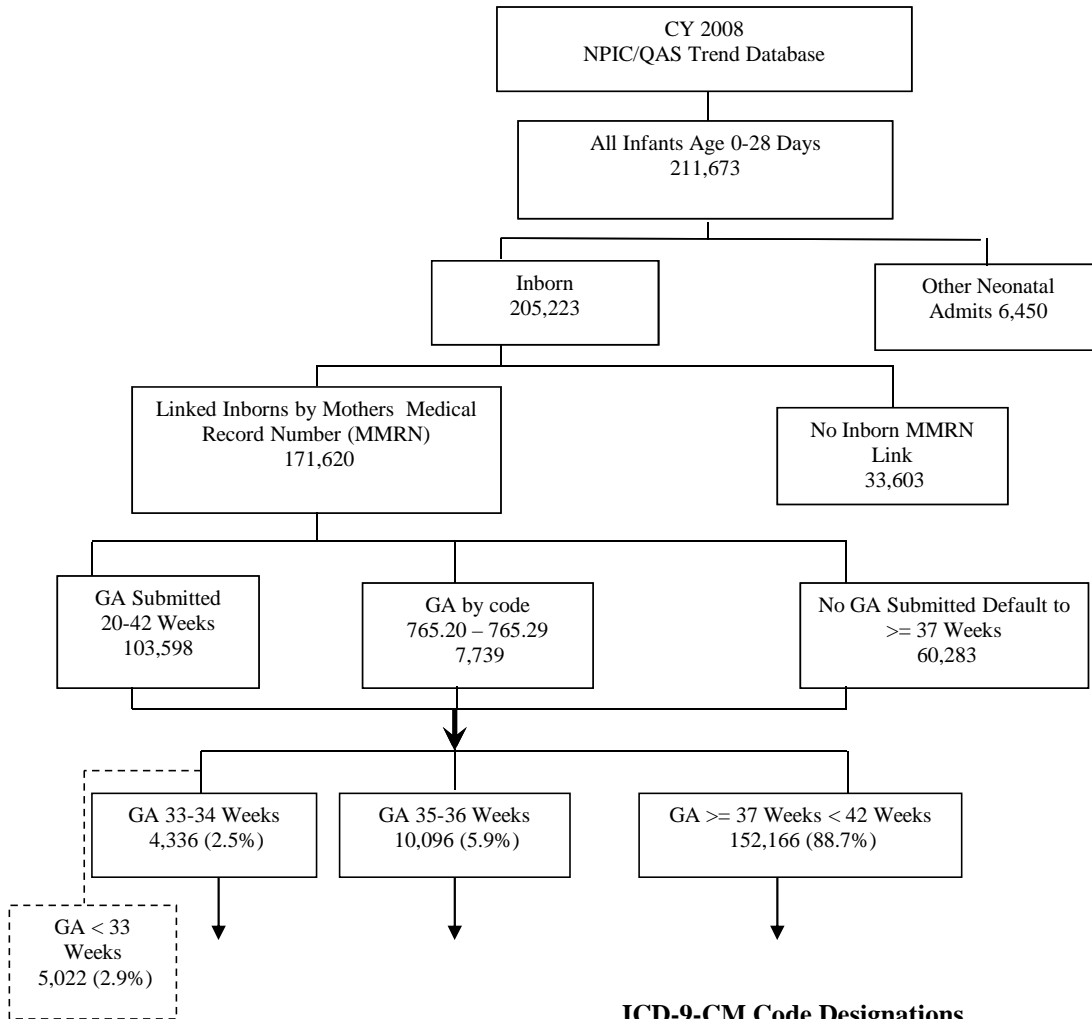
Gestational age 35-36 weeks				
10 Predetermined DX codes (see above)		Count	% of total	ALOS
774.2	Neonatal jaundice associated with preterm delivery	1290	32.4%	5.1
769	Respiratory Distress Syndrome	383	9.6%	10.2
779.3	Feeding problems in newborn	201	5.0%	5.6
775.6	Neonatal hypoglycemia	336	8.4%	5.2
771.81	Septicemia (sepsis) of newborn	166	4.2%	7.4
V29.0	Observation for suspected infectious condition	243	6.1%	2.8
770.6	Transitory tachypnea of newborn	307	7.7%	3.7
V05.3	Need for other prophylactic vaccination: viral hepatitis	851	21.4%	1.8
770.89	Other Respiratory problems after birth	169	4.2%	4.1
770.81	Primary Apnea of Newborn	38	1.0%	2.7
10 Predetermined DX Codes (GA 35-36 wks) Subtotal		3984	50.3%	5.5
Cases with only V30XX or V30XX and 765XX		1684	21.3%	2.5
All Others		2247	28.4%	5.4
Total (GA 35-36 wks)		7915	100.0%	5.0

Gestational age 37-42 weeks				
10 Predetermined DX codes (see above)		Count	% of total	ALOS
774.2	Neonatal jaundice associated with preterm delivery	280	0.8%	8.7
769	Respiratory Distress Syndrome	504	1.5%	18.3
779.3	Feeding problems in newborn	684	2.0%	4.2
775.6	Neonatal hypoglycemia	1510	4.4%	3.6
771.81	Septicemia (sepsis) of newborn	874	2.6%	10.2
V29.0	Observation for suspected infectious condition	3468	10.1%	2.4
770.6	Transitory tachypnea of newborn	1797	5.2%	3.3
V05.3	Need for other prophylactic vaccination: viral hepatitis	24131	70.4%	2.0
770.89	Other Respiratory problems after birth	922	2.7%	3.1
770.81	Primary Apnea of Newborn	99	0.3%	3.0
10 Predetermined DX Codes (GA 37-42 wks) Subtotal		34269	26.0%	3.5
Cases with only V30XX or V30XX and 765XX		47829	36.2%	2.2
All Others		49862	37.8%	3.0
Total (GA 37-42 wks)		131960	100.0%	2.8

Table 2
CY 2006 NPIC/QAS Trend Database
Late Preterm and Term Births by APR DRG Subclass, Delivery Type and Charges

Cases with Coded Conditions ONLY	GA 33-34	GA 35-36	GA 37-42
Count of cases	2703	3984	34269
Percent of total in GA category	73.1%	50.3%	26.0%
ALOS	11.5	5.5	3.5
Average APGAR 1	6	6	7
Average APGAR 5	7	7	7
APR DRG Subclass Distribution (Percent of total)			
Subclass 1 Minor complications	31.7%	31.2%	68.4%
Subclass 2 Moderate complication	33.6%	37.8%	23.2%
Subclass 3 Major complications	31.9%	28.5%	6.7%
Subclass 4 Extreme complications	1.9%	1.5%	0.6%
APRDRG Subclass undefined	0.8%	1.0%	1.1%
	100.0%	100.0%	100.0%
Delivery Type (case linked to mother's record)			
Percent delivered by c-section	57.2%	49.0%	31.6%
Percent delivered by c-section with induction code	3.2%	4.3%	4.0%
Percent delivered vaginally	42.8%	51.0%	68.4%
Percent delivered vaginally with induction code	8.7%	11.4%	14.4%
Percent with operative vaginal delivery code	2.5%	4.2%	5.9%
Charge analysis			
Percent with Special care charges/days (NICU and/or NINT)	91.2%	51.8%	13.5%
Percent with NICU only charges/days	19.3%	11.7%	4.8%
Percent with NINT only charges/days	26.8%	22.2%	6.0%
Average total charge	\$37,039	\$16,741	\$9,035
Average total ancillary charge	\$7,533	\$4,583	\$2,629
Average routine nursery charge	\$5,469	\$3,287	\$1,628
Average Special care charge	\$25,220	\$14,815	\$15,022
Average NICU charge	\$14,413	\$10,604	\$13,605
Average NINT charge	\$14,704	\$8,263	\$7,933

**Figure 2
Late Preterm Infants Analysis
CY 2008**



ICD-9-CM Code Designations

- 765.20 Unspecified weeks of GA
- 765.21 < 24 weeks GA
- 765.22 24 completed weeks of GA
- 765.23 25-26 completed weeks of GA
- 765.24 27-28 completed weeks of GA
- 765.25 29-30 completed weeks of GA
- 765.26 31-32 completed weeks of GA
- 765.27 33-34 completed weeks of GA
- 765.28 35-36 completed weeks of GA
- 765.29 37 or more completed weeks of GA

Table 3
CY 2008 NPIC/QAS Trend Database
Top Ten Associated Diagnosis for Late Preterm and Term Births

Gestational age 33-34 weeks				
Ranking of DX Codes (top 10 DX codes) (excluding V30XX- Live born & 765.x)		Count	% of total	ALOS
769	Respiratory Distress Syndrome	659	23.0%	13.9
774.2	Neonatal jaundice associated with preterm delivery	596	20.8%	9.4
770.81	Primary Apnea of Newborn	313	10.9%	10.6
V29.0	Observation for suspected infectious condition	228	8.0%	4.7
775.6	Neonatal hypoglycemia	224	7.8%	9.3
770.6	Transitory tachypnea of newborn	199	6.9%	7.4
771.81	Septicemia (sepsis) of newborn	198	6.9%	9.4
779.3	Feeding problems in newborn	162	5.7%	7.0
770.89	Other Respiratory problems after birth	152	5.3%	8.3
V05.3	Need for other prophylactic vaccination: viral hepatitis	136	4.7%	2.8
Top 10 DX Codes (GA 33-34 wks) Subtotal		2867	66.1%	11.8
Cases with only V30XX or V30XX and 765XX		116	2.7%	4.0
All Others		1353	31.2%	13.3
Total (GA 33-34 wks)		4336	100.0%	12.1

Gestational age 35-36 weeks				
10 Predetermined DX codes (see above)		Count	% of total	ALOS
769	Respiratory Distress Syndrome	451	9.7%	10.3
774.2	Neonatal jaundice associated with preterm delivery	924	19.8%	4.5
770.81	Primary Apnea of Newborn	110	2.4%	6.0
V29.0	Observation for suspected infectious condition	396	8.5%	2.5
775.6	Neonatal hypoglycemia	382	8.2%	5.7
770.6	Transitory tachypnea of newborn	482	10.3%	4.5
771.81	Septicemia (sepsis) of newborn	169	3.6%	6.5
779.3	Feeding problems in newborn	131	2.8%	4.9
770.89	Other Respiratory problems after birth	203	4.4%	4.7
V05.3	Need for other prophylactic vaccination: viral hepatitis	1416	30.4%	1.8
10 Predetermined DX Codes (GA 35-36 wks) Subtotal		4664	46.2%	5.0
Cases with only V30XX or V30XX and 765XX		1957	19.4%	2.9
All Others		3475	34.4%	5.3
Total (GA 35-36 wks)		10096	100.0%	4.7

Gestational age 37-42 weeks				
10 Predetermined DX codes (see above)		Count	% of total	ALOS
769	Respiratory Distress Syndrome	476	0.9%	14.6
774.2	Neonatal jaundice associated with preterm delivery	155	0.3%	3.7
770.81	Primary Apnea of Newborn	192	0.4%	3.6
V29.0	Observation for suspected infectious condition	5092	9.6%	2.4
775.6	Neonatal hypoglycemia	1505	2.8%	4.3
770.6	Transitory tachypnea of newborn	2178	4.1%	3.2
771.81	Septicemia (sepsis) of newborn	785	1.5%	5.9
779.3	Feeding problems in newborn	459	0.9%	3.1
770.89	Other Respiratory problems after birth	983	1.9%	3.2
V05.3	Need for other prophylactic vaccination: viral hepatitis	41027	77.6%	1.6
10 Predetermined DX Codes (GA 37-42 wks) Subtotal		52852	34.7%	3.0
Cases with only V30XX or V30XX and 765XX		41567	27.3%	2.1
All Others		57747	38.0%	3.0
Total (GA 37-42 wks)		152166	100.0%	2.7

Table 4
CY 2008 NPIC/QAS Trend Database
Late Preterm and Term Births by APR DRG Subclass, Delivery Type and Charges

Cases with Coded Conditions ONLY	GA 33-34	GA 35-36	GA 37-42
Count of cases	2867	4664	52852
Percent of total in GA category	66.1%	46.2%	34.7%
ALOS	11.8	5.0	3.0
Average APGAR 1	5	6	6
Average APGAR 5	7	7	7
APR DRG Subclass Distribution (Percent of total)			
Subclass 1 Minor complications	29.9%	37.2%	74.1%
Subclass 2 Moderate complication	34.8%	36.3%	19.3%
Subclass 3 Major complications	32.2%	24.3%	4.7%
Subclass 4 Extreme complications	1.9%	0.9%	0.2%
APRDRG Subclass undefined	1.2%	1.3%	1.6%
	100.0%	100.0%	100.0%
Delivery Type (case linked to mother's record)			
Percent delivered by c-section	57.8%	49.8%	31.6%
Percent delivered by c-section with induction code	3.1%	3.7%	3.9%
Percent delivered vaginally	42.2%	50.2%	68.4%
Percent delivered vaginally with induction code	8.7%	10.5%	14.2%
Percent with operative vaginal delivery code	2.4%	3.5%	4.3%
Charge analysis			
Percent with Special care charges/days (NICU and/or NINT)	93.8%	43.7%	8.5%
Percent with NICU only charges/days	18.9%	10.1%	2.5%
Percent with NINT only charges/days	26.0%	18.1%	4.1%
Average total charge	\$42,342	\$15,619	\$7,896
Average total ancillary charge	\$8,976	\$4,068	\$2,756
Average routine nursery charge	\$5,129	\$2,959	\$1,732
Average Special care charge	\$29,057	\$16,975	\$13,536
Average NICU charge	\$15,623	\$12,647	\$11,914
Average NINT charge	\$16,825	\$8,890	\$6,859