



**The Canadian Neonatal Network™**  
**Le Réseau Néonatal Canadien™**  
**Annual Report 2018 Rapport Annuel**

## **Acknowledgements**

This report is based upon data collected from 32 Health Care Organizations that were members of the Canadian Neonatal Network™ during the year 2018. In addition to all the investigators and the funding agency, we would like to recognize the invaluable support of the Neonatal Intensive Care Units (NICUs) that collected this information, the support of all of the participating sites and most importantly, the dedication and hard work of the Site Investigators, NICU Medical Directors and Data Abstractors.

### **Structure of the CNN**

The Canadian Neonatal Network™ (CNN) is a group of researchers who collaborate on research issues relating to neonatal care. The CNN was founded in 1995 by Dr. Shoo Lee. The CNN maintains a standardized neonatal database and provides unique opportunities for researchers to participate in collaborative projects on a national and international scale. Health care professionals, health services researchers, and health care administrators participate actively in clinical, epidemiologic, outcomes, health services, health policy and informatics research aimed at improving quality, effectiveness and efficiency of neonatal care. Research results are published in Network reports and in peer-reviewed journals.

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Moncton Hospital, Moncton, New Brunswick

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## A. Executive Summary

### **Inclusion summary:**

This report from the Canadian Neonatal Network<sup>TM</sup> (CNN) is based on data from 32 tertiary NICU sites that contributed data in the year 2018. Admissions between January 1, 2018 and December 31, 2018 who were discharged by March 31, 2019 were included. Eight (8) infants who were admitted in 2017 but discharged after March 31, 2018 were also included in the 2018 report. Delivery room deaths, moribund neonates, and readmissions from 2017 were excluded.

Total number of eligible admissions to participating Canadian sites (See section D.1 for analyses)	16 827
Total number of eligible individual neonates (See section D.2. for analyses)	15 484
Total number of eligible very preterm (GA <33 weeks) neonates	4 482
Total number of eligible extremely preterm (GA <29 weeks) neonates (See section D.3. for analyses)	2 299
Total number of eligible very low birth weight (BW <1500 g) neonates (See section D.3. for analyses)	3 086

### **Important information for data interpretations:**

- Neonates who were transferred to a “normal newborn care area” (level I nursery) or discharged home within 24 hours of their admission to the site were excluded.
- In 2018, seven (7) sites had resource limitations and were only able to contribute data from a subset of eligible neonates admitted to their NICUs. Each of these seven (7) sites included, at a minimum, all neonates born at less than 33 weeks’ gestational age (GA). See [page 3](#) for data collection criteria of all participating sites.
- Characteristics of participating sites were highlighted at the outset of the presentations.
- ‘Missing’ data on outcome variables varied for each presentation. Caution should be used when interpreting the information. When possible, both the total number of neonates and the number of neonates with available data were provided.
- The denominators for all percentages in this report included neonates whose data for that particular item were available.
- This report included data from neonates who were admitted to the NICUs, except for Presentations #4, #6 and #6b.
- Presentations #4, #6 and #6b included delivery room deaths.
- Neonates who were not admitted to participating NICUs were not included in this report.

**Noteworthy findings:**

- a. Out of 32 CNN sites, 30 had maternity units in their facilities; and of those, 29 collected data on delivery room deaths in 2018.
- b. 22% of all admitted neonates were outborn neonates and 14% of neonates of <33 weeks' GA were admitted as outborn neonates.
- c. The survival rate has remained similar at lower GAs:
  - i. At 22 weeks' GA, 13% of all neonates and 34% of neonates who received intensive care survived.
  - ii. At 23 weeks' GA, 34% of all neonates and 47% of neonates who received intensive care survived.
- d. The survival rate also remained similar at lower BWs:
  - i. At 400-499g, 30% of all neonates and 52% of neonates who received intensive care survived.
  - ii. At 500-599g, 49% of all neonates and 61% of neonates who received intensive care survived.
- e. Among inborn neonates <29 weeks' GA at birth:
  - i. 44% received a complete course of antenatal steroids within the last week prior to birth
  - ii. 76% received MgSO<sub>4</sub> for neuroprotection.
  - iii. 47% received deferred cord clamping.
  - iv. 28% were hypothermic (temperature <36.5°C) on admission.
  - v. 92% received antibiotics at some time during their stay.
  - vi. 20% were never intubated during their stay.
  - vii. 36% were exclusively breast milk feeding at discharge and 23% were exclusively formula feeding at discharge.
- f. A majority of neonates received <40% oxygen at the start of resuscitation.
- g. Surgical ligation for PDA decreased and was done in 48 neonates.
- h. NEC rates were 4% in neonates <33 weeks' GA and 5% for VLBW neonates.
- i. Stage 3 ROP occurred in 8% of neonates <33 weeks' GA (6% required treatment) and in 9% of neonates <1500g BW (7% required treatment).
- j. A total of 566 neonates were diagnosed with HIE and of whom 306 received hypothermia.

## B. CNN Site Characteristics

SITE	CNN data collection criteria	Level II / Step-down nursery	Level II / Step-down data included in CNN	Delivery room deaths included in CNN	ROP treatment service?	PDA surgical service?
Victoria General Hospital	All eligible admissions	y	y	y	y	y
BC Women's Hospital	All eligible admissions	y	n	y	y	y
Royal Columbian Hospital	All eligible admissions	y	y	y	y	n
Surrey Memorial Hospital	All eligible admissions	y	y	y	n	n
Foothills Medical Centre	All eligible admissions	n	n/a	y	y	y
Alberta Children's Hospital	All eligible admissions	n	n/a	n/a	y	y
Royal Alexandra Hospital (Edmonton)*	< 33 weeks GA & HIE	y	y	y	y	n
University of Alberta Hospital - Stollery (Edmonton)*	All eligible admissions	n	n/a	n/a	n	y
Regina General Hospital	All eligible admissions	y	y	y	n	n
Royal University Hospital	All eligible admissions	n	n/a	n	n	y
Health Sciences Centre Winnipeg	<33 weeks GA, cardiacs, CDH & gastroschisis	y	y	y	y	y
St. Boniface General Hospital	All eligible admissions	n	n/a	y	y	y
Hamilton Health Sciences	All eligible admissions	y	n	y	y	y
London Health Sciences Centre	All eligible admissions	y	y	y	y	y
Windsor Regional Hospital	All eligible admissions	n	n/a	y	y	n
Hospital for Sick Children	All eligible admissions	n	n/a	n/a	y	y
Mount Sinai Hospital	All eligible admissions	y	y	y	n	n
Sunnybrook Health Sciences Centre	All eligible admissions	n	n/a	y	n	n
Children's Hospital of Eastern Ontario and the Ottawa Hospital**	< 33 weeks GA	y	y	y	y	y
Kingston General Hospital	All eligible admissions	y	y	y	y	y
Jewish General Hospital	All eligible admissions	y	y	y	y	n
Hôpital Sainte-Justine	All eligible admissions	y	n	y	y	y
Centre Hospitalier Universitaire de Quebec	< 33 weeks GA	y	n	y	y	y
Montreal Children's Hospital - MUHC	All eligible admissions	n	n/a	y	y	y
Centre Hospitalier Universitaire de Sherbrooke	< 33 weeks GA & HIE	y	n	y	n	n
Hôpital Maisonneuve-Rosemont	< 33 weeks GA	n	n/a	y	y	n
The Moncton Hospital	All eligible admissions	n	n/a	y	n	n
Dr. Everett Chalmers Hospital	All eligible admissions	n	n/a	y	n	n
Saint John Regional Hospital	All eligible admissions	n	n	y	n	n
Janeway Children's Health & Rehab Centre	All eligible admissions	y	y	y	y	y
IWK Health Centre	< 37 weeks GA, HIE, CDH & gastroschisis	y	y	y	y	y
Cape Breton Regional Hospital	All eligible admissions	n	n/a	y	n	n
University of Utah Hospital	All eligible admissions	y	n	y	n	n

\* Royal Alexandra Hospital &amp; University of Alberta Hospital transmit data as one site

\*\* Children's Hospital of Eastern Ontario and the Ottawa Hospital transmit data as one site

## **C. Information Systems**

Neonates included in this report are those who were admitted to a CNN participating site between January 1, 2018 and December 31, 2018, and were discharged by March 31, 2019. The neonates must have had a length of stay at one of the CNN participating sites for greater than or equal to 24 hours, or died or were transferred to another level 2 or 3 facility within 24 hours. Eight (8) infants who were admitted in 2017 but discharged after March 31, 2018 were also included in the 2018 report. Delivery room deaths, moribund neonates, and readmissions from 2017 were excluded. A total of 15 484 patients accounted for 16 827 admissions as some neonates were admitted on more than one occasions.

Patient information was retrospectively abstracted from patient charts by trained personnel using standard definitions and protocols contained in a standard manual of operations. Data were usually entered into a laptop computer using a customized data entry program with built-in error checking and subsequently sent electronically to the Canadian Neonatal Network<sup>TM</sup> Coordinating Centre located at the Maternal-Infant Care Research Centre (MiCare) in Toronto, Ontario. Patient data at each participating site are available to the respective site investigator and data abstractor only. Patient identifiers were stripped prior to data transfer to the Coordinating Centre. Patient confidentiality was strictly observed. A unique identifier was generated for each entry of neonate into the system and that identifier was followed throughout one or more hospital stays. Individual-level data are used for analyses, but only aggregate data are reported. The results presented in this report will not identify participating sites by name; each site is anonymous using a randomly assigned number. Whenever a small cell size (1 to 4 individuals) was observed in the data output, the data were grouped to maintain anonymity.

At each participating site, data are stored in a secured database in the site or in an alternate secured site used by the site to store patient information (e.g. health records department, computer services department). At the Coordinating Centre, the central database is stored in a secured computer database located on a server and an off-site back up that is maintained and secured by the Mount Sinai Hospital Information Technology Department. At the Coordinating Centre, information was verified for completeness and was reviewed for accuracy by looking for “unusual” and missing values on individual data items and by comparison with other information that might be related (e.g. gestational age [GA] and birth weight [BW]). However, the principal accuracy rests upon the diligence and capabilities of the individual sites. Each site had one or occasionally two dedicated person(s) responsible for data acquisition and transmission.

At the Coordinating Centre, analyses were conducted using univariate, bivariate, and multivariate analyses for the total cohort, and for individual sites. Multivariable regression analysis was used to identify risk factors associated with mortality and major morbidities. Grouped data enabled development of outcome graphs by GA and BW for mortality and selected major morbidities. Similar systems have been used to assist in quality assurance and predict resource utilization.

## **D. Descriptive Analyses**

This section is divided into three sub-sections.

### **Section D.1. Analyses based on number of eligible admissions to participating sites**

These include data from 16 827 eligible admissions (including readmissions) to 32 sites. 25 of these sites submitted complete data (n=14 832) on all admissions and 7 sites submitted data on a selected admission cohort (n=1 995).

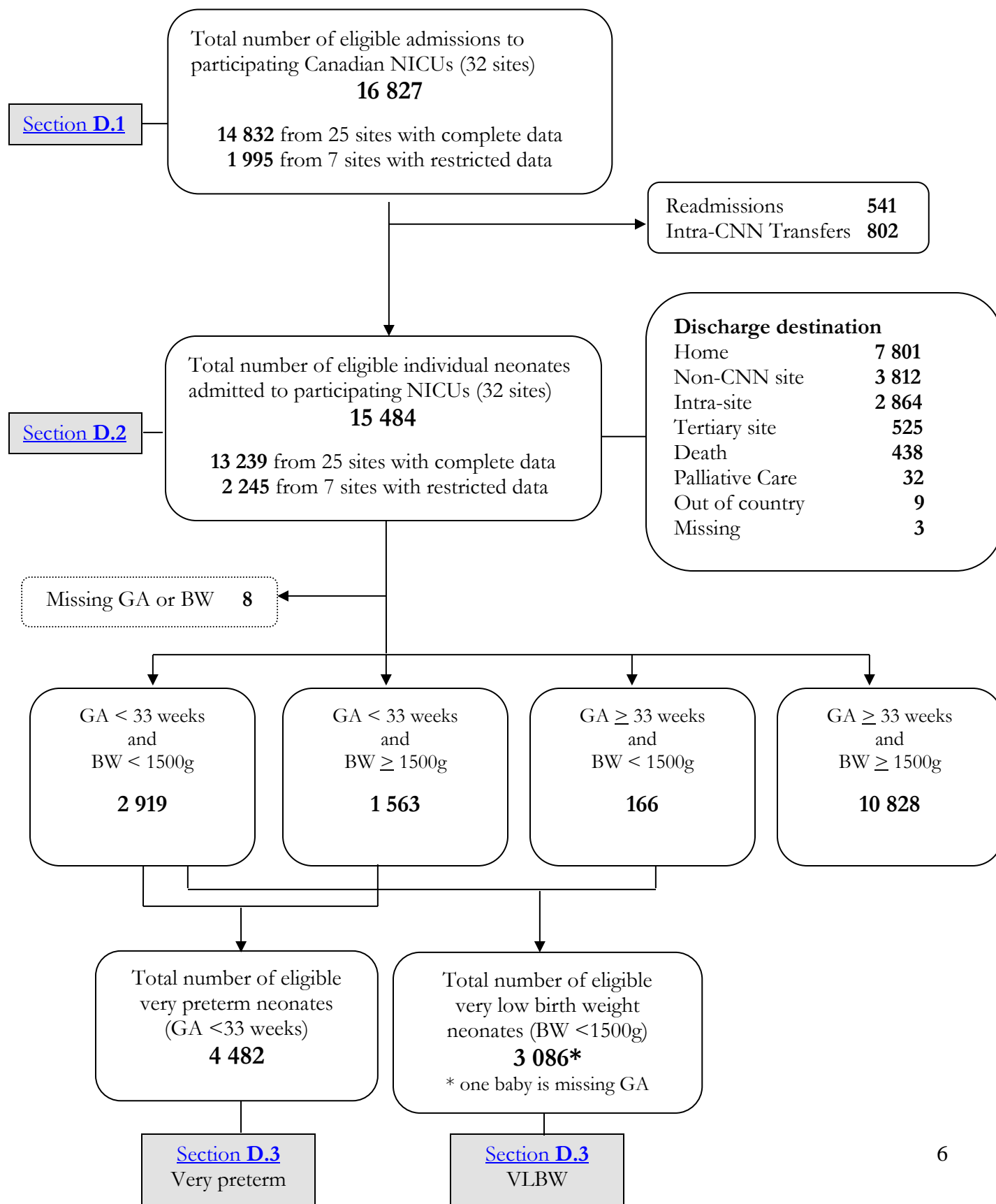
### **Section D.2. Analyses based on number of eligible neonates admitted to participating sites**

These include data from 15 484 eligible neonates admitted to 32 sites. 25 of these sites submitted complete data (n=13 239) on all eligible admitted neonates and 7 sites submitted data on selected eligible admitted neonates (n=2 245).

### **Section D.3. Analyses based on number of eligible very preterm (GA <33 weeks) or very low birth weight (BW <1500g) neonates**

These include data from 4 482 eligible very preterm neonates and 3 086 eligible very low birth weight (VLBW) neonates.

Canadian Neonatal Network™ Database: Admissions between January 1, 2018 and December 31, 2018 who were discharged by March 31, 2019. Eight (8) infants who were admitted in 2017 but discharged after March 31, 2018 were also included in the 2018 report. Delivery room deaths, moribund neonates, and readmissions from 2017 were excluded.

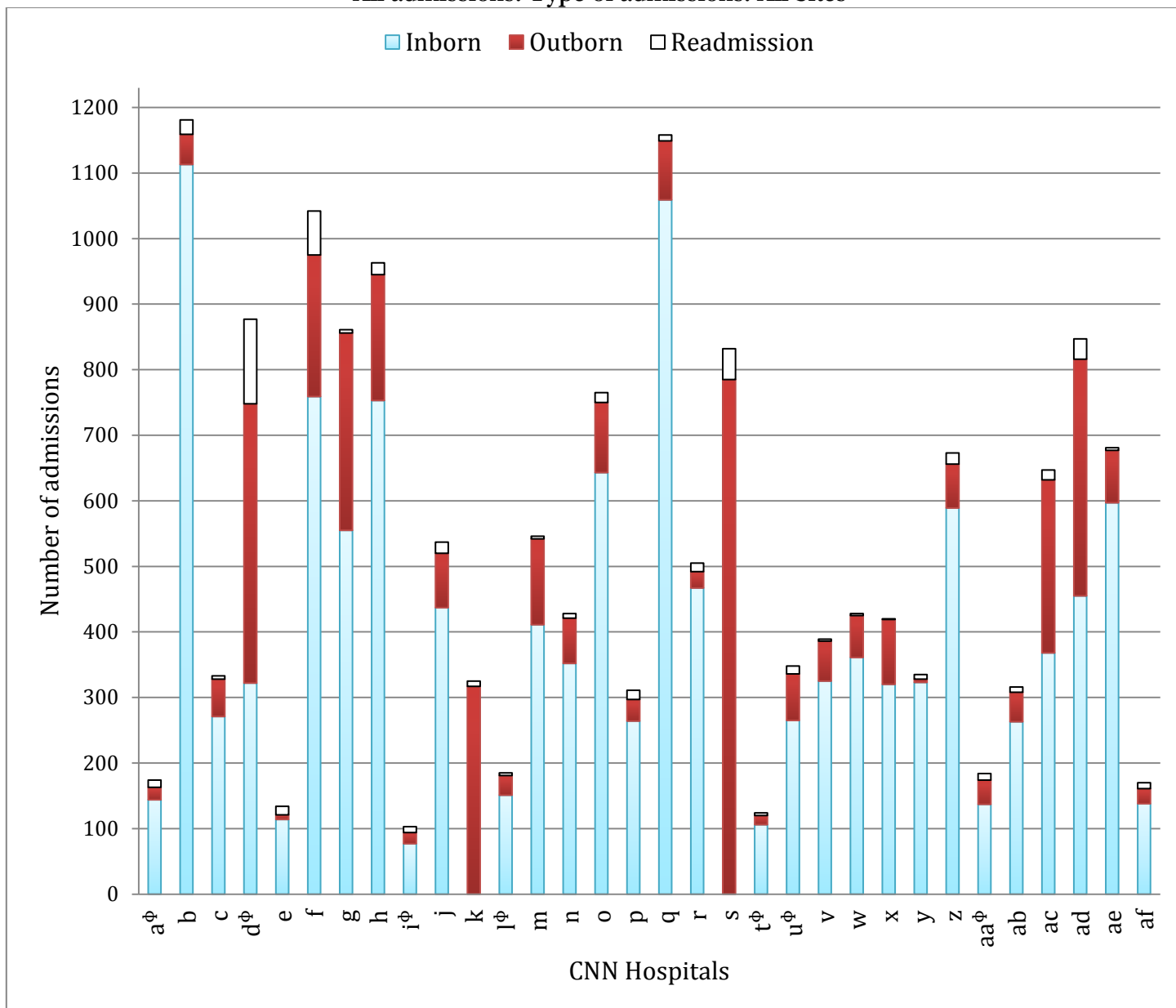


## **Section D.1**

### **Analyses based on number of eligible admissions to participating sites**

These include data from 16 827 eligible admissions (including readmissions) to 32 sites. 25 of these sites submitted complete data (n=14 832) on all admissions and 7 sites submitted data on a selected admission cohort (n=1 995).

Presentation #1  
All admissions: Type of admissions: All Sites



† Data collected on selected cohort of eligible admissions only.

**Presentation #1 (continued)**  
**All admissions: Type of admissions: All Sites**

Sites		Admission Status			Total
		Inborn	Outborn	Readmission	
a <sup>Φ</sup>	Count	144	19	11	174
	%	82.8	10.9	6.3	(100.0)
b	Count	1113	46	22	1181
	%	94.2	3.9	1.9	(100.0)
c	Count	271	57	5	333
	%	81.4	17.1	1.5	(100.0)
d <sup>Φ</sup>	Count	322	426	129	877
	%	36.7	48.6	14.7	(100.0)
e	Count	114	7	13	134
	%	85.1	5.2	9.7	(100.0)
f	Count	759	216	67	1042
	%	72.8	20.7	6.4	(100.0)
g	Count	555	301	5	861
	%	64.5	35.0	0.6	(100.0)
h	Count	753	192	18	963
	%	78.2	19.9	1.9	(100.0)
i <sup>Φ</sup>	Count	77	17	9	103
	%	74.8	16.5	8.7	(100.0)
j	Count	437	83	17	537
	%	81.4	15.5	3.2	(100.0)
k	Count	0	317	8	325
	%	0.0	97.5	2.5	(100.0)
l <sup>Φ</sup>	Count	151	30	4	185
	%	81.6	16.2	2.2	(100.0)
m	Count	411	131	4	546
	%	75.3	24.0	0.7	(100.0)
n	Count	352	69	7	428
	%	82.2	16.1	1.6	(100.0)
o	Count	643	107	15	765
	%	84.1	14.0	2.0	(100.0)
p	Count	264	33	14	311
	%	84.9	10.6	4.5	(100.0)

Sites		Admission status			Total
		Inborn	Outborn	Readmission	
q	Count	1059	90	9	1158
	%	91.5	7.8	0.8	(100.0)
r	Count	467	25	13	505
	%	92.5	5.0	2.6	(100.0)
s	Count	0	785	47	832
	%	0.0	94.4	5.7	(100.0)
t <sup>Φ</sup>	Count	106	14	4	124
	%	85.5	11.3	3.2	(100.0)
u <sup>Φ</sup>	Count	265	71	12	348
	%	76.2	20.4	3.5	(100.0)
v	Count	325	61	3	389
	%	83.6	15.7	0.8	(100.0)
w	Count	361	64	3	428
	%	84.4	15.0	0.7	(100.0)
x	Count	320	99	1	420
	%	76.2	23.6	0.2	(100.0)
y	Count	323	5	7	335
	%	96.4	1.5	2.1	(100.0)
z	Count	589	67	17	673
	%	87.5	10.0	2.5	(100.0)
aa <sup>Φ</sup>	Count	137	37	10	184
	%	74.5	20.1	5.4	(100.0)
ab	Count	263	45	8	316
	%	83.2	14.2	2.5	(100.0)
ac	Count	368	264	15	647
	%	56.9	40.8	2.3	(100.0)
ad	Count	455	361	31	847
	%	53.7	42.6	3.7	(100.0)
ae	Count	597	80	4	681
	%	87.7	11.8	0.6	(100.0)
af	Count	138	23	9	170
	%	81.2	13.5	5.3	(100.0)

Total number of admissions:

16 827

Inborn:

12 139 (72.1%)

Outborn:

4 142 (24.6%)

Readmission:

541 (3.2%)

Missing data on inborn/outborn status:

5 (0.0%)

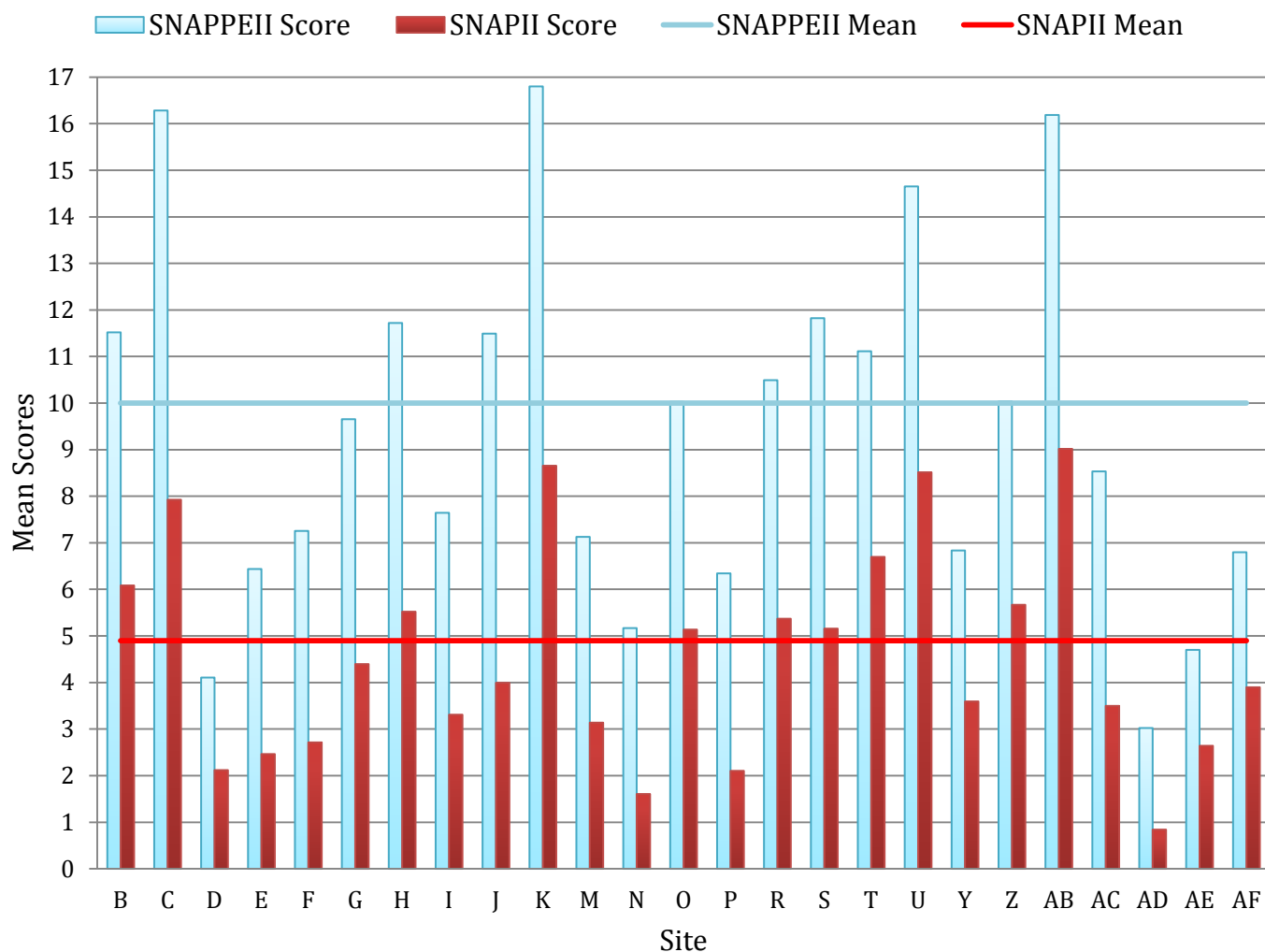
**COMMENTS:** These analyses include 16 827 admissions to participating sites across Canada during the period of January 1, 2018 to December 31, 2018. After adjusting for readmission, 15 484 neonates are represented. **Twenty-five sites collected data on all eligible admissions whereas seven sites (marked by <sup>Φ</sup>) collected data on selected cohort of eligible admissions only.** See [page 3](#) for data collection criteria of all participating sites.

## Presentation #2

All admissions: Admission illness severity scores (SNAP-II and SNAP-IIPE):

Sites with complete data

(n=25 sites, 14 832 admissions, 667 missing data on SNAP-II scores)



Data collection status	Number of sites	Score	Mean	Std Dev	Q1	Median	Q3
Complete	25	SNAPIIPE	10.0	0.1	0	0	18
		SNAPII	4.9	0.1	0	0	7
Restricted	7	SNAPIIPE	14.7	0.4	0	7	23
		SNAPII	6.7	0.3	0	0	9

**Presentation #2 (continued)**  
**All admissions: Admission illness severity scores**  
**(SNAP-II and SNAP-IIPE): All sites**

Site		SNAP-IIPE	SNAP-II	Site		SNAP-IIPE	SNAP-II
<b>A<sup>φ</sup></b>	Mean	14.8	7.2	<b>Q<sup>φ</sup></b>	Mean	14.2	7.1
	SEM	1.8	1.0		SEM	1.4	0.8
<b>B</b>	Mean	11.5	6.1	<b>R</b>	Mean	10.5	5.4
	SEM	0.7	0.4		SEM	0.9	0.6
<b>C</b>	Mean	16.3	7.9	<b>S</b>	Mean	11.8	5.2
	SEM	0.7	0.4		SEM	0.6	0.4
<b>D</b>	Mean	4.1	2.1	<b>T</b>	Mean	11.1	6.7
	SEM	0.4	0.2		SEM	0.5	0.3
<b>E</b>	Mean	6.4	2.5	<b>U</b>	Mean	14.7	8.5
	SEM	0.5	0.3		SEM	0.5	0.3
<b>F</b>	Mean	7.3	2.7	<b>V<sup>φ</sup></b>	Mean	8.4	3.3
	SEM	0.4	0.2		SEM	1.0	0.5
<b>G</b>	Mean	9.7	4.4	<b>W<sup>φ</sup></b>	Mean	17.3	7.9
	SEM	0.7	0.4		SEM	1.4	0.8
<b>H</b>	Mean	11.7	5.5	<b>X<sup>φ</sup></b>	Mean	9.9	3.6
	SEM	0.6	0.4		SEM	0.8	0.5
<b>I</b>	Mean	7.6	3.3	<b>Y</b>	Mean	6.8	3.6
	SEM	0.6	0.3		SEM	0.7	0.4
<b>J</b>	Mean	11.5	4.0	<b>Z</b>	Mean	10.0	5.7
	SEM	0.5	0.3		SEM	0.5	0.3
<b>K</b>	Mean	16.8	8.7	<b>AA<sup>φ</sup></b>	Mean	16.4	8.0
	SEM	1.4	0.9		SEM	0.7	0.4
<b>L<sup>φ</sup></b>	Mean	17.6	7.4	<b>AB</b>	Mean	16.2	9.0
	SEM	1.4	0.7		SEM	0.7	0.4
<b>M</b>	Mean	7.1	3.1	<b>AC</b>	Mean	8.5	3.5
	SEM	0.6	0.4		SEM	0.7	0.4
<b>N</b>	Mean	5.2	1.6	<b>AD</b>	Mean	3.0	0.8
	SEM	0.6	0.3		SEM	0.7	0.3
<b>O</b>	Mean	10.0	5.1	<b>AE</b>	Mean	4.7	2.6
	SEM	0.7	0.4		SEM	0.5	0.3
<b>P</b>	Mean	6.3	2.1	<b>AF</b>	Mean	6.8	3.9
	SEM	0.4	0.2		SEM	0.6	0.4

**COMMENTS:** These analyses include 16 827 admissions (689 missing data on SNAP scores) to participating all sites during the year 2018. Adjusting for readmission, these analyses represent 15 484 Neonates. **Twenty-five sites collected data on all eligible admissions whereas seven sites (marked by <sup>φ</sup>) collected data on a selected cohort of eligible admissions only.** These seven sites were not included in the Presentation #2 bar graph but were included in the Presentation #2 Table (above).

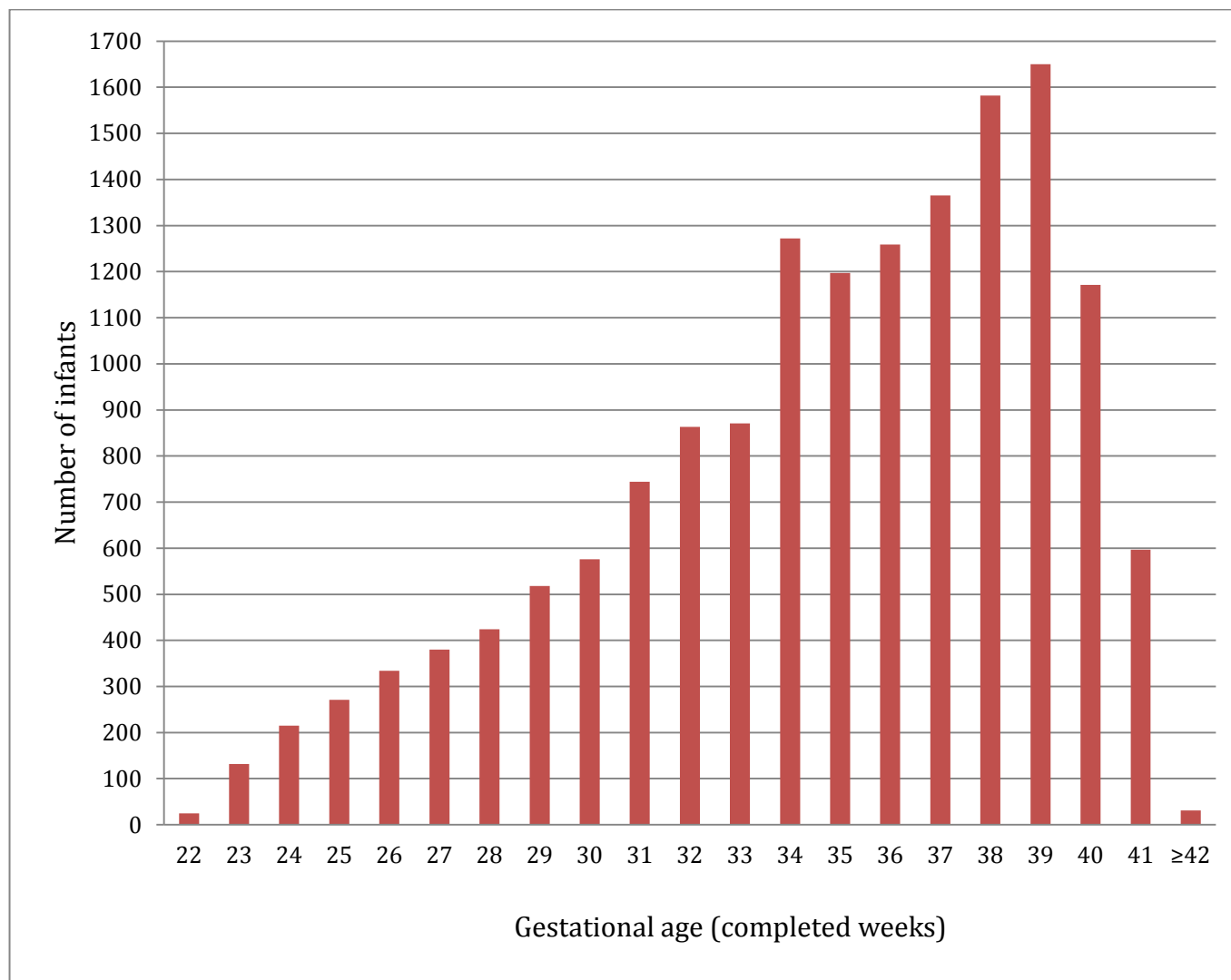
<sup>φ</sup> Please note that the criteria for entering neonates in the CNN dataset are not the same for these seven sites and thus, the scores are not comparable with each other or with centers contributing complete data. These seven sites may have included neonates at lower GAs and/or lower BWs; thus, their severity of illness scores may be different.

## **Section D.2**

### **Analyses based on number of eligible neonates admitted to participating sites**

These include data from 15 484 eligible neonates admitted to 32 sites. 25 of these sites submitted complete data (n=13 239) on all eligible admitted neonates and 7 sites submitted data on a selected cohort of eligible admitted neonates (n=2 245).

**Presentation #3**  
**Gestational age distribution: All sites and all admitted neonates**

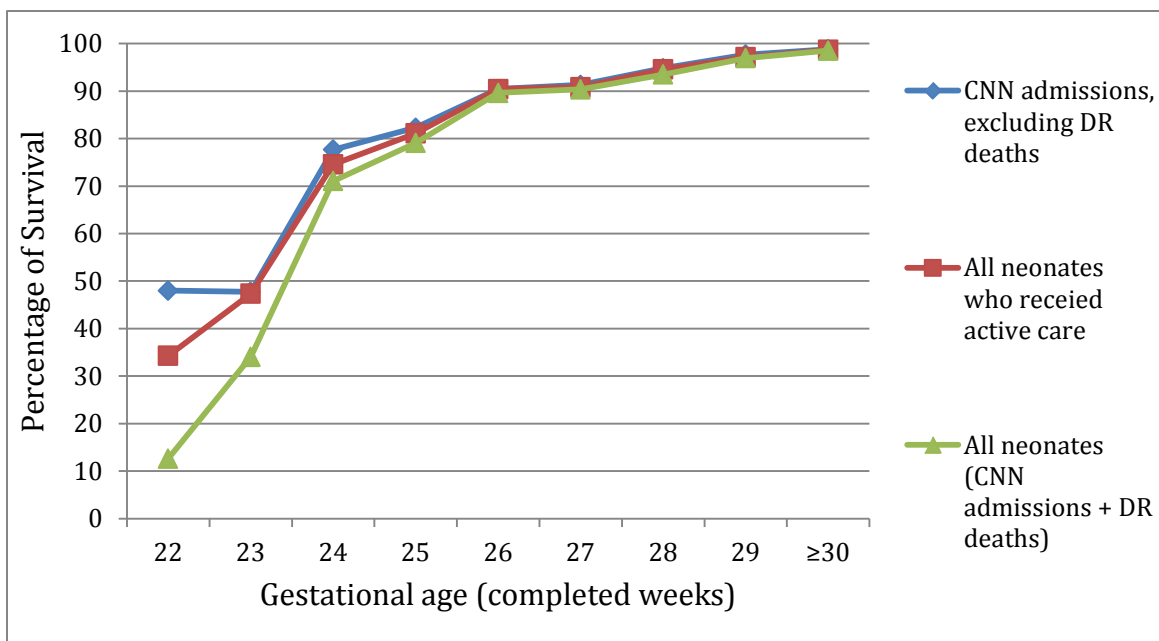


**Presentation #3** (continued)  
**Gestational age distribution: All sites and all admitted neonates**

GA in completed weeks at birth	Frequency	Percent	Cumulative percent
22	25	0.2	0.2
23	132	0.9	1.0
24	215	1.4	2.4
25	271	1.8	4.2
26	334	2.2	6.3
27	380	2.5	8.8
28	424	2.7	11.5
29	518	3.4	14.9
30	576	3.7	18.6
31	744	4.8	23.4
32	863	5.6	29.0
33	871	5.6	34.6
34	1 272	8.2	42.8
35	1 197	7.7	50.5
36	1 259	8.1	58.7
37	1 365	8.8	67.5
38	1 582	10.2	77.7
39	1 650	10.7	88.4
40	1 171	7.6	95.9
41	597	3.9	99.8
≥42	31	0.2	100.0
<b>Total included</b>	15 477	100.0	
<b>Total # of missing GA</b>	7		
<b>Total # of neonates</b>	15 484		

**COMMENTS:** The GA distribution of neonates is shown here. Term babies ( $\geq 37$  weeks) represent 41.3% of the total number of neonates. Twenty-five sites collected data on all eligible admissions whereas seven sites collected data on a selected cohort of eligible admissions.

**Presentation #4**  
**Survival to discharge by GA: All admissions, including delivery room (DR) deaths**

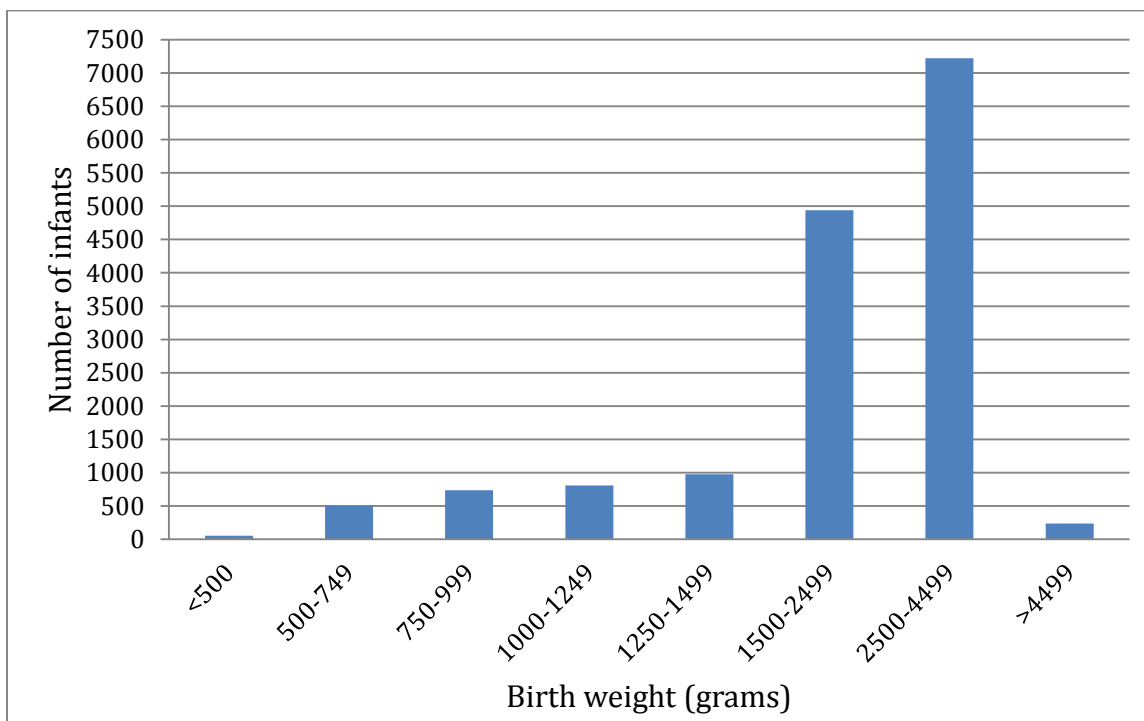


CNN admissions, excluding delivery room deaths					Delivery room deaths*		Total CNN admissions including delivery room deaths*				
GA (completed weeks)	#of neonates	#of survivors	Percent survival among CNN admissions, excluding DR deaths	#of neonates who received palliative care	Palliative care	Active care **	Total	#of neonates who received palliative care	# of neonates who received active care**	Percent survival among those who received active care	Percent survival among all neonates (CNN admissions + DR deaths)
	<i>a</i>	<i>b</i>	<i>b/a</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>a+d+e</i>	<i>c+d</i>	<i>(a-c) + e</i>	<i>b/ (a-c)+e</i>	<i>b/ (a+d+e)</i>
22	25	12	48	0	60	10	95	60	35	34	13
23	132	63	48	2	50	3	185	52	133	47	34
24	215	167	78	0	11	9	235	11	224	75	71
25	271	223	82	1	6	5	282	7	275	81	79
26	334	302	90	0	3	0	337	3	334	90	90
27	380	347	91	0	2	2	384	2	382	91	90
28	424	402	95	0	5	1	430	5	425	95	93
29	518	506	98	0	1	3	522	1	521	97	97
≥30	13 178	13 017	99	1	23	12	13 213	24	13 189	99	99
<b>Total included</b>	<b>15 477</b>	<b>15 039</b>	<b>97</b>	<b>4</b>	<b>161</b>	<b>45</b>	<b>15 683</b>	<b>165</b>	<b>15 518</b>	<b>97</b>	<b>96</b>
Missing GA	7				0	0	7	0	7		
<b>Total</b>	<b>15 484</b>				<b>161</b>	<b>45</b>	<b>15 690</b>	<b>165</b>	<b>15 525</b>		

\*Please note that delivery room deaths are *only included in Presentations #4, #6, and #6b* in this report. \*\*Active care refers to infants who received cardiopulmonary resuscitation at birth.

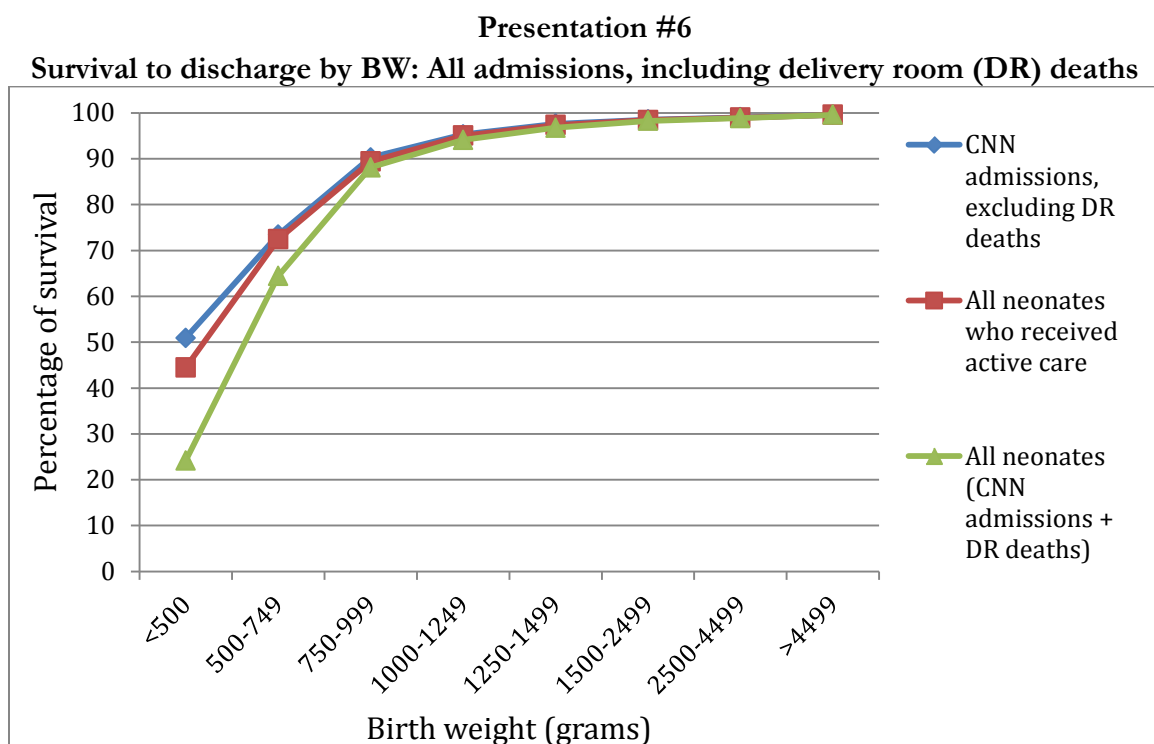
**Note: The results should be used cautiously for antenatal counseling.** The survival rates are based upon the final discharge from the participating neonatal site. Note that these rates include only neonates admitted to the sites or dying in the delivery rooms of participating sites and thus are not reflective of the entire Canadian population. Capturing data for delivery room deaths is an ongoing process and not all sites contributed delivery room death data.

**Presentation #5**  
**Birth weight distribution: All sites and all admitted neonates**



BW (grams)	Frequency	Percent from total number of neonates	Cumulative percent
<500	55	0.4	0.4
500-749	508	3.3	3.6
750-999	739	4.8	8.4
1000-1249	807	5.2	13.6
1250-1499	977	6.3	19.9
1500-2499	4937	31.9	51.8
2500-4499	7218	46.6	98.5
>4499	238	1.5	100.0
<b>Total included</b>	15 479	100.0	
<b>Missing BW</b>	5		
<b>Total # of neonates</b>	15 484		

**COMMENTS:** The BW distribution of neonates admitted to the CNN sites. Eighty percent weighed more than 1 500g at birth and 48% weighed more than 2 500g. Twenty-five sites collected data on all admissions whereas seven sites collected data on a selected cohort of eligible admissions only.

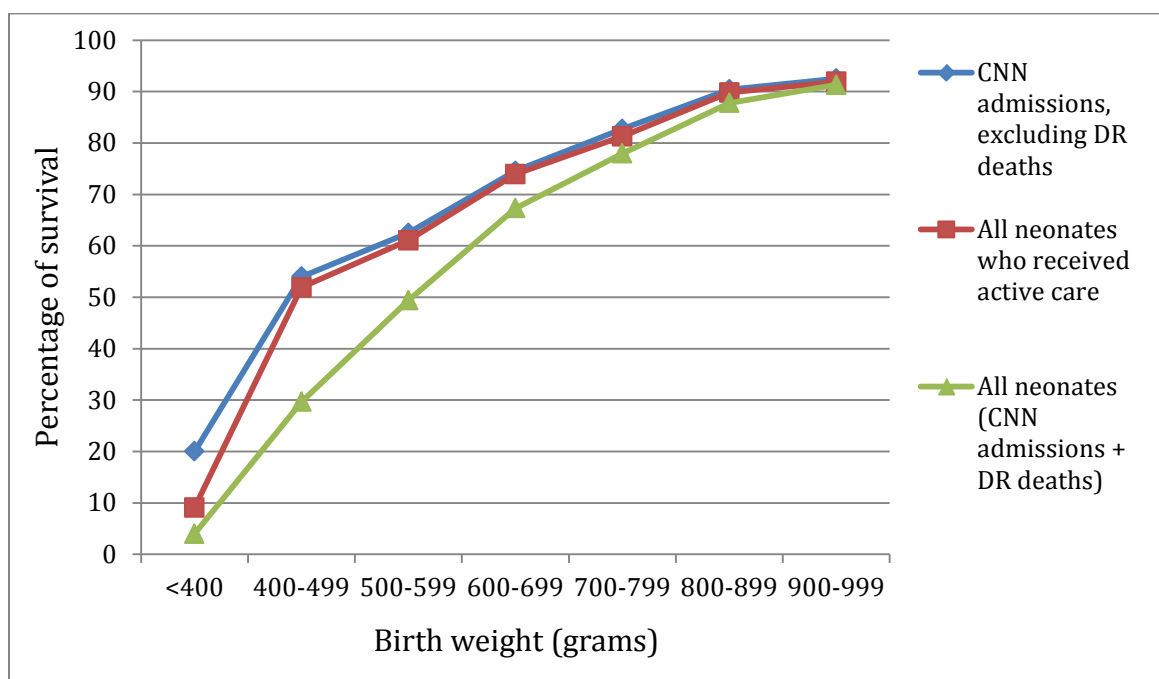


CNN Admissions, excluding delivery room deaths					Delivery room deaths*		Total CNN admissions + Delivery room deaths*				
BW (grams)	#of neonates	# of survivors	Percent survival of CNN admissions, excluding DR deaths	# of neonates who received palliative care	Palliative care	Active care **	Total	# of neonates who received palliative care	# of neonates who received active care**	Percent survival of neonates who received active care	Percent survival of all neonates (CNN admissions + DR deaths)
	<i>a</i>	<i>b</i>	<i>b/a</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>a+d+e</i>	<i>c+d</i>	<i>(a-c) + e</i>	<i>b/ (a-c)+e</i>	<i>b/ (a+d+e)</i>
<500	55	28	51	0	53	8	116	53	63	44	24
500-749	508	373	73	3	61	10	579	64	515	72	64
750-999	739	667	90	0	11	7	757	11	746	89	88
1000-1249	807	769	95	0	8	2	817	8	809	95	94
1250-1499	977	954	98	0	6	3	986	6	980	97	97
1500-2499	4 937	4 866	99	1	8	7	4 952	9	4 943	98	98
2500-4499	7 218	7 147	99	0	7	5	7 230	7	7 223	99	99
>4499	238	237	100	0	0	0	238	0	238	100	100
Total neonates included	15 479	15 041	97	4	154	42	15 675	158	15 517	97	96
Missing BW	5				7	3	15	7	8		
Total # of neonates	15 484				161	45	15 690	165	15 525		

\*Please note that delivery room deaths are *only included in Presentations #4, #6 and #6b* in this report. \*\*Active care refers to infants who received cardiopulmonary resuscitation at birth.

**Note:** The results should be used cautiously for antenatal counseling. The survival rates are based upon the final discharge from the participating neonatal site. Note that these rates include only neonates admitted to the sites or dying in the delivery rooms of participating sites and thus are not reflective of the entire Canadian population. Capturing data for delivery room deaths is an ongoing process and not all sites contributed delivery room death data.

**Presentation #6b**  
**Survival to discharge by BW: BW <1000g including delivery room (DR) deaths**



CNN Admissions, excluding delivery room deaths					Delivery room deaths*		Total CNN admissions + Delivery room deaths*				
BW (grams)	Number of neonates	Number of survivors	Percent survival of CNN admissions, excluding DR deaths	Number of neonates who received palliative care	Palliative care	Active care **	Total	Number of neonates who received palliative care	Number of neonates who received active care**	Percent survival of neonates who received active care	Percent survival of all neonates (CNN admissions + DR deaths)
	<i>a</i>	<i>b</i>	<i>b/a</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>a+d+e</i>	<i>c+d</i>	<i>(a-c) +e</i>	<i>b/ (a-c)+e</i>	<i>b/ (a+d+e)</i>
<400	5	1	20	0	14	6	25	14	11	9	4
400-499	50	27	54	0	39	2	91	39	52	52	30
500-599	128	80	63	2	29	5	162	31	131	61	49
600-699	232	173	75	1	22	3	257	23	234	74	67
700-799	278	230	83	0	12	5	295	12	283	81	78
800-899	302	273	90	0	7	2	311	7	304	90	88
900-999	307	284	93	0	2	2	311	2	309	92	91
Total included	1 302	1 068	84	3	125	25	1 452	128	1 324	81	74

**\*Please note that delivery room deaths are *only included in Presentations #4, #6 and #6b* in this report. \*\*Active care refers to infants who received cardiopulmonary resuscitation at birth.**

**Note:** The results should be used cautiously for antenatal counseling. The survival rates are based upon the final discharge from the participating neonatal site. Note that these rates include only neonates admitted to the sites or died in delivery room of participating sites and thus are not reflective of the entire Canadian population. Capturing data for delivery room deaths is an ongoing process and not all sites contributed delivery room death data.

**Presentation #7a**  
**Maternal and peripartum characteristics: All neonates**

Characteristics				GA at birth (completed weeks)					
		Missing/ Unknown		<26	26-28	29-32	33 - 36	≥37	Total
Total		7		643	1138	2701	4599	6396	15477
No prenatal care		462	N	26	52	133	80	72	363
			%	4.2	4.7	5.1	1.8	1.2	2.4
Marijuana/cannabis		181	N	34	89	146	302	320	891
			%	5.3	7.9	5.5	6.6	5.1	5.8
Smoking		108	N	87	180	356	680	805	2108
			%	13.6	15.9	13.3	14.9	12.7	13.7
Maternal hypertension		936	N	74	208	605	903	664	2454
			%	11.9	18.9	23.3	20.5	11.4	16.9
Maternal diabetes		981	N	52	152	500	899	1029	2632
			%	8.5	14.1	19.4	20.6	17.6	18.1
Assisted pregnancy (ART)		10	N	94	103	264	410	227	1098
			%	14.6	9.1	9.8	8.9	3.6	7.1
Multiples		10	N	179	325	833	1302	165	2804
			%	27.9	28.6	30.8	28.3	2.6	18.1
MgSO <sub>4</sub> for neuroprotection		1086	N	447	786	1410	350	33	3026
			%	73.6	74.2	55.8	8.0	0.6	21.0
Antenatal steroids	None	453	N	75	120	278	2735	6148	9356
			%	11.9	10.9	10.7	61.4	98.4	62.2
	Partial		N	186	266	653	320	8	1433
			%	29.4	24.1	25.2	7.2	0.1	9.5
	Complete		N	372	716	1659	1403	92	4242
			%	58.8	65.0	64.1	31.5	1.5	28.2
Mode of birth	Vaginal	59	N	294	386	1000	2043	3744	7467
			%	45.8	34.0	37.1	44.6	58.8	48.4
	C/S		N	348	750	1693	2540	2627	7958
			%	54.2	66.0	62.9	55.4	41.2	51.6
Presentation	Vertex	1292	N	312	620	1788	3436	5268	11424
			%	51.0	57.8	70.9	80.3	92.3	80.5
	Breech		N	276	392	632	758	357	2415
			%	45.1	36.5	25.1	17.7	6.3	17.0
	Other		N	24	61	103	83	82	353
			%	3.9	5.7	4.1	1.9	1.4	2.5
Rupture of membranes	<24 h	1276	N	437	809	1914	3688	5205	12053
			%	71.4	76.1	76.1	85.4	91.3	84.8
	24h to 1wk		N	102	127	307	392	402	1330
			%	16.7	12.0	12.2	9.1	7.1	9.4
	>1 wk		N	73	127	294	237	94	825
			%	11.9	12.0	11.7	5.5	1.7	5.8

**Presentation #7a (continued)**  
**Maternal and peripartum characteristics: All neonates**

Characteristics				GA at birth (completed weeks)					
		Missing/ Unknown		<26	26-28	29-32	33 - 36	≥37	Total
Total				621	1053	2684	4332	6083	14773
Chorioamnionitis*		2260	N	252	296	387	291	545	1771
			%	41.9	28.3	15.9	7.3	10.6	13.4
Deferred cord clamping	≤ 29 sec	3186	N	33	48	95	89	76	341
			%	5.8	4.8	4.1	2.3	1.6	2.8
	30-59 sec		N	98	182	438	616	495	1829
			%	17.3	18.3	18.9	16.2	10.7	14.9
	≥60 sec		N	145	287	941	1329	1213	3915
			%	25.6	28.8	40.7	35.0	26.3	31.8
	Yes, but timing unknown		N	6	22	57	236	295	616
			%	1.1	2.2	2.5	6.2	6.4	5.0
	No		N	285	456	782	1532	2542	5597
			%	50.3	45.8	33.8	40.3	55.0	45.5

\*Chorioamnionitis is defined as documented histological chorioamnionitis on placenta pathology **or** “suspected or confirmed clinical chorioamnionitis” in chart **or** presence of maternal fever **and** *either* leukocytosis *or* purulent discharge *or* fetal tachycardia.

**Presentation #7b**  
**Maternal and peripartum characteristics:**  
**Timing of single course of Antenatal Corticosteroids (ANCS): GA <33 weeks**

			No ANCS	Complete course within last week prior to birth *	Complete course before 1 week of birth **	Complete course but timing unknown ***	Partial course within last 24 hours ****
	<b>Weeks</b>						
<b>Inborn</b>	<b>22-28</b>	N	80	647	384	31	339
		%	5.3	42.7	25.4	2.1	22.4
	<b>29-32</b>	N	154	778	785	42	487
		%	6.6	33.5	33.8	1.8	21.0
<b>Outborn</b>	<b>22-28</b>	N	114	16	9	1	79
		%	43.0	6.0	3.4	0.4	29.8
	<b>29-32</b>	N	124	34	14	6	116
		%	32.6	9.0	3.7	1.6	30.5

\*Complete course within last week prior to birth – defined as receipt of at least two doses of corticosteroids 24 hours or more but within one week of birth.

\*\*Complete course before 1 week of birth – defined as receipt of at least two doses of corticosteroids initiated more than one week prior to birth.

\*\*\*Complete course but timing unknown – defined as receipt of at least two doses of corticosteroids or if “complete course” was documented, but the dates of administration were not available.

\*\*\*\*Partial course within last 24 hours – defined as any dose given less than 24 hours prior to birth.

Note: Data on “Partial course >24 hours ago” and “Partial course but timing unknown” are collected in the database but they are not reported in this table.

**Presentation #7c**  
**Maternal and peripartum characteristics:**  
**Timing of deferred cord clamping: GA <33 weeks**

**Singleton**

			Deferred Cord clamping timing						Immediate Cord clamping	Unknown timing
			0-15 seconds	16-30 seconds	31-60 seconds	61-75 seconds	>75 seconds	Duration unknown		
	Weeks									
Inborn	22-28	N	21	117	395	6	15	17	434	60
		%	2.0	11.0	37.1	0.6	1.4	1.6	40.8	5.6
	29-32	N	16	170	763	10	32	41	429	95
		%	1.0	10.9	49.0	0.6	2.1	2.6	27.6	6.1
Outborn	22-28	N	1	10	21	0	0	2	81	95
		%	0.5	4.8	10.0	0.0	0.0	1.0	38.6	45.2
	29-32	N	0	11	37	2	4	0	70	188
		%	0.0	3.5	11.9	0.6	1.3	0.0	22.4	60.3

**First twin**

			Deferred Cord clamping timing						Immediate Cord clamping	Unknown timing
			0-15 seconds	16-30 seconds	31-60 seconds	61-75 seconds	>75 seconds	Duration unknown		
	Weeks									
Inborn	22-28	N	1	23	70	1	1	5	95	14
		%	0.5	11.0	33.3	0.5	0.5	2.4	45.2	6.7
	29-32	N	6	30	152	1	4	5	116	21
		%	1.8	9.0	45.4	0.3	1.2	1.5	34.6	6.3
Outborn	22-28	N	0	2	1	0	0	0	8	12
		%	0.0	8.7	4.4	0.0	0.0	0.0	34.8	52.2
	29-32	N	0	3	3	0	1	1	7	15
		%	0.0	10.0	10.0	0.0	3.3	3.3	23.3	50.0

**Second twin**

			Deferred Cord clamping timing						Immediate Cord clamping	Unknown timing
			0-15 seconds	16-30 seconds	31-60 seconds	61-75 seconds	>75 seconds	Duration unknown		
	Weeks									
Inborn	22-28	N	4	23	65	0	2	4	89	19
		%	1.9	11.2	31.6	0.0	1.0	1.9	43.2	9.2
	29-32	N	3	33	144	0	3	5	116	33
		%	0.9	9.8	42.7	0.0	0.9	1.5	34.4	9.8
Outborn	22-28	N	0	1	1	0	0	0	13	11
		%	0.0	3.9	3.9	0.0	0.0	0.0	50.0	42.3
	29-32	N	0	2	1	0	1	1	5	20
		%	0.0	6.7	3.3	0.0	3.3	3.3	16.7	66.7

**Presentation #8a**  
**Resuscitation details: GA < 31 weeks**

Action taken		GA at birth (completed weeks)								
		≤23	24	25	26	27	28	29	30	Total
<b>Total</b>		<b>157</b>	<b>215</b>	<b>271</b>	<b>334</b>	<b>380</b>	<b>424</b>	<b>518</b>	<b>576</b>	<b>2875</b>
No resuscitation needed/provided	N	0	1	0	1	5	6	10	27	50
	%	0.0	0.5	0.0	0.3	1.3	1.4	1.9	4.7	1.7
CPAP	N	32	81	145	211	234	311	381	422	1817
	%	20.4	37.7	53.7	63.2	61.6	73.4	73.6	73.3	63.2
PPV via mask	N	128	178	212	269	290	307	313	324	2021
	%	81.5	82.8	78.5	80.5	76.3	72.4	60.4	56.3	70.3
PPV via ETT	N	132	146	156	156	144	119	91	76	1020
	%	84.1	67.9	57.8	46.7	37.9	28.1	17.6	13.2	35.5
Chest compression	N	2	8	12	16	15	13	16	15	97
	%	1.3	3.7	4.4	4.8	4.0	3.1	3.1	2.6	3.4
Epinephrine	N	7	2	6	8	6	6	9	10	54
	%	4.5	0.9	2.2	2.4	1.6	1.4	1.7	1.7	1.9
Unknown	N	2	2	4	1	0	1	3	5	18
	%	1.3	0.9	1.5	0.3	0.0	0.2	0.6	0.9	0.6
Any resuscitation provided*	N	153	210	264	330	373	413	495	509	2747
	%	97.5	97.7	97.8	98.8	98.2	97.4	95.6	88.4	95.6
Initial gas	Air	N	14	27	32	66	116	111	188	749
		%	8.9	12.6	11.8	19.8	30.5	26.2	36.3	26.1
	22-40% O <sub>2</sub>	N	90	130	135	179	166	211	213	1314
		%	57.3	60.5	49.8	53.6	43.7	49.8	41.1	45.7
	41-70% O <sub>2</sub>	N	5	7	19	18	21	24	36	153
		%	3.2	3.3	7.0	5.4	5.5	5.7	4.4	5.3
	71-99% O <sub>2</sub>	N	1	1	4	2	7	1	4	26
		%	0.6	0.5	1.5	0.6	1.8	0.2	0.8	0.9
	100% O <sub>2</sub>	N	25	19	29	36	18	21	22	198
		%	15.9	8.8	10.7	10.8	4.7	5.0	4.3	6.9
	Unknown/Missing	N	22	31	52	33	52	56	68	435
		%	14.0	14.4	19.2	9.9	13.7	13.2	13.1	15.1
Maximum O <sub>2</sub> conc. during resus.	21%	N	0	0	0	0	4	5	15	45
		%	0.0	0.0	0.0	0.0	1.1	1.2	2.9	1.6
	22-40%	N	6	11	23	37	79	103	152	572
		%	3.8	5.1	8.5	11.1	20.8	24.3	29.3	19.9
	41-70%	N	6	24	37	66	90	92	102	527
		%	3.8	11.2	13.7	19.8	23.7	21.7	19.7	18.3
	>70%	N	130	156	175	195	166	159	137	1277
		%	82.8	72.6	64.6	58.4	43.7	37.5	30.7	44.4
	Missing	N	15	24	36	36	41	65	90	454
		%	9.6	11.2	13.3	10.8	10.8	15.3	17.4	15.8

\* Number of neonates who received any resuscitation includes those who received CPAP, PPV, chest compression or epinephrine

**NOTE:** Please use caution when interpreting these data. Resuscitation time was defined as the first 30 minutes after birth.

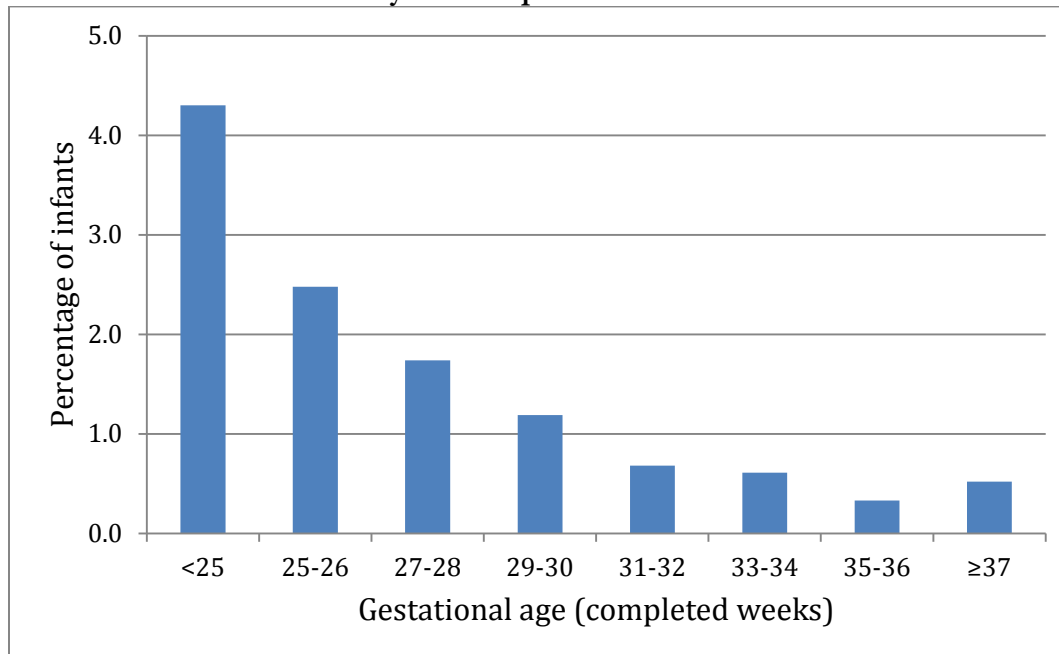
**Presentation #8b**  
**Resuscitation details: GA  $\geq$  31 weeks**

Action taken		GA at birth (completed weeks)							
		31	32	33	34	35	36	$\geq 37$	Total
<b>Total</b>		<b>744</b>	<b>863</b>	<b>971</b>	<b>1272</b>	<b>1197</b>	<b>1259</b>	<b>6396</b>	<b>12602</b>
No resuscitation needed / provided	N	72	119	209	398	451	510	2426	4185
	%	9.7	13.8	24.0	31.3	37.7	40.5	37.9	33.2
CPAP	N	500	535	397	498	402	336	1815	4483
	%	67.2	62.0	45.6	39.2	33.6	26.7	28.4	35.6
PPV via mask	N	359	373	267	357	279	297	1809	3741
	%	48.3	43.2	30.7	28.1	23.3	23.6	28.3	29.7
PPV via ETT	N	57	61	53	46	49	50	440	756
	%	7.7	7.1	6.1	3.6	4.1	4.0	6.9	6.0
Chest compression	N	12	11	12	14	14	8	126	197
	%	1.6	1.3	1.4	1.1	1.2	0.6	2.0	1.6
Epinephrine	N	8	5	5	8	5	3	41	75
	%	1.1	0.6	0.6	0.6	0.4	0.2	0.6	0.6
Unknown	N	11	14	14	18	18	22	153	250
	%	1.5	1.6	1.6	1.4	1.5	1.8	2.4	2.0
Any resuscitation provided*	N	610	649	490	621	489	472	2708	6039
	%	82.0	75.2	56.3	48.8	40.9	37.5	42.4	47.9
Initial gas	Air	N	291	349	239	268	273	1356	3043
		%	39.1	40.4	27.4	21.1	22.8	21.2	24.1
	22-40% O <sub>2</sub>	N	216	193	179	243	151	134	1709
		%	29.0	22.4	20.6	19.1	12.6	10.6	9.3
	41-70% O <sub>2</sub>	N	31	18	20	37	25	136	295
		%	4.2	2.1	2.3	2.9	2.1	2.2	2.1
	71-99% O <sub>2</sub>	N	4	6	4	1	5	2	22
		%	0.5	0.7	0.5	0.1	0.4	0.2	0.3
	100% O <sub>2</sub>	N	16	22	33	47	27	47	273
		%	2.2	2.6	3.8	3.7	2.3	3.7	4.3
	Unknown/ Missing	N	186	275	396	676	716	781	4016
		%	25.0	31.9	45.5	53.1	59.8	62.0	62.8
Maximum O <sub>2</sub> conc. during resus	21%	N	40	56	64	82	82	97	344
		%	5.4	6.5	7.4	6.5	6.9	7.7	5.4
	22-40%	N	214	234	153	229	176	140	659
		%	28.8	27.1	17.6	18.0	14.7	11.1	10.3
	41-70%	N	144	118	74	97	67	83	336
		%	19.4	13.7	8.5	7.6	5.6	6.6	5.3
	>70%	N	133	135	113	122	128	127	851
		%	17.9	15.6	13.0	9.6	10.7	10.1	13.3
	Missing	N	213	320	467	742	744	812	4206
		%	28.6	37.1	53.6	58.3	62.2	64.5	65.8

\* Number of neonates who received any resuscitation includes those who received CPAP, PPV, Chest compression or epinephrine

**NOTE:** Please use caution while interpreting these data. Resuscitation time was defined as the first 30 minutes after birth.

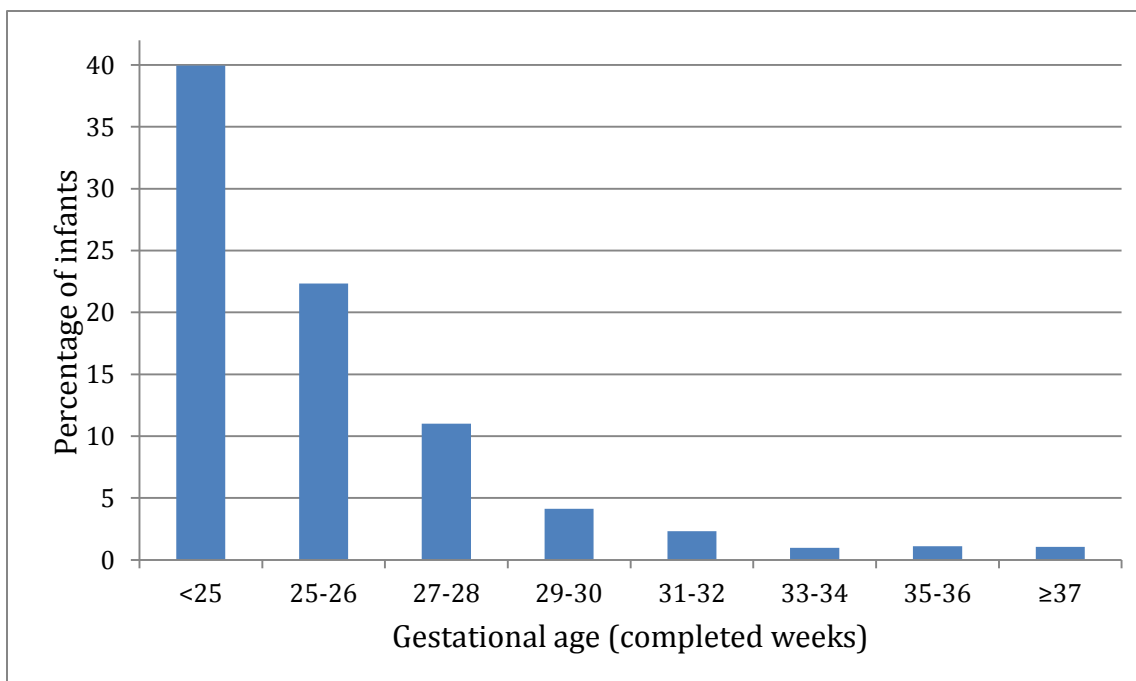
**Presentation #9**  
**Early onset sepsis rates: All GA**



GA at birth (completed weeks)	Total number of neonates	No. of neonates with infection	% of neonates with infection	Total number of organisms	Organism		
					E. Coli	GBS	Others
<25	372	16	4.3	17	11	3	3
25-26	605	15	2.5	15	8	3	4
27-28	804	14	1.7	14	9	0	5
29-30	1 094	13	1.2	14	5	2	7
31-32	1 607	11	0.7	11	5	1	5
33-34	2 143	13	0.6	14	4	3	7
35-36	2 456	8	0.3	8	3	2	3
≥37	6 396	33	0.5	34	4	13	17
<b>Total neonates included</b>	<b>15 477</b>	<b>123</b>	<b>0.8</b>	<b>127</b>	<b>49</b>	<b>27</b>	<b>51</b>
<b>Missing</b>	<b>7</b>						
<b>Total # of neonates</b>	<b>15 484</b>						

**COMMENTS:** Early onset sepsis is indicated by positive bacterial, viral or fungal culture in blood and/or cerebrospinal fluid, in the first two days after birth. Two neonates had two organisms isolated. In other category, top five organisms were: Streptococci other than GBS (n=14), Staph aureus (n=8), Cytomegalovirus (n=5), Enterococci (n=4), Hemophilus influenza (n=4). In contrast to previous CNN reports, CONS was *not* included as an organism causing early onset sepsis in this report based on consultation with microbiologists.

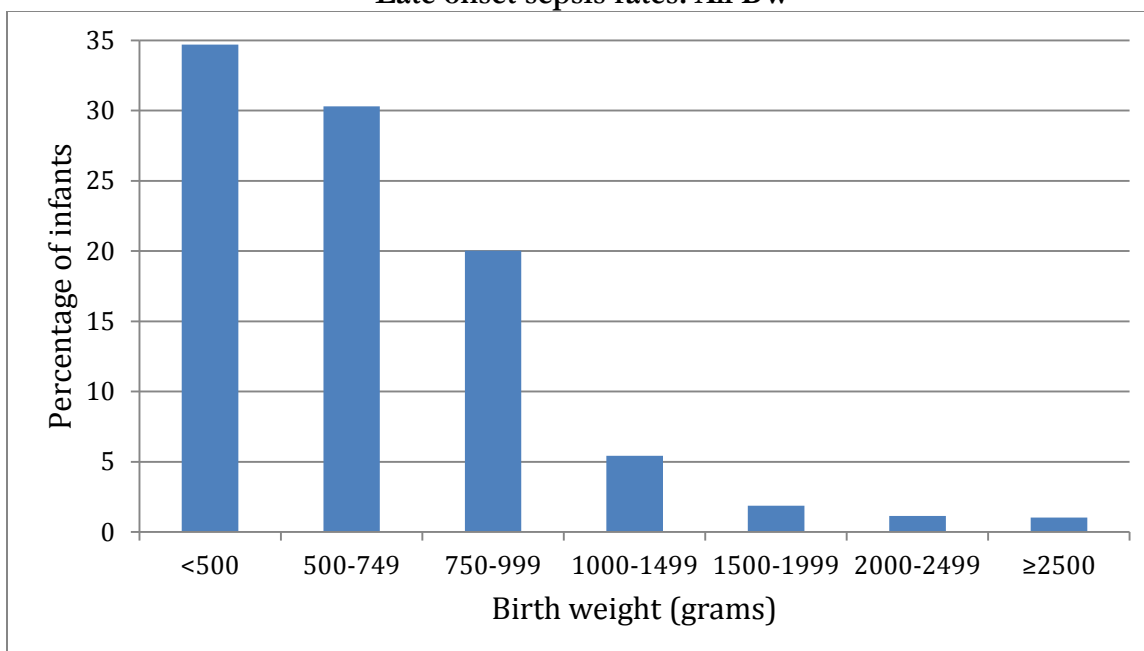
**Presentation #10**  
**Late onset sepsis rates: All GA**



GA at birth (completed weeks)	Total number	Number of deaths in the first 2 days after birth	Number of neonates survived beyond day 2 after birth	Number of neonates with at least one infection	Number of neonates with more than one infection	Among neonates who survived day 2, percentage with at least one infection	Total number of organisms	Organisms					
								CONS	E. Coli	Staph aureus	Fungal	Virus	Other
<25	372	29	343	137	35	40	192	61	27	46	10	2	46
25-26	605	14	591	132	22	22	179	64	24	37	9	6	39
27-28	804	14	790	87	13	11	103	45	13	17	0	1	27
29-30	1 094	6	1 088	45	3	4	52	19	5	11	0	0	17
31-32	1 607	7	1 600	37	1	2	37	16	1	8	2	3	7
33-34	2 143	6	2 137	21	2	1	24	5	2	9	0	3	5
35-36	2 456	4	2 452	27	3	1	31	12	4	6	1	1	7
≥37	6 396	15	6 381	67	3	1	70	21	14	7	1	10	17
<b>Total included</b>	<b>15 477</b>	<b>95</b>	<b>15 382</b>	<b>553</b>	<b>82</b>	<b>4</b>	<b>688</b>	<b>243</b>	<b>90</b>	<b>141</b>	<b>23</b>	<b>26</b>	<b>165</b>
Missing	7												
<b>Total # of neonates</b>	<b>15 484</b>												

**COMMENTS:** Late onset sepsis is defined as any positive blood and/or cerebrospinal fluid culture for bacteria, viral or fungi after 2 days of age (analysis is neonate-based). The numbers are adjusted for readmission. Among other category, top 5 organisms were: GBS (n=45), Enterococci (n=28), Klebsiella (n=24), Enterobacter (n=12), Candida albicans (n=11).

**Presentation #11**  
**Late onset sepsis rates: All BW**



BW (grams)	Total number	Number of deaths in the first 2 days after birth	Number of neonates survived beyond day 2 after birth	Number of neonates with at least one infection	Number of neonates with more than one infection	Among neonates who survived day 2, percentage with at least one infection	Total number of organisms	Organisms					
								CON S	E. Coli	Staph aureus	Fungal	Virus	Other
<500	55	6	49	17	6	35	30	10	1	7	1	4	7
500-749	508	26	482	146	39	30	203	74	27	43	8	4	47
750-999	739	15	724	145	20	20	183	69	28	40	7	1	38
1000-1499	1 784	16	1 768	96	6	5	108	36	12	24	4	2	30
1500-1999	2 309	6	2 303	43	5	2	50	17	2	10	1	1	19
2000-2499	2 628	6	2 622	30	2	1	32	12	2	5	2	5	6
≥2500	7 456	20	7 436	76	4	1	82	25	18	12	0	9	18
Total included	15 479	95	15 384	553	82	4	688	243	90	141	23	26	165
Missing (BW)	5												
Total # of neonates	15 484												

**COMMENTS:** Late onset sepsis is defined as any positive blood and/or cerebrospinal fluid culture for bacteria, viral or fungi after 2 days of age (analysis is neonate-based). The numbers are adjusted for readmission and transfer. Among other category, top 5 organisms were: GBS (n=45), Enterococci (n=28), Klebsiella (n=24), Enterobacter (n=12), Candida albicans (n=11).

**Presentation #12**  
**Other diagnoses / interventions / procedures: All GA**

Characteristics		Missing		GA at birth (completed weeks)						
				≤25	26 - 28	29 - 30	31 - 32	33 - 36	≥37	Total
Total				643	1138	1094	1607	4599	6396	15477
Prophylactic	Indomethacin	2	N	200	89	4	2	4	2	301
			%	31.1	7.8	0.4	0.1	0.1	0.0	1.9
	Probiotics	2	N	416	779	714	809	356	47	3121
			%	64.7	68.5	65.3	50.3	7.7	0.7	20.2
RDS	Unknown	3	N	2	2	4	2	2	11	23
			%	0.3	0.2	0.4	0.1	0.0	0.2	0.1
	Uncertain		N	7	15	24	39	77	68	230
			%	1.1	1.3	2.2	2.4	1.7	1.1	1.5
	None		N	25	127	325	814	3851	6048	11190
			%	3.9	11.2	29.7	50.7	83.8	94.6	72.3
	Definite		N	608	994	741	752	668	268	4031
			%	94.7	87.4	67.7	46.8	14.5	4.2	26.1
Surfactant in first 30 min			N	122	94	34	12	7	2	271
			%	19.0	8.3	3.1	0.8	0.2	0.0	1.8
Surfactant in first 60 min			N	250	205	69	42	14	7	587
			%	38.9	18.0	6.3	2.6	0.3	0.1	3.8
Surfactant in first 120 min			N	376	375	141	92	38	16	1038
			%	58.5	33.0	12.9	5.7	0.8	0.3	6.7
Surfactant at any time			N	567	750	436	333	325	169	2580
			%	88.2	65.9	39.9	20.7	7.1	2.6	16.7
Pneumothorax diagnosis		2	N	43	44	24	50	115	362	638
			%	6.7	3.9	2.2	3.1	2.5	5.7	4.1
Pneumothorax treatment**	Observation	2	N	12	14	10	17	62	244	359
			%	27.9	31.8	41.7	34.0	53.9	67.4	56.3
	Needle drainage	2	N	21	18	7	16	42	70	174
			%	48.8	40.9	29.2	32.0	36.5	19.3	27.3
	Chest tube	2	N	30	31	14	33	47	66	221
			%	69.8	70.5	58.3	66.0	40.9	18.2	34.6
Seizures	Definite /suspected	3	N	37	33	20	21	76	393	580
			%	5.8	2.9	1.8	1.3	1.7	6.2	3.7

\*\* One neonate can have multiple treatments. Denominators for treatment were based on the number of neonates who had pneumothorax.

**Presentation #12 (continued)**  
**Other diagnoses / interventions / procedures: All GA**

Characteristics		Missing		GA at birth (completed weeks)						
				≤25	26 - 28	29 - 30	31 - 32	33 - 36	≥37	Total
Total				643	1138	1094	1607	4599	6396	15477
Operations	Laparotomy	2	N	48	48	19	16	83	140	354
			%	7.5	4.2	1.7	1.0	1.8	2.2	2.3
	Thoracotomy	2	N	7	5	3	9	29	123	176
			%	1.1	0.4	0.3	0.6	0.6	1.9	1.1
	VP shunt	2	N	12	9	7	4	5	7	44
			%	1.9	0.8	0.6	0.3	0.1	0.1	0.3
	Ostomy		N	3	10	1	6	8	22	50
			%	0.5	0.9	0.1	0.4	0.2	0.3	0.3
	Reservoir/Drain	2	N	17	10	5	3	5	4	44
			%	2.6	0.9	0.5	0.2	0.1	0.1	0.3
Gastro-intestinal perforation	Spontaneous	97	N	36	16	5	5	9	7	78
			%	5.6	1.4	0.5	0.3	0.2	0.1	0.5
	NEC related		N	15	10	4	1	5	2	37
			%	2.3	0.9	0.4	0.1	0.1	0.0	0.2
Acquired stricture		2	N	9	4	1	2	4	2	22
			%	1.4	0.4	0.1	0.1	0.1	0.0	0.1
Exchange transfusion		2	N	0	1	0	1	8	15	25
			%	0.0	0.1	0.0	0.1	0.2	0.2	0.2
Congenital anomaly*	None		N	417	827	912	1358	3803	4685	12002
			%	64.9	72.7	83.4	84.5	82.7	73.3	77.5
	Minor		N	201	275	149	182	458	902	2167
			%	31.3	24.2	13.6	11.3	10.0	14.1	14.0
	Major		N	25	36	33	67	338	809	1308
			%	3.9	3.2	3.0	4.2	7.4	12.7	8.5

\*A list of major anomalies can be found in the 2013 annual report, pages 124-127. It is available via the following link:

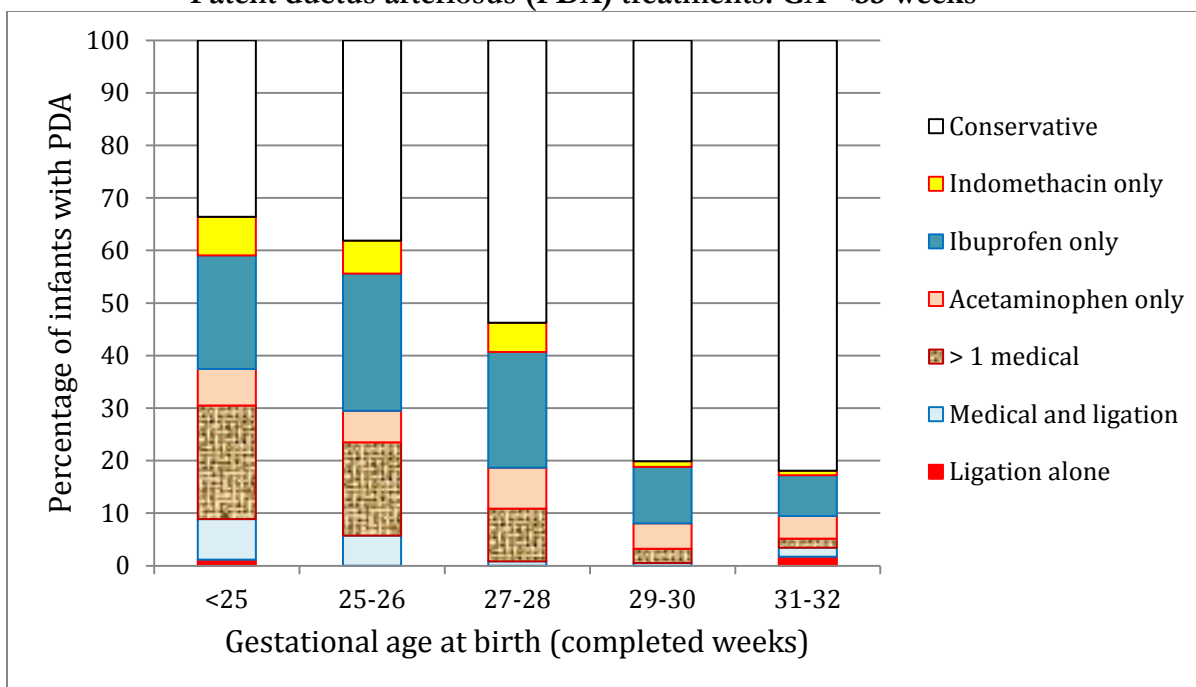
<http://www.canadianneonatalnetwork.org/Portal/LinkClick.aspx?fileticket=lreR0871sjA%3d&tabid=39>

### **Section D.3**

**Analyses based on number of eligible very preterm (GA <33 weeks) or very low birth weight (BW <1 500g) neonates**

These included data from 4 482 eligible very preterm neonates and 3 086 eligible VLBW neonates.

**Presentation #13**  
**Patent ductus arteriosus (PDA) treatments: GA <33 weeks**



Birth GA (completed weeks)		Total	Missing data on PDA	PDA unknown	No PDA	Neonates with PDA	Treatment†						
							Conservative	Indo	Ibu	Acetaminophen	> 1 medical*	Medical and ligation#	Ligation alone
<25	N %	372	0	10	103	259	87 34%	19 7%	56 22%	18 7%	56 22%	20 8%	3 1%
25-26	N %	605	1	6	215	383	146 38%	24 6%	100 26%	23 6%	68 18%	22 6%	0 0%
27-28	N %	804	0	11	434	359	193 54%	20 6%	79 22%	28 8%	36 10%	3 1%	0 0%
29-30	N %	1094	0	4	904	186	149 80%	2 1%	20 11%	9 5%	5 3%	1 1%	0 0%
31-32	N %	1607	0	3	1488	116	95 82%	1 1%	9 8%	5 4%	2 2%	2 2%	2 2%
<b>Total neonates included</b>	N %	4482	1	34	3144	1303	670 51%	66 5%	264 20%	83 6%	167 13%	48 4%	5 0%

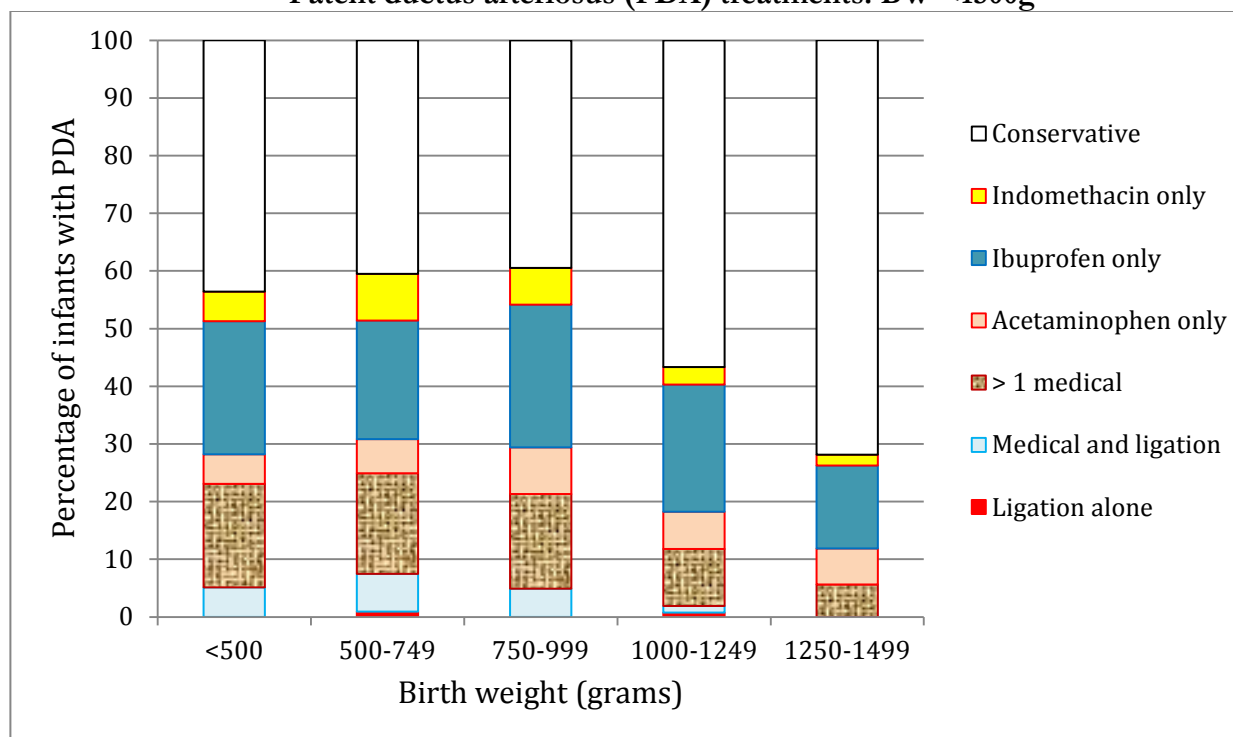
†The percentage of neonates receiving each PDA treatment was calculated using the total number of neonates diagnosed with PDA as the denominator.

\*>1 medical = 2 or 3 of (Indomethacin or Ibuprofen or Acetaminophen)

#Medical and ligation = Ligation + at least one of the drugs (Indomethacin or Ibuprofen or Acetaminophen)

**COMMENTS:** Specific reasons for treatment with indomethacin and frequency of repeat course of indomethacin were not recorded. Excludes indomethacin prophylaxis started on the first day of age. Neonates were identified as without PDA if there was no clinical suspicion of PDA.

**Presentation #14**  
**Patent ductus arteriosus (PDA) treatments: BW <1500g**



BW (grams)		Total	Missing data on PDA	PDA information unknown	No PDA	Neonates with PDA	Treatment†						
							Conser vative	Indo	Ibu	Acetamin ophen	> 1 medical*	Medical and ligation#	Ligation alone
<500	N	55	0	4	12	39	17	2	9	2	7	2	0
	%						44%	5%	23%	5%	18%	5%	0%
500-749	N	508	1	11	175	321	130	26	66	19	56	21	3
	%						41%	8%	21%	6%	17%	7%	1%
750-999	N	739	0	4	327	408	161	26	101	33	67	20	0
	%						39%	6%	25%	8%	16%	5%	0%
1000-1249	N	807	0	8	536	263	149	8	58	17	26	3	2
	%						57%	3%	22%	6%	10%	1%	1%
1250-1499	N	977	0	3	814	160	115	3	23	10	9	0	0
	%						72%	2%	14%	6%	6%	0%	0%
Total neonates included	N	3086	1	30	1864	1191	572	65	257	81	165	46	5
	%						48%	5%	22%	7%	14%	4%	0%

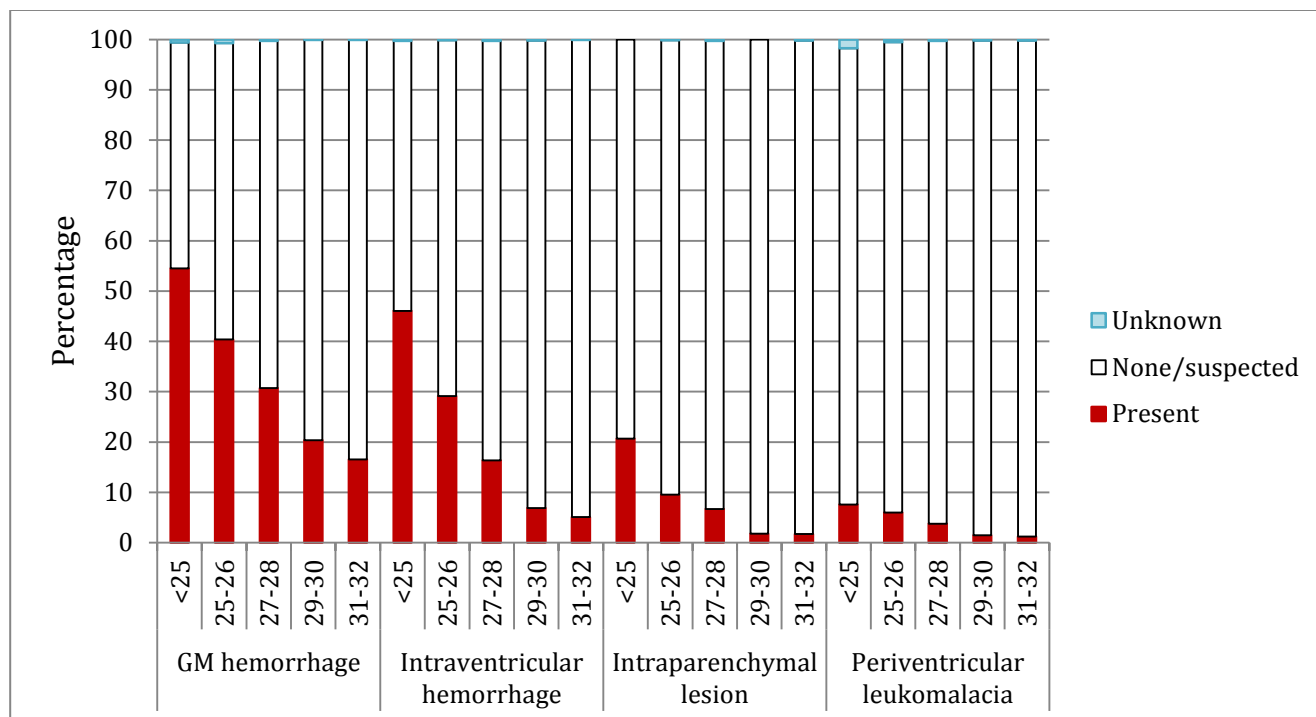
† The percentage of neonates receiving each PDA treatment was calculated using the total number of neonates diagnosed with PDA as the denominator.

\*>1 medical = 2 or 3 of (Indomethacin or Ibuprofen or Acetaminophen)

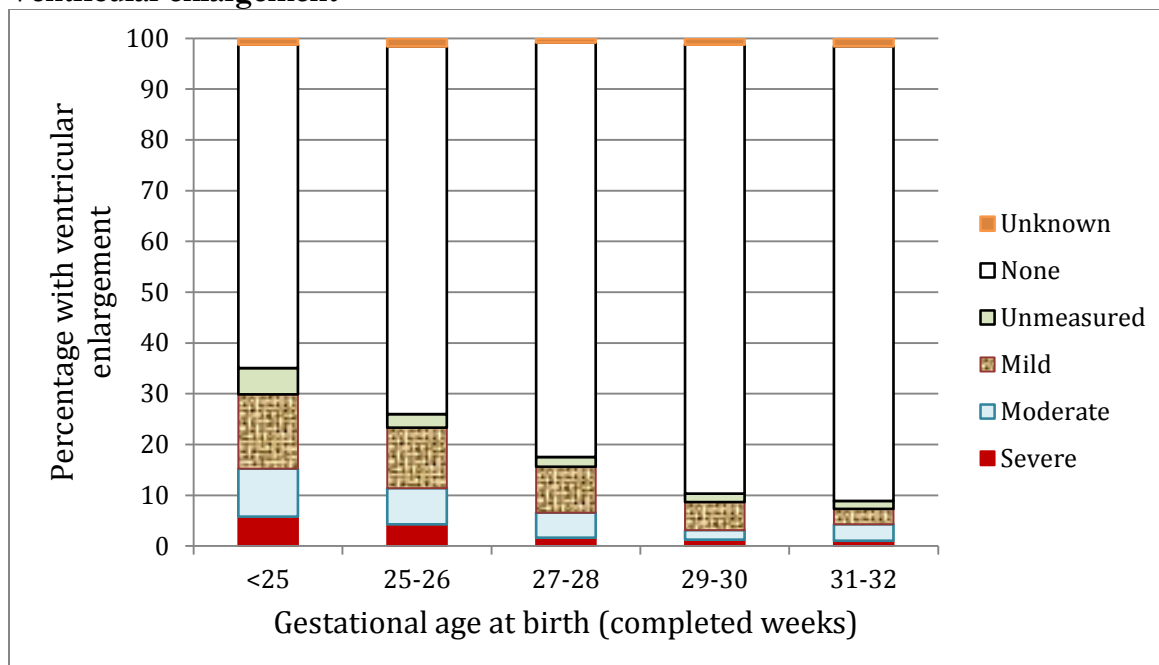
#Medical and ligation = Ligation + at least one of the drugs (Indomethacin or Ibuprofen or Acetaminophen)

**COMMENTS:** Specific reasons for treatment with indomethacin and frequency of a repeat course of indomethacin were not recorded. Excludes indomethacin prophylaxis started on the first day of age. Neonates were identified as without PDA if there was no clinical suspicion of PDA.

**Presentation #15**  
**Neuroimaging findings: GA <33 weeks**



**Ventricular enlargement**



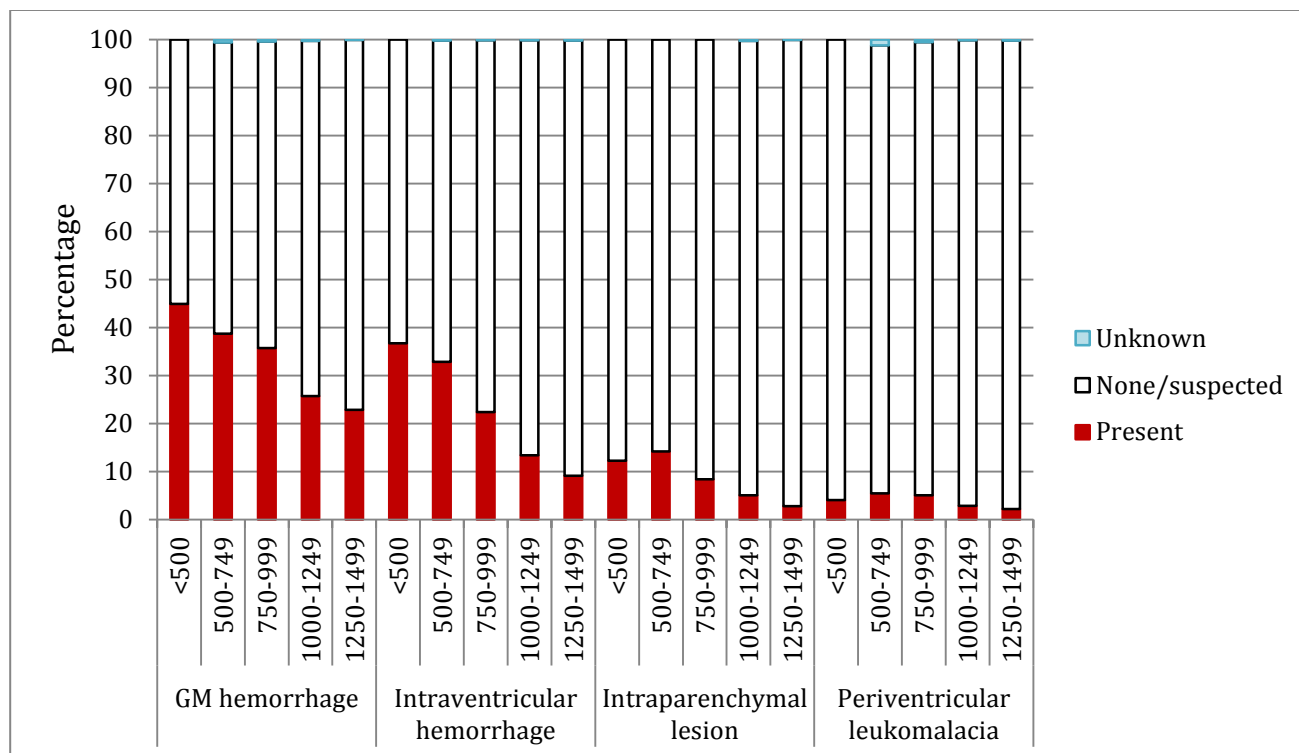
See [page 134](#) for classifications of ventricular enlargement.

**Presentation #15 (continued)**  
**Neuroimaging findings: GA <33 weeks**

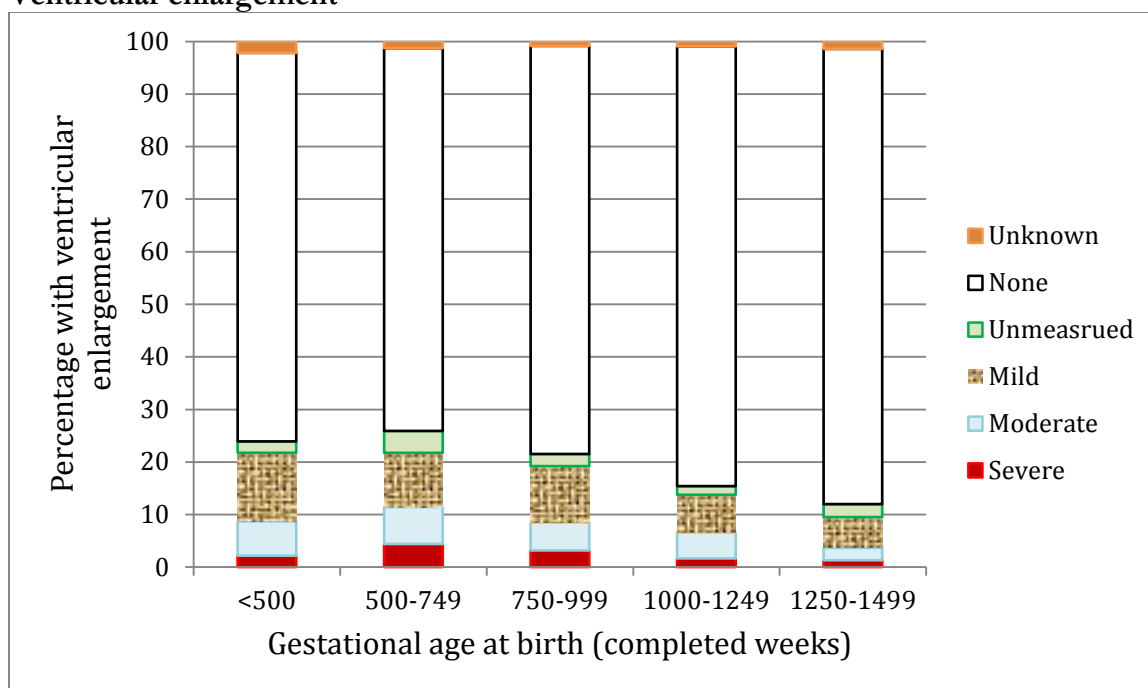
GA at birth (completed weeks)		Total	Neuro-imaging available	Neuroimaging findings																	
				GM hemorrhage			Intraventricular hemorrhage			Ventricular enlargement						Intraparenchymal lesion			Periventricular leukomalacia		
				Present	None/suspected	Unknown	Present	None/suspected	Unknown	Mild	Moderate	Severe	Unmeasured	None	Unknown	Present	None/suspected	Unknown	Present	None/suspected	Unknown
<25	N %	372	343	187 55%	154 45%	2 1%	158 46	184 54	1 0%	48 15%	31 9%	19 6%	17 5%	209 64%	4 1%	71 21%	272 79%	0 0%	26 8%	311 91%	6 2%
25-26	N %	605	587	237 40%	346 59%	4 1%	171 29%	415 71%	1 0%	67 12%	40 7%	24 4%	15 3%	407 72%	9 2%	56 10%	530 90%	1 0%	35 6%	549 94%	3 1%
27-28	N %	804	778	239 31%	537 69%	2 0%	127 16%	649 83%	2 0%	66 9%	36 5%	12 2%	14 2%	596 82%	6 1%	52 7%	724 93%	2 0%	29 4%	747 96%	2 0%
29-30	N %	1094	1006	205 20%	800 80%	1 0%	69 7%	935 93%	2 0%	53 6%	18 2%	12 1%	16 2%	849 88%	12 1%	18 2%	988 98%	0 0%	15 1%	989 98%	2 0%
31-32	N %	1607	1005	166 17%	838 83%	1 0%	51 5%	953 95%	1 0%	29 3%	31 3%	10 1%	15 2%	857 90%	15 2%	17 2%	986 98%	2 0%	12 1%	991 99%	2 0%
Total number of neonates	N	4482	3719	1034	2675	10	576	3136	7	263	156	77	77	2918	46	214	3500	5	117	3587	15
	%			28%	72%	0%	15%	84%	0%	7%	4%	2%	2%	78%	1%	6%	94%	0%	3%	96%	0%

**Note:** Neuroimaging findings were not mutually exclusive, i.e. one neonate may have had more than one finding.  
 See [page 134](#) for classifications of ventricular enlargement.

**Presentation #16**  
**Neuroimaging findings: BW <1500g**



**Ventricular enlargement**



See [page 134](#) for classifications of ventricular enlargement.

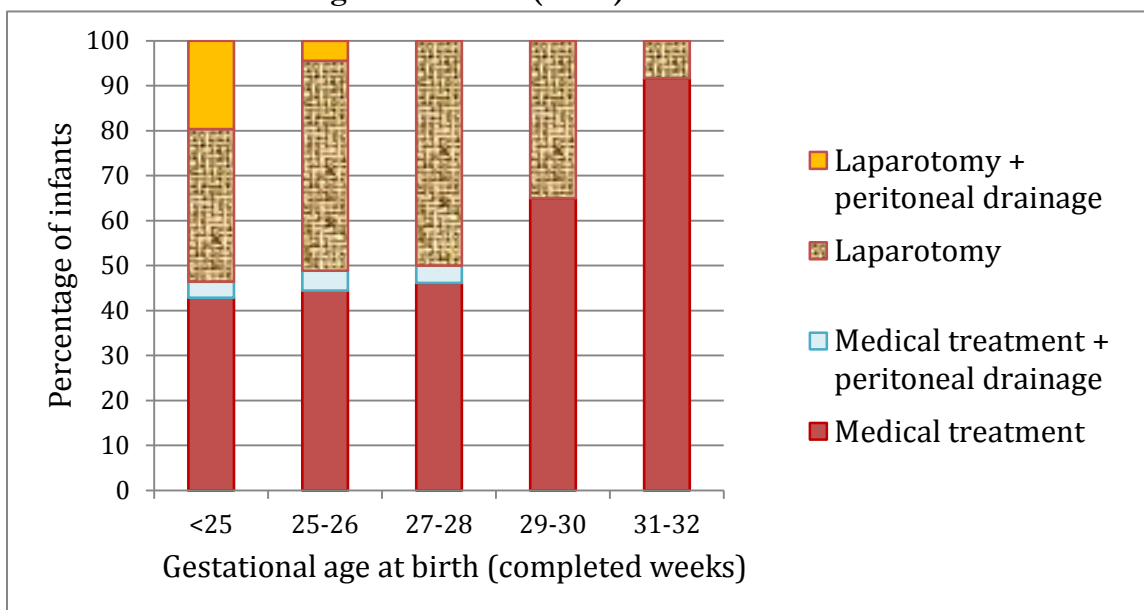
**Presentation #16 (continued)**  
**Neuroimaging findings: BW <1500g**

BW (grams)		Total	Neuro-imaging available	Neuroimaging findings																	
				GM hemorrhage			Intraventricular hemorrhage			Ventricular enlargement						Intraparenchymal lesion			Periventricular leukomalacia		
				Present	None/suspected	Unknown	Present	None/suspected	Unknown	Mild	Moderate	Severe	Unmeasured	None	Unknown	Present	None/suspected	Unknown	Present	None/suspected	Unknown
<500	N %	55	49	22 45%	27 55%	0 0%	18 37%	31 63%	0 0%	6 13%	3 7%	1 2%	1 2%	34 74%	1 2%	6 12%	43 88%	0 0%	2 4%	47 96%	0 0%
500-749	N %	508	478	185 39%	290 61%	3 1%	157 33%	320 67%	1 0%	47 10%	32 7%	20 4%	19 4%	332 73%	6 1%	68 14%	410 86%	0 0%	26 5%	446 93%	6 1%
750-999	N %	739	714	255 36%	456 64%	3 0%	160 22%	553 77%	1 0%	74 11%	37 5%	22 3%	16 2%	538 78%	6 1%	60 8%	654 92%	0 0%	36 5%	674 94%	4 1%
1000-1249	N %	807	770	198 26%	570 74%	2 0%	103 13%	666 86%	1 0%	52 7%	36 5%	12 2%	12 2%	609 84%	7 1%	39 5%	729 95%	2 0%	22 3%	747 97%	1 0%
1250-1499	N %	977	813	186 23%	626 77%	1 0%	74 9%	737 91%	2 0%	45 6%	18 2%	10 1%	19 2%	665 87%	11 1%	23 3%	789 97%	1 0%	18 2%	793 98%	2 0%
Total neonates	N	3086	2824	846	1969	9	512	2307	5	224	126	65	67	2178	31	196	2625	3	10 4%	2707	13
	%			30%	70%	0%	18%	82%	0%	8%	4%	2%	2%	77%	1%	7%	93%	0%	4%	96%	0%

**Note:** Neuroimaging findings were not mutually exclusive, i.e. one neonate may had more than one findings.  
 See [page 134](#) for classifications of ventricular enlargement.

## Presentation #17

## Necrotizing enterocolitis (NEC) treatments: GA &lt;33weeks



GA at birth (completed weeks)		Total number of neonates	Missing data on NEC	No NEC	NEC*	Neonates with necrotizing enterocolitis**				Death among infants with NEC**
						Medical treatment only	Medical + peritoneal drainage	Laparotomy	Laparotomy + peritoneal drainage	
<25	N %	372	0	316 85%	56 15%	24 43%	2 4%	19 34%	11 20%	21 38%
25-26	N %	605	1	559 93%	45 7%	20 44%	2 4%	21 47%	2 4%	16 36%
27-28	N %	804	0	778 97%	26 3%	12 46%	1 4%	13 50%	0 0%	8 31%
29-30	N %	1094	0	1074 98%	20 2%	13 65%	0 0%	7 35%	0 0%	4 20%
31-32	N %	1607	0	1595 99%	12 1%	11 92%	0 0%	1 8%	0 0%	1 8%
Total number of neonates	N %	4482	1	4322 96%	159 4%	80 50%	5 3%	61 38%	13 8%	50 31%

\*The percentage of neonates with NEC was calculated using the total number of neonates in the same GA category with data available on NEC as the denominator.

\*\*The percentages were calculated using the total number of neonates in the same GA category that had NEC as the denominator.

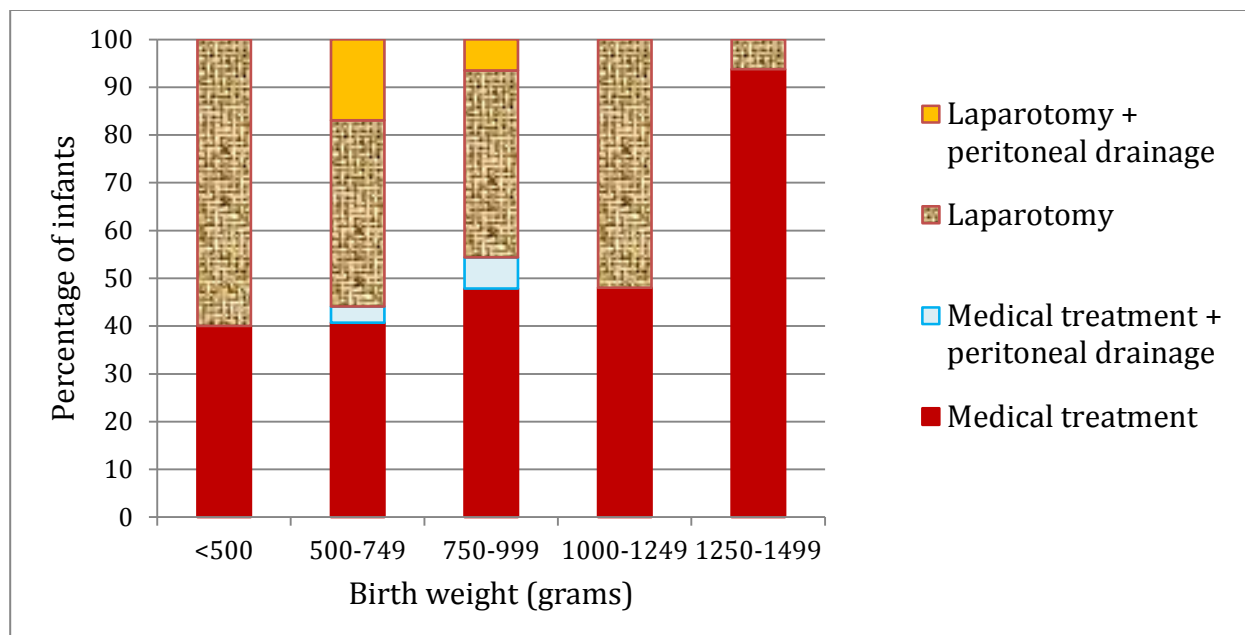
**COMMENTS:** NEC is identified according to the following criteria: a) definite pneumatosis (air within the bowel wall) or portal/hepatic gas as diagnosed by x-ray or ultrasound, or b) if there is a surgical or autopsy diagnosis of NEC. Diagnoses of 'suspected NEC' or x-rays showing pneumoperitoneum without pneumatosis are not classified as NEC.

**Number (%) of neonates with NEC for GA > 33 weeks:**

GA 33 - 36 weeks: 28 neonates (0.6%)

GA ≥ 37 weeks: 11 neonates (0.2%)

**Presentation #18**  
**Necrotizing enterocolitis (NEC) treatments: BW <1500 g**



Birth weight (grams)		Total number of neonates	Missing data on NEC	No NEC	NEC*	Neonates with necrotizing enterocolitis**				Death among infants with NEC**
						Medical treatment only	Medical + peritoneal drainage	Laparotomy	laparotomy + peritoneal drainage	
<500	N	55	0	50	5	2	0	3	0	3
	%			91%	9%	40%	0%	60%	0%	60%
500-749	N	508	1	448	59	24	2	23	10	24
	%			88%	12%	41%	3%	39%	17%	41%
750-999	N	739	0	693	46	22	3	18	3	16
	%			94%	6%	48%	7%	39%	7%	35%
1000-1249	N	807	0	782	25	12	0	13	0	5
	%			97%	3%	48%	0%	52%	0%	20%
1250-1499	N	977	0	961	16	15	0	1	0	2
	%			98%	2%	94%	0%	6%	0%	13%
Total number of neonates	N	3086	1	2934	151	75	5	58	13	50
	%			95%	5%	50%	3%	38%	9%	33%

\*The percentage of neonates with NEC was calculated using the total number of neonates in the same GA category with data available on NEC as the denominator.

\*\* The percentages were calculated using the total number of neonates in the same GA category that had NEC as the denominator.

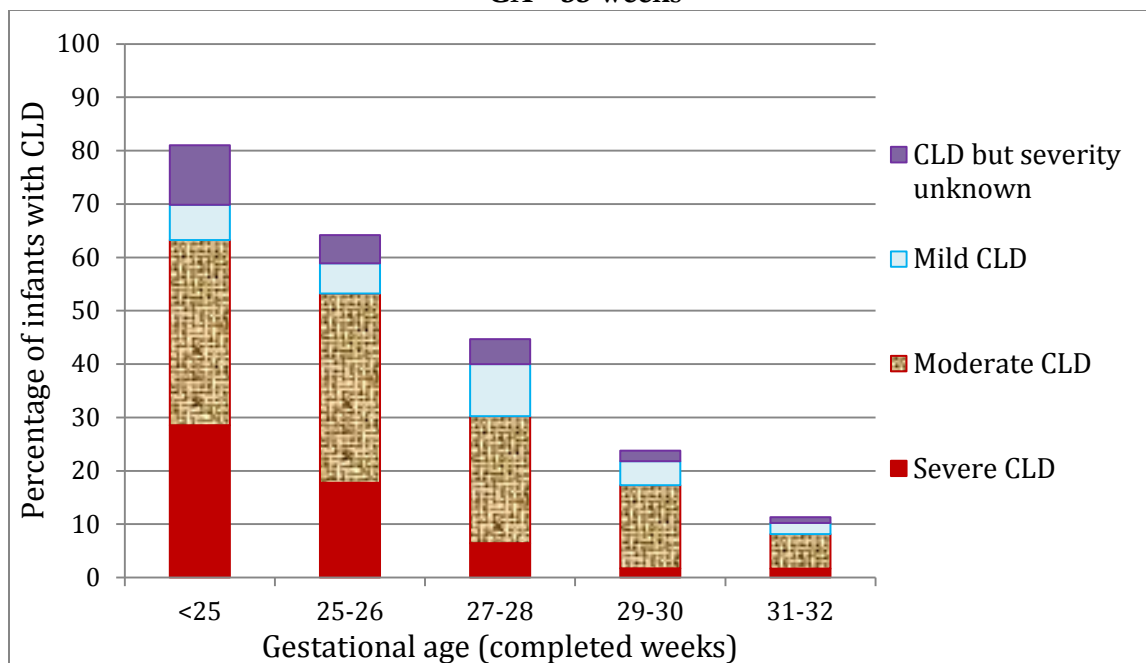
**COMMENTS:** NEC is identified according to the following criteria: a) definite pneumatosis (air within the bowel wall) or portal/hepatic gas as diagnosed by x-ray or ultrasound, or b) if there is a surgical or autopsy diagnosis of NEC. Diagnoses of 'suspected NEC' or x-rays showing pneumoperitoneum without pneumatosis are not classified as NEC.

**Number (%) of neonates with NEC and BW > 1500g:**

**BW 1500 - 2499g: 31 neonates (0.6%)**

**BW ≥ 2500g: 16 neonates (0.2%)**

**Presentation #19**  
**Chronic lung disease (CLD) at 36 weeks post menstrual age (PMA) or discharge:**  
**GA <33 weeks**



GA	Total number of neonates	Number of neonates who died before 36 weeks PMA	Number of surviving neonates whose respiratory support is unknown*	CLD from**	Number of neonates with known results	Number of neonates with severe CLD	Number of neonates with moderate CLD	Number of neonates with mild CLD	Number of neonates with CLD but severity unknown	Number of neonates without CLD
<25	372	128	2	36w	214	62	81	13	23	35
				Disch	28	7	3	3	4	11
25-26	605	73	2	36w	394	87	154	21	23	109
				Disch	136	7	34	9	5	81
27-28	804	52	4	36w	424	39	114	51	15	205
				Disch	324	9	64	22	20	209
29-30	1 094	28	1	36w	420	13	92	30	16	269
				Disch	645	5	74	18	5	543
31-32	1 607	18	12	36w	573	20	52	26	12	463
				Disch	1 004	6	50	7	5	936
Total	4 482	299	21	36w	2 025	221	493	141	89	1 081
				Disch	2 137	34	225	59	39	1 780

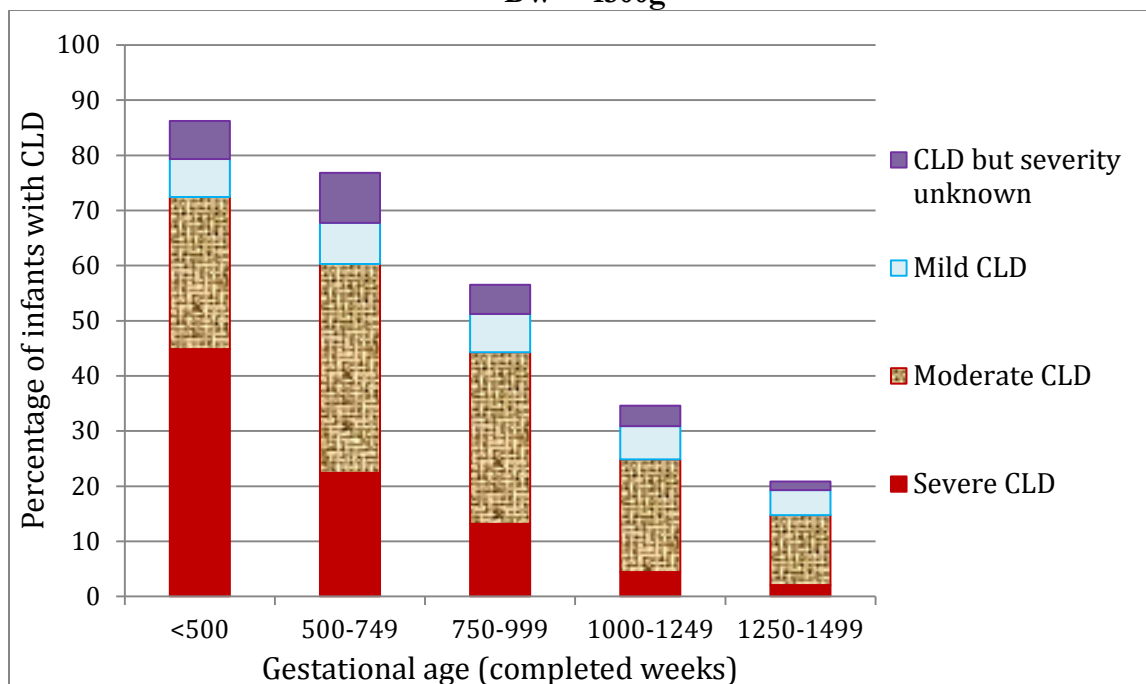
**COMMENTS:** See [pages 134-135](#) for the definition of severity of CLD.

\*unknown = first admission was after 36 weeks' PMA

\*\* w = weeks' PMA, Disch = Discharge prior to 36 weeks' PMA

Note: Percentages of neonates with CLD were calculated based on the total number of neonates in the same GA category with known CLD results.

**Presentation #20**  
**Chronic lung disease (CLD) at 36 weeks post menstrual age (PMA) or discharge:**  
**BW < 1500g**



BW	Total number of neonates	Number of neonates who died before 36 weeks' PMA	Number of surviving neonates whose respiratory support is unknown*	CLD from**	Number of neonates with known results	Number of neonates with severe CLD	Number of neonates with moderate CLD	Number of neonates with mild CLD	Number of neonates with CLD but severity unknown	Number of neonates without CLD
<500	55	25	1	36w	27	12	8	2	2	3
				Disch	2	1	0	0	0	1
500-749	508	130	3	36w	294	76	122	18	27	51
				Disch	81	8	20	10	7	36
750-999	739	75	2	36w	476	80	169	34	27	166
				Disch	186	7	37	12	8	122
1000-1249	807	73	5	36w	368	23	90	29	14	212
				Disch	361	9	59	15	13	265
1250-1499	977	138	3	36w	322	16	47	27	7	225
				Disch	514	1	59	11	6	437
Total	3 086	441	14	36w	1 487	207	436	110	77	657
				Disch	1 144	26	175	48	34	861

**COMMENTS:** See [pages 134-135](#) for the definition of severity of CLD.

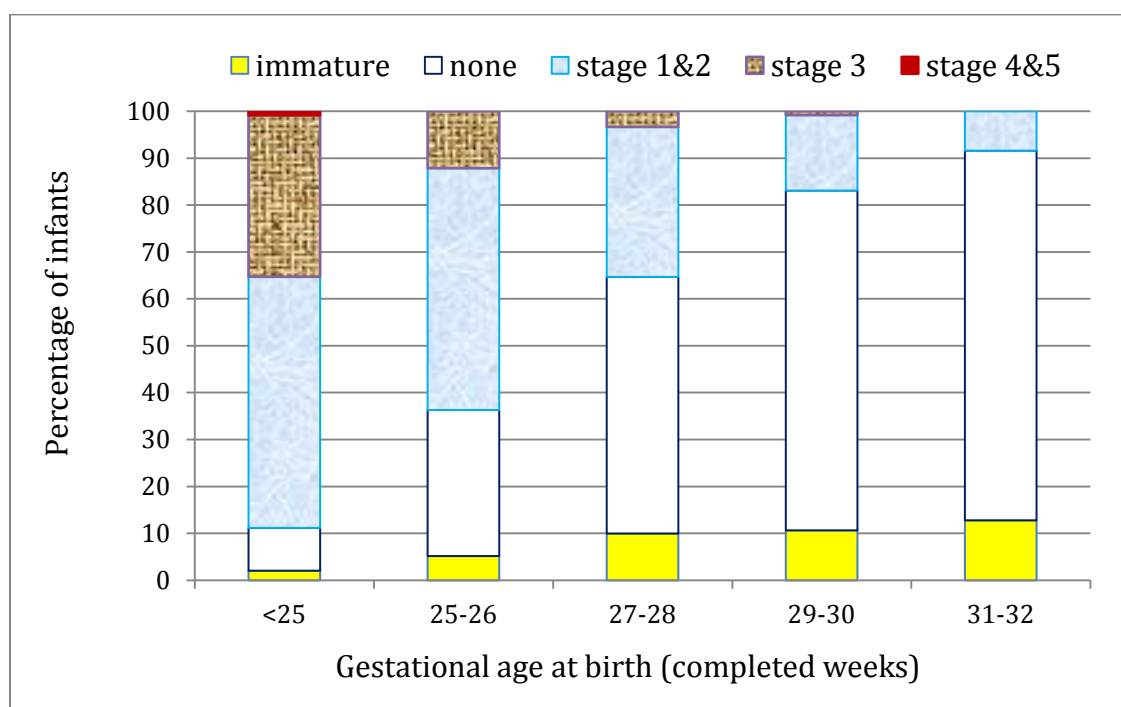
\*unknown = first admission was after 36 weeks' PMA

\*\* w = weeks' PMA, Disch = Discharge prior to 36 weeks' PMA

Note: Percentages of neonates with CLD were calculated based on the total number of neonates in the same GA category with known CLD results.

## Presentation #21

## Retinopathy of prematurity (ROP) staging: GA &lt;33 weeks

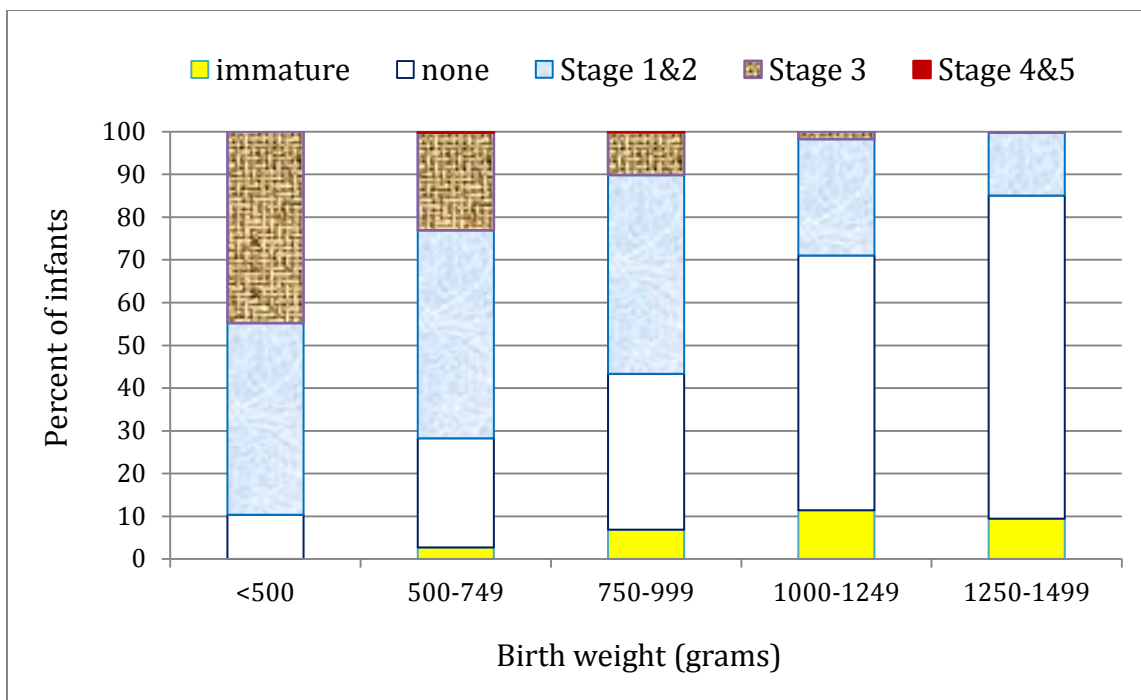


GA (completed weeks)		Total number of neonates	Number of neonates alive at 6 weeks of age	Number of neonates with known eye examination results	Retinopathy of prematurity*				
					Immature	None	Stages 1 & 2	Stage 3	Stages 4 & 5
<25	N	372	260	241	5	22	129	83	2
	%				2%	9%	54%	34%	1%
25-26	N	605	539	520	27	162	268	63	0
	%				5%	31%	52%	12%	0%
27-28	N	804	753	660	66	361	211	22	0
	%				10%	55%	32%	3%	0%
29-30	N	1 094	1 067	628	67	455	101	5	0
	%				11%	72%	16%	1%	0%
31-32	N	1 607	1 586	203	26	160	17	0	0
	%				13%	79%	8%	0%	0%
Total neonates included	N	4 482	4 205	2 252	191	1 160	726	173	2
	%				8%	52%	32%	8%	0%

\*The percentage of neonates diagnosed with each stage of ROP was calculated using the total number of neonates in the same GA category with known eye examination results as the denominator.

**COMMENTS:** ROP is defined according to the International Classification of Retinopathy of Prematurity (ICROP) and includes the highest level of ROP in either eye. More advanced stages may have been detected in neonates transferred from network sites to level II sites or units. **Caution should be used when interpreting these data.**

**Presentation #22**  
**Retinopathy of prematurity (ROP) staging: BW < 1500 g**



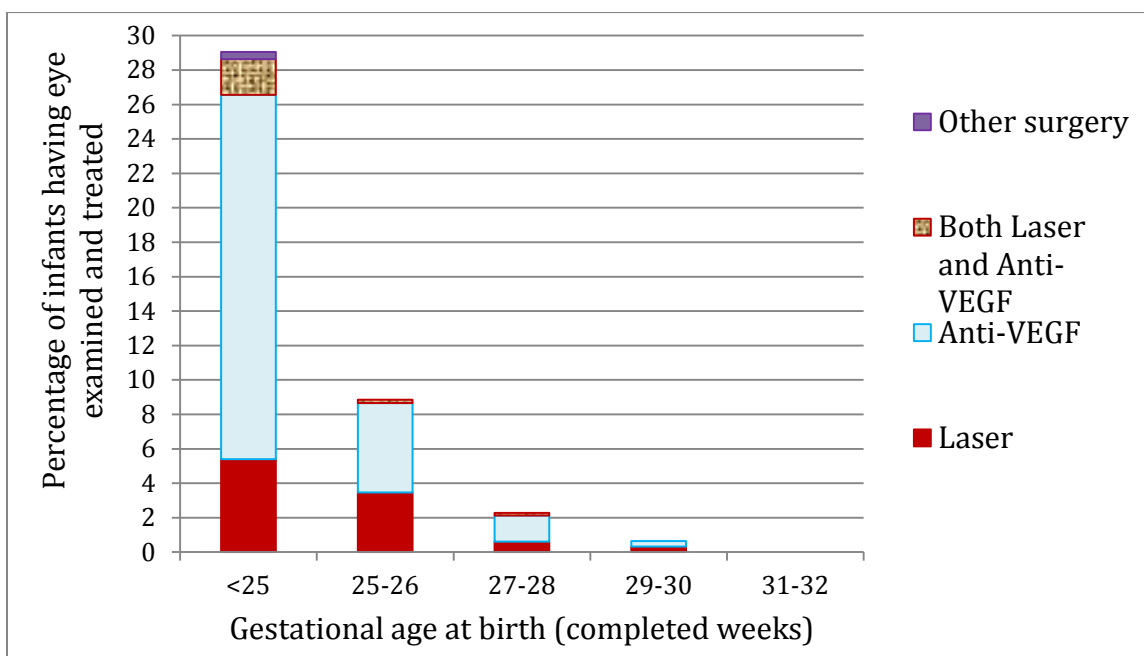
BW (grams)		Total number of neonates	Number of neonates alive at 6 weeks of age	Number of neonates with known eye examination results	Retinopathy of prematurity*				
					Immature	None	Stages 1 & 2	Stage 3	Stages 4 & 5
<500	N	55	31	29	0	3	13	13	0
	%				0%	10%	45%	45%	0%
500-749	N	508	393	372	10	95	181	85	1
	%				3%	26%	49%	23%	0%
750-999	N	739	678	628	43	229	292	63	1
	%				7%	36%	47%	10%	0%
1000-1249	N	807	773	562	64	335	153	10	0
	%				11%	60%	27%	2%	0%
1250-1499	N	977	956	414	39	313	61	1	0
	%				9%	76%	15%	0%	0%
Total neonates included	N	3 086	2 831	2 005	156	975	700	172	2
	%				8%	49%	35%	9%	0%

\*The percentage of neonates diagnosed with each stage of ROP was calculated using the total number of neonates in the same GA category with known eye examination results as the denominator.

**COMMENTS:** ROP is defined according to the International Classification of Retinopathy of Prematurity (ICROP) and includes the highest level of ROP in either eye. More advanced stages may have been detected in neonates transferred from network sites to level II sites or units. **Caution should be used when interpreting these data.**

## Presentation #23

## Retinopathy of prematurity (ROP) treatments: GA &lt;33 weeks

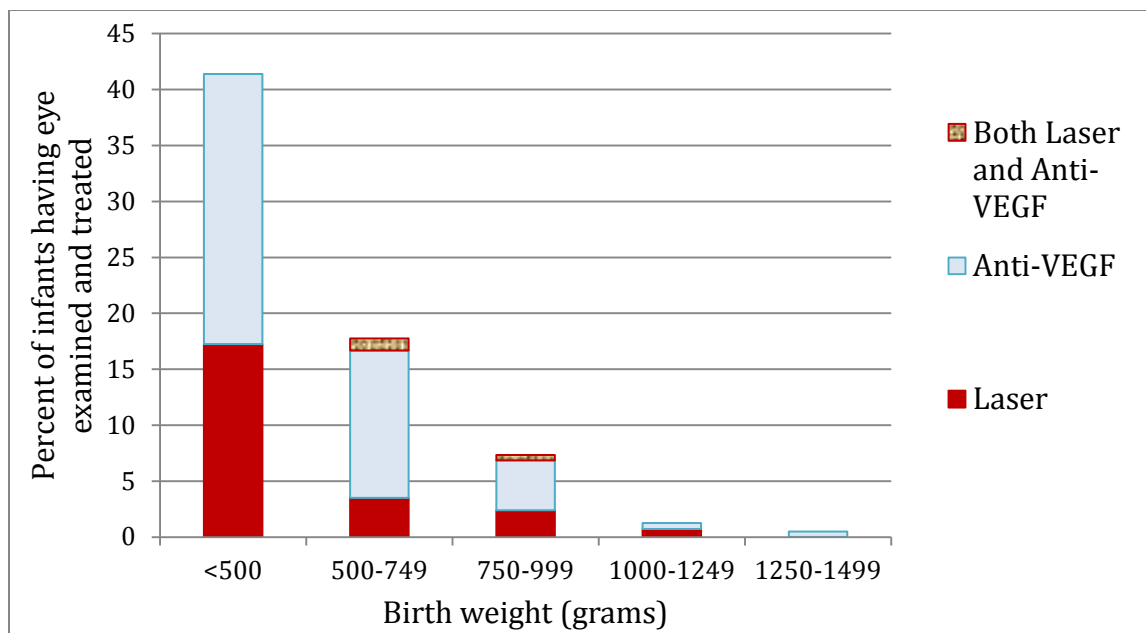


Birth GA (completed weeks)		Total number of neonates	Number of neonates with known eye examination results	Therapy for retinopathy of prematurity (ROP)*	Therapy for ROP			
					Laser	Anti-VEGF	Both Laser and Anti-VEGF	Other surgery
<25	N %	372	241	69 29%	13	51	5	1
25-26	N %	605	520	46 9%	18	27	1	0
27-28	N %	804	660	15 2%	4	10	1	0
29-30	N %	1 094	628	4 1%	2	2	0	0
31-32	N %	1 607	203	0 0%	0	0	0	0
Total neonates included	N %	4 482	2 252	134 6%	37	90	7	1

\*The percentage of neonates who received ROP therapy was calculated using the total number of neonates in the same GA category with known eye examination results as the denominator.

**COMMENTS:** ROP is defined according to the International Classification of Retinopathy of Prematurity (ICROP) and includes the highest level of ROP in either eye. More advanced stages may have been detected in neonates transferred from network sites to level II sites or units. **Caution should be used when interpreting these data as some neonates did not have eye examination data.**

**Presentation #24**  
**Retinopathy of prematurity (ROP) treatments: BW <1500 g**



BW (grams)		Total number of neonates	Number of neonates with known eye examination results	Therapy for retinopathy of prematurity (ROP)*	Therapy for ROP			
					Laser	Anti-VEGF	Both Laser and Anti-VEGF	Other surgery
<500	N	55	29	12	5	7	0	0
	%			41%				
500-749	N	508	372	66	13	49	4	1
	%			18%				
750-999	N	739	628	46	15	28	3	0
	%			7%				
1000-1249	N	807	562	7	4	3	0	0
	%			1%				
1250-1499	N	977	414	2	0	2	0	0
	%			1%				
Total neonates included	N	3 086	2005	133	37	89	7	1
	%			7%				

\*The percentage of neonates who received ROP therapy was calculated using the total number of neonates in the same GA category with known eye examination results as the denominator.

**COMMENTS:** ROP is defined according to the International Classification of Retinopathy of Prematurity (ICROP) and includes the highest level of ROP in either eye. More advanced stages may have been detected in neonates transferred from network sites to level II sites or units. **Caution should be used when interpreting these data as some neonates did not have eye examination data.**

**Presentation #25**  
**Mortality or select major morbidity: GA <33 weeks**

GA	Number of neonates	Number survived until discharge / transfer (%)	Major morbidity <sup>a</sup> (%)	CLD <sup>b</sup> (%)	Severe ROP <sup>c</sup> (%)	Severe neurological injury <sup>d</sup> (%)	NEC <sup>e</sup> (%)	Late onset sepsis <sup>f</sup>
<24	153	72 (47)	106 (69)	56 (78)	33 (45)	36 (26)	27 (18)	58 (38)
24	209	161 (77)	176 (84)	132 (82)	54 (35)	45 (23)	28 (13)	74 (35)
25	256	212 (83)	187 (73)	145 (67)	39 (19)	38 (15)	19 (7)	69 (27)
26	329	298 (91)	228 (69)	184 (61)	24 (9)	36 (11)	25 (8)	56 (17)
27	367	337 (92)	206 (56)	160 (48)	20 (7)	35 (10)	17 (5)	52 (14)
28	406	387 (95)	191 (47)	154 (40)	3 (1)	31 (8)	9 (2)	30 (7)
29	505	495 (98)	159 (31)	127 (26)	5 (2)	13 (3)	9 (2)	24 (5)
30	556	544 (98)	137 (25)	113 (21)	0	13 (3)	7 (1)	18 (3)
31	723	714 (99)	108 (15)	74 (10)	0	16 (3)	6 (1)	18 (2)
32	817	805 (99)	101 (12)	78 (10)	0	12 (3)	5 (1)	13 (2)
<b>Total neonates</b>	4321	4025 (93)	1599 (37)	1223 (30)	178 (9)	275 (8)	152 (4)	412 (10)

**Inclusion criteria for these analyses:**

1. Neonate born at <33 weeks GA without major congenital anomaly
2. Denominators were based on the number of neonates with available data and those without major congenital anomaly

**Definitions:**

<sup>a</sup> Major morbidity was counted as any one of the following

1. CLD (any grade)
2. Severe ROP
3. Severe neurological injury (IVH  $\geq$  grade 3 and/or PVL)
4. Stage 2 or 3 NEC
5. Late onset sepsis

<sup>b</sup> Chronic lung disease was defined as per presentation #19 of any grade

<sup>c</sup> Severe ROP was defined as ROP stage 3,4,5 and/or those with ROP treatment (laser or intraocular injection).

<sup>d</sup> Severe neurological injury was defined as IVH  $\geq$  grade 3 and/or PVL

<sup>e</sup> NEC defined as stage 2 or 3

<sup>f</sup> Late onset sepsis was defined as any positive blood and/or cerebrospinal fluid culture after 2 days of age. Analysis was neonate-based.

## **E. Site Comparisons**

## **E.1. Site Comparisons – Care Practices**

**Presentation #26**  
**Prenatal and delivery room care practices: GA<29 weeks:**  
**Site specific crude rates\* (inborn only)**

Site	Number of neonates	Antenatal MgSO <sub>4</sub>			Antenatal steroids <sup>a</sup>	Timing of cord clamping <sup>b</sup>			Admission temperature			Apgar <5 at 5 minutes
	N	Yes	No	Missing	Completed course within last week prior to birth <sup>a</sup>	≥ 30 sec	< 30 sec or none	Missing	<36.5	36.5-37.2	>37.2	
vi	< 20	55.6	44.4	0.0	22.2	61.1	22.2	16.7	22.2	55.6	22.2	22.2
xxxi		100.0	0.0	0.0	33.3	33.3	66.7	0.0	33.3	66.7	0.0	33.3
xxix		50.0	50.0	0.0	25.0	75.0	25.0	0.0	75.0	25.0	0.0	25.0
i		84.6	15.4	0.0	53.9	61.5	38.5	0.0	15.4	38.5	46.2	23.1
xxxii		86.7	13.3	0.0	66.7	20.0	73.3	6.7	13.3	53.3	33.3	20.0
xxviii		0.0	100.0	0.0	0.0	50.0	50.0	0.0	0.0	0.0	100.0	50.0
xix		27.8	55.6	16.7	22.2	55.6	38.9	5.6	66.7	16.7	16.7	16.7
v		100.0	0.0	0.0	52.6	84.2	15.8	0.0	23.5	52.9	23.5	10.5
xvi	20 – 39	80.0	20.0	0.0	30.0	50.0	50.0	0.0	5.0	90.0	5.0	10.0
xxi		88.6	11.4	0.0	48.6	54.3	45.7	0.0	14.3	62.9	22.9	20.0
xv		80.0	20.0	0.0	24.0	48.0	44.0	8.0	16.7	70.8	12.5	8.0
xi		75.9	24.1	0.0	37.9	62.1	37.9	0.0	35.7	46.4	17.9	27.6
xiv		100.0	0.0	0.0	37.5	37.5	45.8	16.7	16.7	25.0	58.3	33.3
xvii		78.1	15.6	6.3	22.6	28.1	46.9	25.0	34.5	37.9	27.6	3.1
xxx		70.6	29.4	0.0	52.9	91.2	8.8	0.0	29.4	47.1	23.5	20.6
iv		42.9	51.4	5.7	34.3	57.1	40.0	2.9	37.1	45.7	17.1	34.3
vii	40 – 70	88.1	11.9	0.0	31.0	4.8	4.8	90.5	15.8	55.3	29.0	7.1
xxiv		23.4	63.8	12.8	44.7	51.1	44.7	4.3	39.5	55.8	4.7	27.7
xxvi		93.9	6.1	0.0	36.7	49.0	44.9	6.1	48.9	36.2	14.9	16.3
iii		92.5	5.7	1.9	43.4	1.9	98.1	0.0	62.5	27.1	10.4	19.2
x		93.1	6.9	0.0	60.3	62.1	31.0	6.9	27.6	56.9	15.5	22.4
xxvii		83.3	16.7	0.0	54.2	2.1	95.8	2.1	53.9	38.5	7.7	14.9
xviii		84.8	13.6	1.7	49.2	62.7	33.9	3.4	29.3	53.5	17.2	20.3
viii		89.2	10.8	0.0	49.2	6.2	90.8	3.1	18.5	38.5	43.1	12.3
xxv	> 70	71.0	29.0	0.0	53.6	8.7	89.9	1.5	55.2	37.3	7.5	20.3
xii		75.3	23.4	1.3	48.7	55.1	44.3	0.6	25.8	61.9	12.3	8.9
xxii		90.9	9.1	0.0	46.4	55.5	41.8	2.7	9.4	54.2	36.5	4.6
xxiii		67.9	9.8	22.3	35.5	56.3	34.8	8.9	19.1	61.0	20.0	28.6
ix		37.6	61.4	1.0	51.5	61.4	37.6	1.0	29.3	48.5	22.2	7.9
xiii		88.1	11.9	0.0	36.3	58.9	40.5	0.6	16.7	76.8	6.6	22.6
<b>Total CNN</b>		76.1	21.0	2.9	43.6	47.0	47.0	6.1	27.6	53.4	19.0	17.1

\*Denominators were based on **inborn** neonates <29 weeks' GA admitted without major congenital anomaly.

<sup>a</sup> Completed course of antenatal steroids within the last week prior to birth = received at least two doses of corticosteroids for a period of 24 hours or more, but within one week of birth

**These are unadjusted rates.**

**Presentation #27**  
**Postnatal care practices: GA <29 weeks:**  
**Site specific crude rates\* (inborn only)**

Site	Number of neonates	No mechanical ventilation at any time in first 3 days <sup>a</sup>	Never received mechanical ventilation <sup>a</sup>	Fed at any time in first 2 days of admission	Never received antibiotics <sup>b</sup>	Exclusive breast milk feeding at discharge <sup>c</sup>	Exclusive formula feeding at discharge <sup>c</sup>
	N	%	%	%	%	%	%
vi	< 20	50.0	50.0	100.0	38.9	38.9	22.2
xxxi		0.0	0.0	100.0	0.0	33.3	33.3
xxix		100.0	75.0	50.0	0.0	25.0	75.0
i		46.2	30.8	84.6	7.7	30.8	46.2
xxxii		13.3	13.3	93.3	20.0	0.0	26.7
xxviii		50.0	0.0	50.0	0.0	0.0	100.0
xix		33.3	22.2	94.4	5.6	27.8	38.9
v		36.8	26.3	84.2	36.8	57.9	0.0
xvi	20 – 39	35.0	30.0	50.0	15.0	10.0	20.0
xxi		45.7	34.3	74.3	8.6	25.7	48.6
xv		48.0	40.0	76.0	40.0	32.0	24.0
xi		31.0	27.6	65.5	3.5	3.5	13.8
xiv		12.5	8.3	66.7	8.3	37.5	33.3
xvii		9.4	0.0	43.8	0.0	6.3	37.5
xxx		47.1	29.4	67.7	8.8	52.9	14.7
iv		22.9	17.1	91.4	2.9	25.7	48.6
vii	40 – 70	38.1	28.6	33.3	9.5	45.2	33.3
xxiv		31.9	23.4	83.0	8.5	21.3	25.5
xxvi		20.4	14.3	22.5	8.2	30.6	40.8
iii		34.0	26.4	60.4	17.0	17.0	28.3
x		32.8	25.9	86.2	6.9	44.8	32.8
xxvii		16.7	10.4	22.9	2.1	31.3	22.9
xviii		23.7	17.0	69.5	5.1	52.5	25.4
viii		29.2	21.5	98.5	12.3	53.9	24.6
xxv	> 70	30.4	23.2	87.0	18.8	17.4	27.5
xii		27.9	25.3	94.3	8.9	58.9	10.1
xxii		13.6	10.9	75.5	2.7	55.5	17.3
xxiii		27.7	18.8	91.1	0.9	33.9	11.6
ix		30.7	19.8	92.1	9.9	2.0	18.8
xiii		22.0	13.1	81.0	2.4	50.0	14.3
<b>Total CNN</b>		27.8	20.5	76.9	8.5	36.7	22.7

\*Denominators were based on **inborn** neonates <29 weeks' GA admitted without major congenital anomaly.

<sup>a</sup> Neonates either received high frequency ventilation or intermittent positive pressure ventilation.

<sup>b</sup> Neonates never received any antibiotics. Prophylactic administration of trimethoprim or amoxicillin for the prevention of urinary tract infections with a suspected renal anomaly was not included as antibiotics.

<sup>c</sup> Information obtained from *Discharge* screen/table of CNN database.

**These are unadjusted rates.**

## **E.2. Site Comparisons – Survival / Mortality**

**Presentation #28**  
**Survival rates by site: All GA**

Site	Percentage survival for each GA (completed weeks)								Overall survival rate for sites*
	<25	25-26	27-28	29-30	31-32	33-34	35-36	≥37	
A <sup>φ</sup>	66.7	100.0	80.0	100.0	100.0	NA	100.0	92.3	96.7
B	53.3	100.0	94.3	97.6	94.9	97.6	99.0	99.0	97.0
C	76.9	91.3	97.4	91.3	100.0	96.4	98.7	98.9	97.2
D	NA	66.7	86.7	100.0	100.0	100.0	100.0	99.6	99.2
E	66.7	90.9	83.3	100.0	98.0	99.0	100.0	98.7	98.3
F	58.8	88.2	82.9	100.0	95.8	97.8	99.5	99.0	97.2
G	33.3	62.5	90.5	100.0	100.0	98.7	100.0	99.4	97.8
H	86.7	89.7	88.5	100.0	98.0	98.7	96.0	98.8	97.4
I	90.0	100.0	100.0	100.0	100.0	98.9	100.0	99.5	99.4
J	75.0	85.7	89.5	90.5	96.0	90.7	98.3	98.0	96.4
K	50.0	100.0	81.3	100.0	100.0	100.0	100.0	100.0	96.8
L <sup>φ</sup>	55.6	83.3	100.0	100.0	100.0	NA	NA	NA	93.9
M	0.0	85.7	94.1	100.0	100.0	100.0	98.9	100.0	99.0
N	50.0	57.1	88.9	100.0	96.0	100.0	100.0	99.2	97.9
O	66.7	88.0	89.5	100.0	100.0	100.0	100.0	99.2	97.6
P	66.7	92.9	100.0	100.0	100.0	97.9	99.1	99.7	98.8
Q <sup>φ</sup>	42.9	83.3	92.9	97.1	96.8	100.0	100.0	100.0	93.0
R	NA	NA	100.0	NA	100.0	100.0	100.0	96.9	97.6
S	58.3	71.4	87.9	97.3	98.4	99.3	96.5	98.5	95.8
T	57.7	87.0	96.2	98.3	98.8	95.8	98.7	98.8	96.5
U	65.5	90.0	92.6	94.2	98.3	98.3	100.0	98.7	95.8
V <sup>φ</sup>	100.0	80.0	88.9	97.8	98.0	NA	NA	NA	95.8
W <sup>φ</sup>	75.0	90.9	96.0	94.4	98.6	NA	NA	NA	95.1
X <sup>φ</sup>	75.0	75.0	95.8	94.7	97.0	98.6	100.0	88.9	97.0
Y	0.0	100.0	76.9	100.0	100.0	98.4	100.0	100.0	97.4
Z	77.3	95.5	98.0	98.0	100.0	99.2	99.5	99.2	98.6
AA <sup>φ</sup>	55.9	82.7	92.7	95.8	97.8	90.9	97.8	98.7	93.9
AB	76.7	84.2	96.4	97.9	93.9	98.3	100.0	99.0	94.8
AC	60.0	83.3	100.0	100.0	100.0	100.0	100.0	100.0	98.5
AD	NA	NA	100.0	100.0	100.0	100.0	100.0	100.0	100.0
AE	NA	66.7	100.0	100.0	100.0	100.0	100.0	100.0	99.7
AF	100.0	100.0	100.0	100.0	100.0	100.0	100.0	98.9	99.3
<b>Overall survival rate for GA**</b>	65.1	86.8	93.2	97.4	98.3	98.4	99.2	99.0	97.2

These analyses included 15 477 neonates from 32 sites (7 neonates had missing GA data).

**Twenty-five sites collected data on all eligible admissions whereas seven sites (marked by<sup>φ</sup>) collected data on selected eligible admissions only.**

<sup>φ</sup> Please note the data collection criteria were not the same for these seven sites, and thus their rates may not be comparable with other sites.

Overall\* = (number of neonates who survived per site / total number of neonates for that site)\*100

Overall\*\* = (number of neonates who survived for each GA category / total number of neonates in each GA category)\*100

NA = no data available, 0 = no neonates survived, Delivery room deaths were not included

**Presentation #29**  
**Survival rates by site: All BW**

Site	Percentage survival for each BW (g) category							Overall survival rate for sites*
	<500	500-749	750-999	1000-1249	1250-1499	1500-2499	≥2500	
A <sup>‡</sup>	NA	75.0	100.0	100.0	93.8	100.0	94.1	96.7
B	0.0	76.0	95.5	100.0	88.9	97.9	99.1	97.0
C	50.0	80.0	100.0	97.1	96.6	95.8	99.1	97.2
D	NA	50.0	100.0	81.8	100.0	100.0	99.6	99.2
E	NA	100.0	75.0	94.1	100.0	99.4	98.9	98.3
F	50.0	53.3	88.5	88.6	97.0	98.2	99.2	97.2
G	NA	40.0	71.4	100.0	100.0	100.0	99.0	97.8
H	0.0	85.7	96.7	89.7	100.0	98.1	98.5	97.4
I	100.0	91.7	100.0	100.0	100.0	99.4	99.6	99.4
J	100.0	62.5	100.0	91.3	100.0	93.3	98.1	96.4
K	100.0	57.1	88.9	88.9	100.0	100.0	100.0	96.8
L <sup>‡</sup>	0.0	69.6	91.7	100.0	100.0	100.0	100.0	93.9
M	0.0	66.7	90.9	100.0	100.0	99.2	100.0	99.0
N	NA	42.9	87.5	100.0	100.0	100.0	98.9	97.9
O	66.7	73.7	88.5	100.0	100.0	100.0	99.3	97.6
P	0.0	83.3	94.7	100.0	100.0	98.4	99.8	98.8
Q <sup>‡</sup>	NA	71.4	81.8	88.2	100.0	95.5	100.0	93.1
R	NA	NA	100.0	100.0	100.0	96.6	97.8	97.6
S	33.3	64.7	85.7	86.1	97.2	97.9	98.9	95.8
T	33.3	70.6	91.1	95.8	96.9	98.5	98.2	96.5
U	54.5	75.7	91.3	94.0	98.3	98.4	98.6	95.8
V <sup>‡</sup>	NA	100.0	60.0	100.0	100.0	98.2	100.0	95.8
W <sup>‡</sup>	NA	75.0	95.8	96.6	96.6	97.0	100.0	95.1
X <sup>‡</sup>	50.0	80.0	93.8	100.0	95.7	97.5	98.6	97.0
Y	0.0	40.0	75.0	93.3	93.3	100.0	100.0	97.4
Z	100.0	86.7	96.1	98.4	100.0	99.5	99.1	98.6
AA <sup>‡</sup>	50.0	58.8	83.6	95.0	92.6	98.8	98.1	93.9
AB	62.5	84.2	89.0	94.8	96.5	98.0	99.3	94.8
AC	75.0	58.3	100.0	100.0	100.0	100.0	100.0	98.5
AD	NA	NA	NA	100.0	100.0	100.0	100.0	100.0
AE	NA	0.0	100.0	100.0	100.0	100.0	100.0	99.7
AF	NA	NA	100.0	100.0	100.0	98.6	99.5	99.3
<b>Overall survival rate for BW**</b>	50.9	73.4	90.3	95.3	97.6	98.6	99.0	97.2

These analyses included 15 479 neonates from 32 sites (5 neonates had missing BW data).

**Twenty-five sites collected data on all eligible admissions whereas seven sites (marked by ‡) collected data on selected eligible admissions only.**

‡ Please note the data collection criteria were not the same for these seven sites, and thus their rates may not be comparable with other sites.

Overall\* = (number of neonates who survived per site / total number of neonates for site)\*100

Overall\*\* = (number of neonates who survived for each BW category / total number of neonates in each BW category)\*100

NA = no data available, 0 = no neonates survived, Delivery room deaths were not included

**Presentation #30a**  
**Mortality: GA<33 weeks: Adjusted standardized ratios by site**

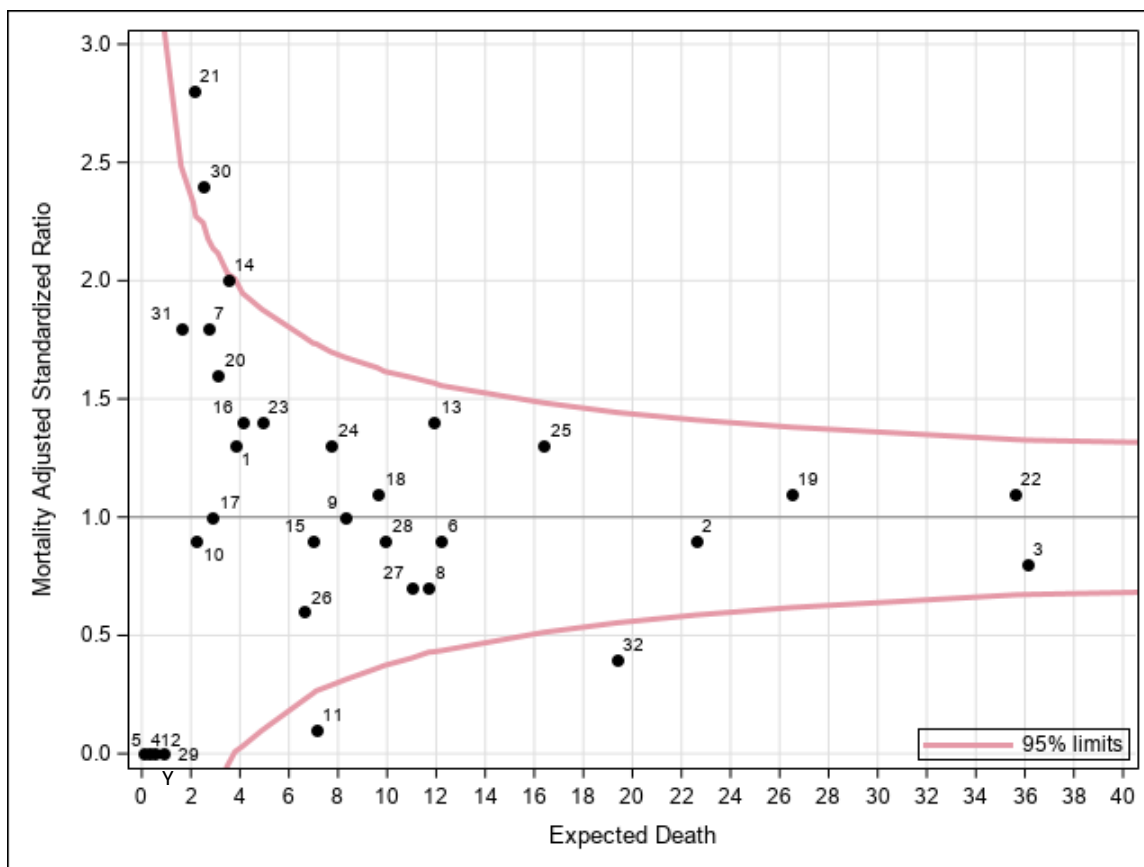
Site	Number of neonates	Number of deaths	Adjusted# expected number of deaths	Adjusted# standardized ratio	95% confidence interval (CI) for adjusted standardized ratio	
1	99	5	3.8	1.3	0.4	3.1
2	263	21	22.6	0.9	0.6	1.4
3	358	30	36.1	0.8	0.6	1.2
4	5	0	0.1	0.0	.	42.2
5	9	0	0.3	0.0	.	13.3
6	176	11	12.2	0.9	0.5	1.6
7	44	5	2.7	1.8	0.6	4.3
8	153	8	11.7	0.7	0.3	1.4
9	158	8	8.3	1.0	0.4	1.9
10	74	2	2.2	0.9	0.1	3.3
11	139	1	7.1	0.1	0.0	0.8
12	22	0	0.5	0.0	.	6.7
13	168	17	11.9	1.4	0.8	2.3
14	94	7	3.5	2.0	0.8	4.2
15	87	6	7.0	0.9	0.3	1.9
16	87	6	4.1	1.4	0.5	3.2
17	69	3	2.9	1.0	0.2	3.0
18	153	11	9.6	1.1	0.6	2.1
19	327	28	26.5	1.1	0.7	1.5
20	119	5	3.1	1.6	0.5	3.8
21	51	6	2.1	2.8	1.0	6.1
22	417	39	35.6	1.1	0.8	1.5
23	119	7	4.9	1.4	0.6	2.9
24	132	10	7.7	1.3	0.6	2.4
25	178	22	16.4	1.3	0.8	2.0
26	107	4	6.6	0.6	0.2	1.6
27	165	8	11.0	0.7	0.3	1.4
28	125	9	9.9	0.9	0.4	1.7
29	23	0	0.9	0.0	.	4.2
30	57	6	2.5	2.4	0.9	5.2
31	48	3	1.6	1.8	0.4	5.4
32	295	8	19.4	0.4	0.2	0.8

Numeric site codes were used in Presentations 30a-f and they may not correspond to other presentations in this report.

Neonates with major congenital anomalies were excluded.

<sup>#</sup>The prediction model was adjusted for GA, SGA, sex, and SNAP-II > 20.

**Presentations #30b**  
**Mortality: GA<33 weeks: Adjusted standardized ratios by site**



**Explanation for Presentation 30a**

Column 1: Numeric site codes

Column 2: Number of eligible neonates at each

site (<33 weeks GA and no major anomaly)

Column 3: Number of neonates with the outcome of interest among those eligible neonates

Column 4: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAP II > 20

Column 5: Adjusted standardized ratio calculated based on observed deaths/expected deaths

Columns 6 and 7: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 30b**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

## Presentation #30c

## Mortality: GA&lt;29 weeks: Adjusted standardized ratios by site

Site	Number of neonates	Number of deaths	Adjusted# expected number of deaths	Adjusted# standardized ratio	95% confidence interval (CI) for adjusted standardized ratio	
1	26	4	2.8	1.4	0.4	3.6
2	129	19	20.0	0.9	0.6	1.5
3	197	24	32.0	0.8	0.5	1.1
6	72	11	10.6	1.0	0.5	1.9
7	24	5	2.4	2.0	0.7	4.8
8	67	7	10.0	0.7	0.3	1.4
9	54	5	6.4	0.8	0.3	1.8
10	13	2	1.5	1.4	0.2	4.9
11	45	1	5.9	0.2	0.0	0.9
12	4	0	0.3	0.0	.	13.2
13	67	15	10.2	1.5	0.8	2.4
14	29	3	2.8	1.1	0.2	3.1
15	38	6	6.4	0.9	0.3	2.0
16	31	6	3.0	2.0	0.7	4.4
17	25	3	2.6	1.2	0.2	3.4
18	59	8	8.2	1.0	0.4	1.9
19	135	26	22.6	1.1	0.8	1.7
20	25	3	1.7	1.7	0.4	5.1
21	18	5	1.8	2.8	0.9	6.6
22	189	31	32.0	1.0	0.7	1.4
23	36	4	3.8	1.1	0.3	2.7
24	39	8	6.1	1.3	0.6	2.6
25	83	22	14.8	1.5	0.9	2.2
26	34	4	5.6	0.7	0.2	1.8
27	71	6	9.2	0.7	0.2	1.4
28	55	9	8.9	1.0	0.5	1.9
29	4	0	0.6	0.0	.	6.1
30	21	6	1.9	3.1	1.1	6.7
31	18	3	1.1	2.7	0.6	8.0
32	109	7	16.4	0.4	0.2	0.9

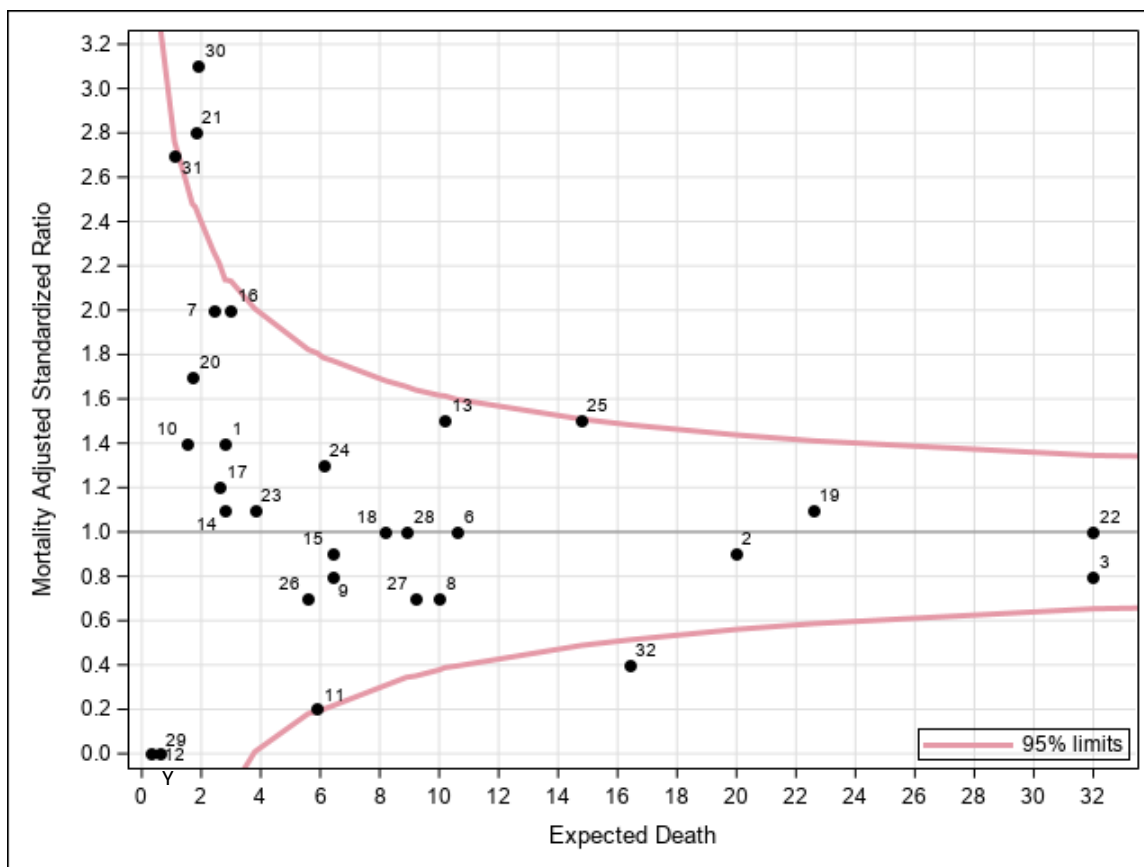
Numeric site codes were used in Presentations 30a-f and they may not correspond to other presentations in this report.

Neonates with major congenital anomalies were excluded.

<sup>#</sup>The prediction model was adjusted for GA, SGA, sex, and SNAP II > 20.

Note: Site 4 and 5 were excluded from the analysis due to the small number of eligible neonates.

**Presentations #30d**  
**Mortality: GA<29 weeks: Adjusted standardized ratios by site**

**Explanation for Presentation 30c**

Column 1: Numeric site codes

Column 2: Number of eligible neonates at each site (<29 weeks GA and no major anomaly)

Column 3: Number of neonates with the outcome of interest among those eligible neonates

Column 4: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAPII > 20

Column 5: Adjusted standardized ratio calculated based on observed deaths/expected deaths

Columns 6 and 7: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 30d**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

**Presentation #30e**  
**Mortality: All neonates: Adjusted standardized ratios by site**

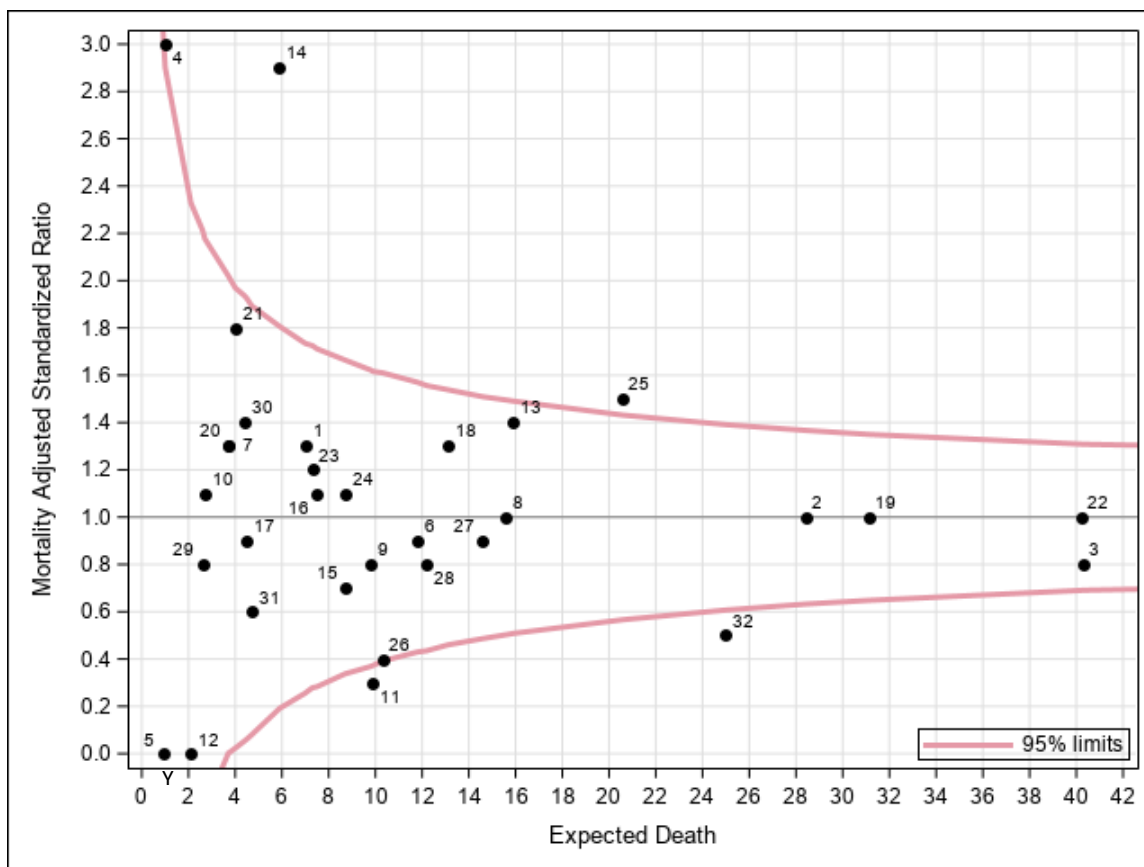
Site	Number of neonates	Number of deaths	Adjusted# expected number of deaths	Adjusted# standardized ratio	95% confidence interval (CI) for adjusted standardized ratio	
1	508	9	7.0	1.3	0.6	2.4
2	894	27	28.4	1.0	0.6	1.4
3	643	33	40.3	0.8	0.6	1.1
4	139	3	1.0	3.0	0.6	8.7
5	115	0	0.9	0.0	.	4.3
6	176	11	11.8	0.9	0.5	1.7
7	153	5	3.7	1.3	0.4	3.1
8	705	16	15.6	1.0	0.6	1.7
9	158	8	9.8	0.8	0.4	1.6
10	91	3	2.7	1.1	0.2	3.3
11	484	3	9.9	0.3	0.1	0.9
12	319	0	2.1	0.0	.	1.8
13	850	22	15.9	1.4	0.9	2.1
14	488	17	5.9	2.9	1.7	4.7
15	383	6	8.7	0.7	0.3	1.5
16	378	8	7.5	1.1	0.5	2.1
17	370	4	4.5	0.9	0.2	2.3
18	569	17	13.1	1.3	0.8	2.1
19	512	32	31.1	1.0	0.7	1.5
20	119	5	3.7	1.3	0.4	3.1
21	316	7	4.0	1.8	0.7	3.6
22	961	42	40.2	1.0	0.8	1.4
23	288	9	7.3	1.2	0.6	2.3
24	146	10	8.7	1.1	0.5	2.1
25	712	31	20.6	1.5	1.0	2.1
26	692	4	10.3	0.4	0.1	1.0
27	503	13	14.6	0.9	0.5	1.5
28	405	10	12.2	0.8	0.4	1.5
29	285	2	2.6	0.8	0.1	2.8
30	287	6	4.4	1.4	0.5	3.0
31	474	3	4.7	0.6	0.1	1.9
32	1051	13	25.0	0.5	0.3	0.9

Numeric site codes were used in Presentations 30a-f and they may not correspond to other presentations in this report.

Neonates with major congenital anomalies were excluded.

<sup>#</sup>The prediction model was adjusted for GA, SGA, sex, and SNAP II > 20.

**Presentations #30f**  
**Mortality: All neonates: Adjusted standardized ratios by site**



**Explanation for Presentation 30e**

Column 1: Numeric site codes

Column 2: Number of eligible neonates at each site (no major anomaly)

Column 3: Number of neonates with outcome of interest among those eligible neonates

Column 4: Expected number of neonates with the outcome of interest after adjustment for GA, SGA, sex, and SNAPII > 20

Column 5: Adjusted standardized ratio calculated based on observed deaths/expected deaths

Columns 6 and 7: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 30f**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

## **E.3. Site Comparisons – Mortality / Morbidities**

**Presentation #31**  
**Mortality/morbidities: GA<33 weeks: Site specific crude rates**

Site	Number of neonates	Mortality	Severe neurological injury	Severe ROP	CLD at 36 weeks PMA or discharge*	NEC stage 2 or 3	Late onset sepsis	Mortality or severe morbidity
	N	%	%	%	%	%	%	%
K	≤ 60	11.4	10.5	17.4	15.4	6.8	4.6	31.8
AD		0.0	0.0	33.3	11.1	0.0	11.1	22.2
AE		4.4	5.3	6.7	4.6	0.0	0.0	13.0
AF		0.0	21.1	0.0	21.7	0.0	0.0	33.3
D		6.3	2.1	0.0	17.8	0.0	8.3	25.0
R		0.0	33.3	0.0	25.0	0.0	0.0	16.7
N		11.8	2.7	0.0	17.8	3.9	9.8	29.4
Y		11.9	10.0	2.9	11.5	3.4	5.1	28.8
M	61 – 120	4.4	3.6	2.3	9.1	0.0	8.7	20.3
A		2.7	3.3	7.4	13.9	5.4	6.8	23.0
AC		6.7	5.6	9.8	18.6	4.4	13.3	28.9
G		7.8	5.7	0.0	19.3	1.1	5.6	28.9
E		5.0	3.0	6.8	16.7	5.0	13.0	27.0
J		7.9	15.5	7.1	34.6	5.0	10.9	52.5
P		3.6	7.9	10.9	33.0	1.8	13.6	40.0
V		4.2	4.8	1.9	17.1	4.2	5.8	26.7
X	121 – 170	5.7	11.9	10.5	18.3	0.8	7.4	31.2
O		7.0	1.8	7.1	14.3	3.1	6.3	26.6
Q		8.1	6.3	7.9	21.4	3.7	16.2	35.3
I		0.7	1.9	22.2	23.8	0.0	8.3	31.3
H		5.7	8.3	3.9	34.9	3.2	10.8	47.1
W		4.9	5.7	5.8	38.5	3.7	6.8	44.8
B		7.9	4.8	10.0	73.7	1.8	2.4	75.6
C		5.8	9.1	15.7	30.7	2.3	8.7	41.6
F	> 170	10.1	8.8	16.1	29.1	2.3	6.7	37.1
L		6.2	16.0	3.2	32.0	2.8	7.3	41.3
S		12.9	8.4	7.2	36.4	8.6	13.4	47.9
T		8.0	7.3	14.7	74.7	4.4	16.0	78.6
Z		3.2	3.6	6.9	35.9	1.3	5.8	41.9
AA		9.8	19.0	24.7	27.2	5.5	9.3	38.4
AB		8.5	6.7	14.4	17.6	4.4	9.6	32.1
U		9.4	9.9	7.2	36.1	5.1	16.5	47.3
Total CNN		7.2	8.0	9.1	31.3	3.6	9.8	41.3

Mortality or severe morbidity = Mortality prior to discharge or any of the five morbidities

\*PMA: Post-menstrual age

**These are unadjusted rates.**

**Presentation #32**  
**Mortality/morbidities: GA<29 weeks: Site specific crude rates**

Site	Number of neonates	Mortality	Severe neurological injury	Severe ROP	CLD at 36 weeks PMA or discharge*	NEC stage 2 or 3	Late onset sepsis	Mortality or severe morbidity
	N	%	%	%	%	%	%	%
N	< 25	27.8	5.9	0.0	46.2	11.1	27.8	66.7
AD		0.0	0.0	50.0	50.0	0.0	50.0	100.0
AF		0.0	40.0	0.0	60.0	0.0	0.0	80.0
A		15.4	7.7	28.6	54.6	15.4	30.8	76.9
D		16.7	5.9	0.0	26.7	0.0	11.1	38.9
R		0.0	50.0	0.0	100.0	0.0	0.0	50.0
Y		31.8	25.0	0.0	26.7	9.1	13.6	63.6
AE		20.0	25.0	25.0	25.0	0.0	0.0	60.0
K		20.8	18.2	22.2	31.6	12.5	8.3	58.3
M	25 – 40	12.0	4.6	4.6	22.7	0.0	20.0	44.0
V		12.0	12.5	4.6	34.8	16.0	20.0	60.0
E		15.4	8.7	13.6	50.0	7.7	30.8	61.5
J		13.3	19.2	10.0	69.6	0.0	10.0	73.3
G		21.9	12.9	0.0	28.0	3.1	15.6	53.1
P		11.1	16.7	20.0	78.1	5.6	33.3	86.1
X		11.1	11.4	16.7	50.0	2.8	11.1	61.1
Q		20.5	13.9	18.8	58.1	5.1	38.5	74.4
AC		15.0	10.0	13.9	41.7	10.0	25.0	55.0
I	41 – 80	2.1	4.3	24.4	61.7	0.0	20.8	75.0
W		9.1	7.4	11.8	74.0	7.3	10.9	78.2
O		16.1	3.7	12.8	23.4	7.1	10.7	46.4
B		14.1	8.8	13.3	96.4	4.7	4.7	96.9
F		21.7	14.5	28.0	63.5	4.4	14.5	69.6
H		11.4	11.6	6.3	52.4	4.3	17.1	68.6
L		15.1	28.6	5.3	65.1	6.9	13.7	78.1
C		8.1	13.7	18.6	54.4	2.7	17.6	68.9
S		25.9	14.5	10.3	66.2	16.5	25.9	78.8
Z	> 80	6.8	6.1	12.7	70.9	2.6	12.8	78.6
T		15.0	10.9	16.8	93.0	6.8	29.3	95.5
AA		19.9	29.4	27.5	57.5	12.8	17.7	72.3
U		16.3	16.8	9.2	63.4	10.2	34.2	79.1
AB		12.4	10.3	15.7	26.4	6.9	16.8	48.5
Total CNN		14.9	13.8	13.8	57.2	7.1	20.0	71.0

Mortality or severe morbidity = Mortality prior to discharge or any of the five morbidities

\*PMA: Post-menstrual age

**These are unadjusted rates.**

## **E.3.1. Site Comparisons – Late Onset Sepsis and Antimicrobial Use**

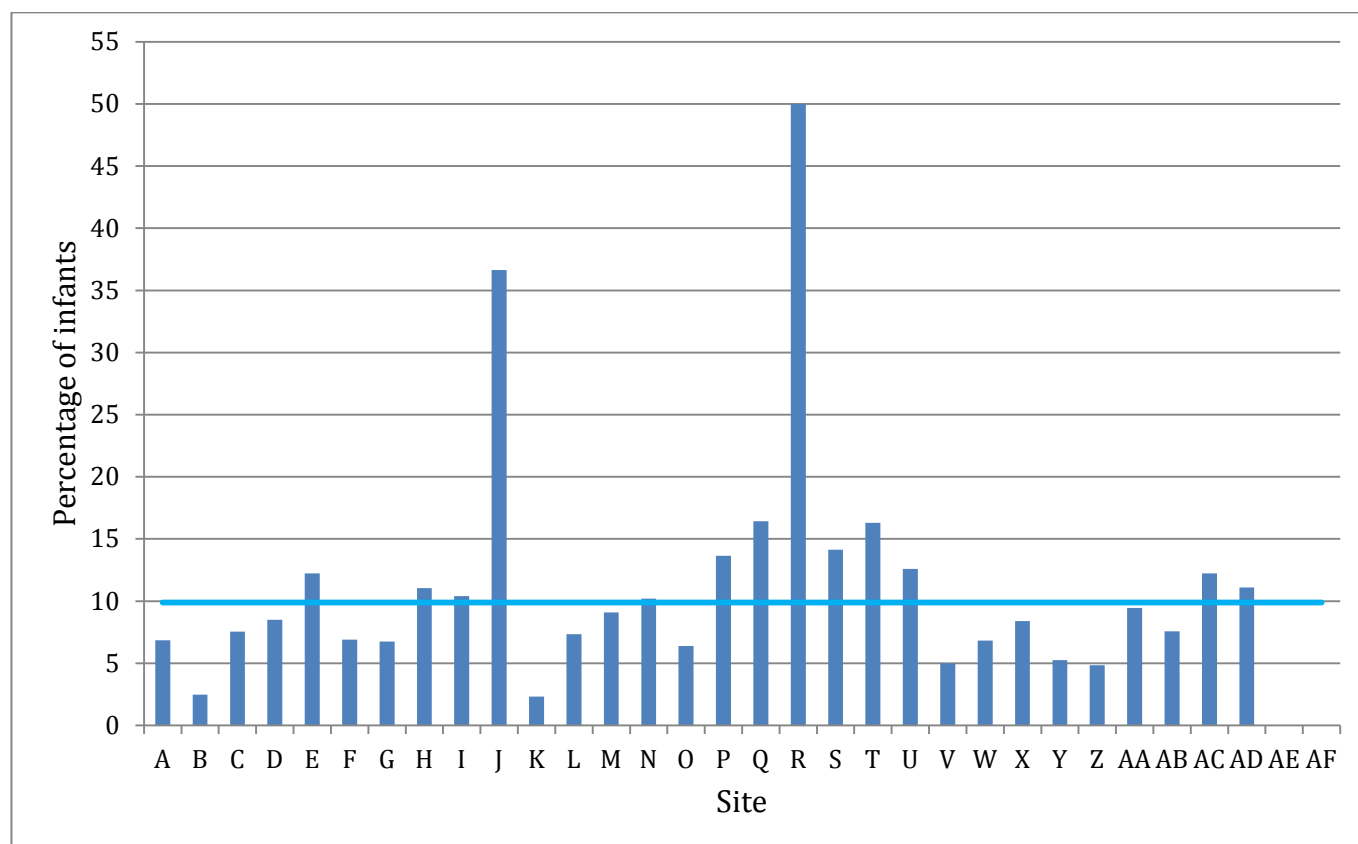
**In presentations #33 and #34**, late onset sepsis was attributed to the hospital where the first episode of sepsis was acquired. Each neonate was counted only once even if there were multiple episodes of infections.

**In presentations #35 and #36**, assignment of infection was based on location where the infection happened and not assigned to the hospital where the first episode of sepsis was acquired. Each episode of infection was counted (the total number of episodes exceeds the total number of neonates).

**In all other presentations of this report**, all morbidities including late onset sepsis were attributed to the hospital where the neonate was first admitted.

## Presentation #33

**Late onset sepsis: GA<33 weeks: Site specific crude rates**  
 (n=4 412 neonates, 70 excluded due to death before 3 days of age)



Site	A	B	C	D	E	F	G	H	I	J	K
%	6.8	2.5	7.6	8.5	12.2	6.9	6.7	11.0	10.4	36.6	2.3
Site	L	M	N	O	P	Q	R	S	T	U	V
%	7.3	9.1	10.2	6.4	13.6	16.4	50.0	14.1	16.3	12.6	5.0
Site	W	X	Y	Z	AA	AB	AC	AD	AE	AF	CNN
%	6.8	8.4	5.3	4.9	9.4	7.6	12.2	11.1	0.0	0.0	9.9

**COMMENTS:** Late onset sepsis is defined as any positive blood and/or cerebrospinal fluid culture after 2 days of age (analysis is neonate-based and deaths before 3 days of age are excluded).

**In presentations #33 and #34**, late onset sepsis was attributed to the hospital where the first episode of sepsis was acquired. Each neonate was counted only once even if there were multiple episodes of infections.

**Presentation #34a**  
**Late onset sepsis: GA<33 weeks: Adjusted standardized ratios by site**

Site	Number of neonates	Number of NI	Adjusted# expected number of NI	Adjusted# standardized ratio	95% confidence interval (CI) for adjusted standardized ratio	
1	97	12	6.4	1.9	1.0	3.3
2	270	44	31.5	1.4	1.0	1.9
3	348	27	46.7	0.6	0.4	0.8
4**	9	3	0.4	8.4	1.7	24.5
5	9	1	0.4	2.7	0.0	14.9
6	177	13	18.0	0.7	0.4	1.2
7	42	1	4.2	0.2	0.0	1.3
8	154	17	16.7	1.0	0.6	1.6
9	161	11	12.9	0.9	0.4	1.5
10	73	5	4.1	1.2	0.4	2.8
11	147	15	12.6	1.2	0.7	2.0
12	22	0	1.2	0.0	.	3.0
13	174	12	16.6	0.7	0.4	1.3
14	127	37	14.8	2.5	1.8	3.5
15	89	11	10.4	1.1	0.5	1.9
16	90	6	6.5	0.9	0.3	2.0
17	66	6	4.3	1.4	0.5	3.0
18	161	4	15.8	0.3	0.1	0.6
19	339	32	35.6	0.9	0.6	1.3
20	119	6	6.1	1.0	0.4	2.1
21	49	5	3.6	1.4	0.5	3.3
22	411	54	47.9	1.1	0.8	1.5
23	120	10	7.7	1.3	0.6	2.4
24	134	22	10.9	2.0	1.3	3.1
25	185	26	22.4	1.2	0.8	1.7
26	110	15	10.6	1.4	0.8	2.3
27	170	13	17.5	0.7	0.4	1.3
28	125	8	13.6	0.6	0.3	1.2
29	24	0	1.4	0.0	.	2.7
30	57	3	4.6	0.7	0.1	1.9
31	47	4	2.8	1.4	0.4	3.7
32	306	15	30.0	0.5	0.3	0.8

**Numeric site codes were used in Presentations 34a-d and they may not correspond to other presentations in this report.**

\*Late onset sepsis was attributed to the hospital where the first episode of sepsis was acquired.

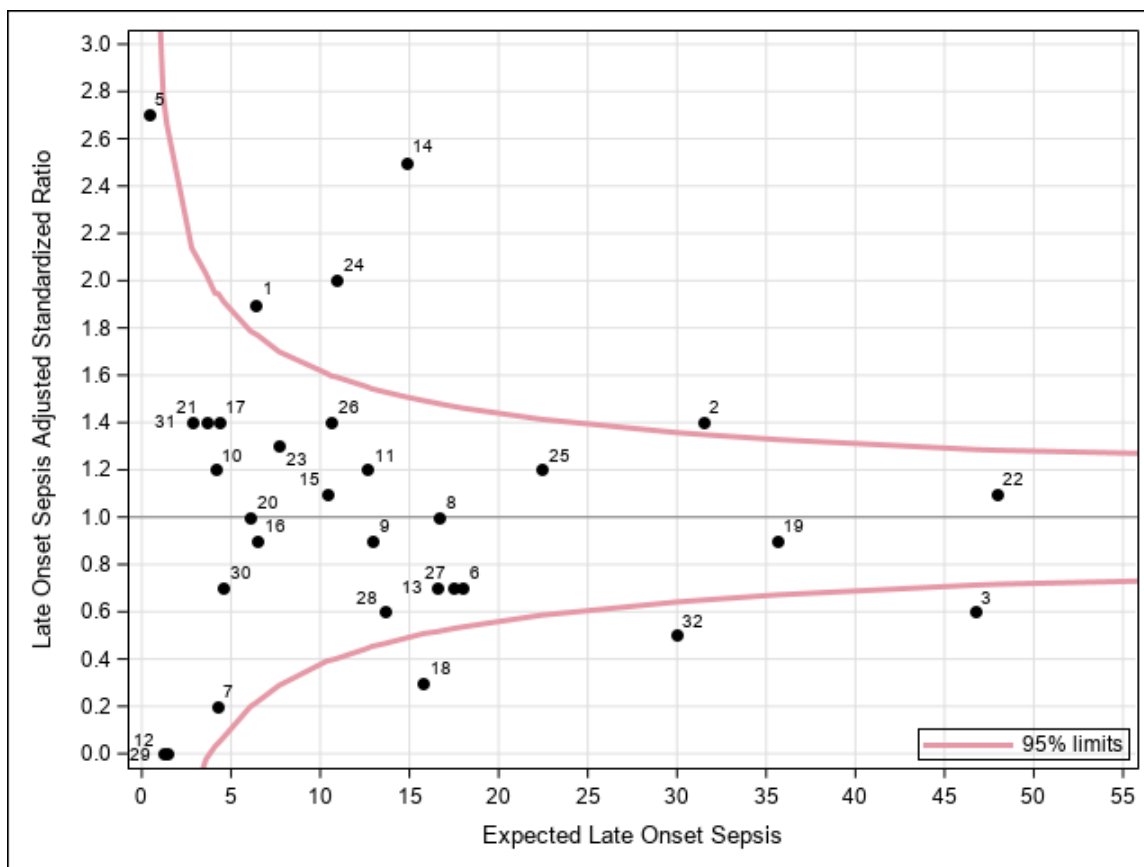
\*Neonates who died before 3 days of age were excluded.

# # The prediction model was adjusted for GA, SGA, sex, and SNAP II > 20.

\*\*Site 4's ASR is not shown in the funnel plot on the next page due to a large ASR that exceeds the upper limit of the Y-axis on the plot.

## Presentation # 34b

Late onset sepsis: GA&lt;33 weeks: Adjusted standardized ratios by site

**Explanation for Presentation 34a**

Column 1: Numeric site codes

Column 2: Number of eligible neonates at each site (&lt;33 weeks GA)

Column 3: Number of neonates with outcome of interest among those eligible neonates

Column 4: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAP-II &gt; 20

Column 5: Adjusted standardized ratio calculated based on observed late onset sepsis/expected late onset sepsis

Columns 6 and 7: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 34b**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

**Presentation #34c**  
**Late onset sepsis: GA<29 weeks: Adjusted standardized ratios by site**

Site	Number of neonates	Number of NI	Adjusted# expected number of NI	Adjusted# standardized ratio	95% confidence interval (CI) for adjusted standardized ratio	
1	24	8	4.4	1.8	0.8	3.6
2	129	39	27.4	1.4	1.0	1.9
3	190	27	40.9	0.7	0.4	1.0
6	71	10	14.5	0.7	0.3	1.3
7	22	1	3.7	0.3	0.0	1.5
8	68	12	14.0	0.9	0.4	1.5
9	53	6	9.9	0.6	0.2	1.3
10	12	4	2.4	1.6	0.4	4.2
11	51	13	10.0	1.3	0.7	2.2
12	4	0	0.6	0.0	.	6.0
13	65	10	13.4	0.7	0.4	1.4
14	54	27	12.7	2.1	1.4	3.1
15	39	9	9.0	1.0	0.5	1.9
16	31	5	4.7	1.1	0.3	2.5
17	22	5	3.0	1.7	0.5	3.9
18	62	3	12.6	0.2	0.0	0.7
19	136	25	30.2	0.8	0.5	1.2
20	24	4	3.2	1.2	0.3	3.2
21	16	5	2.6	1.9	0.6	4.4
22	175	50	39.6	1.3	0.9	1.7
23	35	5	5.5	0.9	0.3	2.1
24	37	15	7.9	1.9	1.1	3.1
25	85	23	19.5	1.2	0.7	1.8
26	36	12	8.3	1.5	0.7	2.5
27	71	11	14.1	0.8	0.4	1.4
28	53	6	11.7	0.5	0.2	1.1
29	5	0	0.9	0.0	.	3.9
30	20	3	3.5	0.9	0.2	2.5
31	17	2	1.8	1.1	0.1	3.9
32	113	15	23.6	0.6	0.4	1.1

**Numeric site codes were used in Presentations 34a-d and they may not correspond to other presentations in this report.**

\*Late onset sepsis was attributed to the hospital where the first episode of sepsis was acquired.

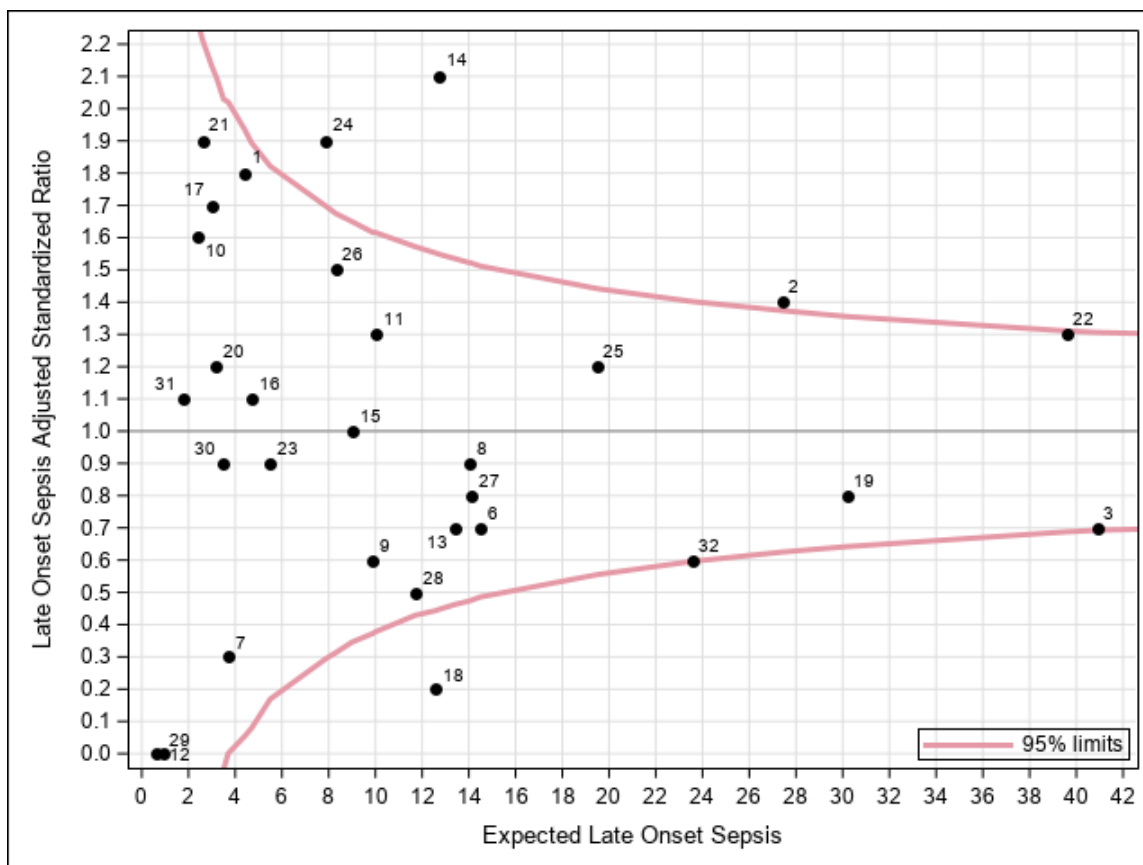
\*Neonates who died before 3 days of age are excluded.

# The prediction model was adjusted for GA, SGA, sex, and SNAPII > 20.

Note: Sites 4 and 5 were excluded from the analysis due to the small number of eligible neonates.

## Presentation # 34d

Late onset sepsis: GA&lt;29 weeks: Adjusted standardized ratios by site

**Explanation for Presentation 34c**

Column 1: Numeric site codes

Column 2: Number of eligible neonates at each site (&lt;29 weeks GA)

Column 3: Number of neonates with outcome of interest among those eligible neonates

Column 4: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAP II &gt; 20

Column 5: Adjusted standardized ratio calculated based on observed late onset sepsis/expected late onset sepsis

Columns 6 and 7: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 34d**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

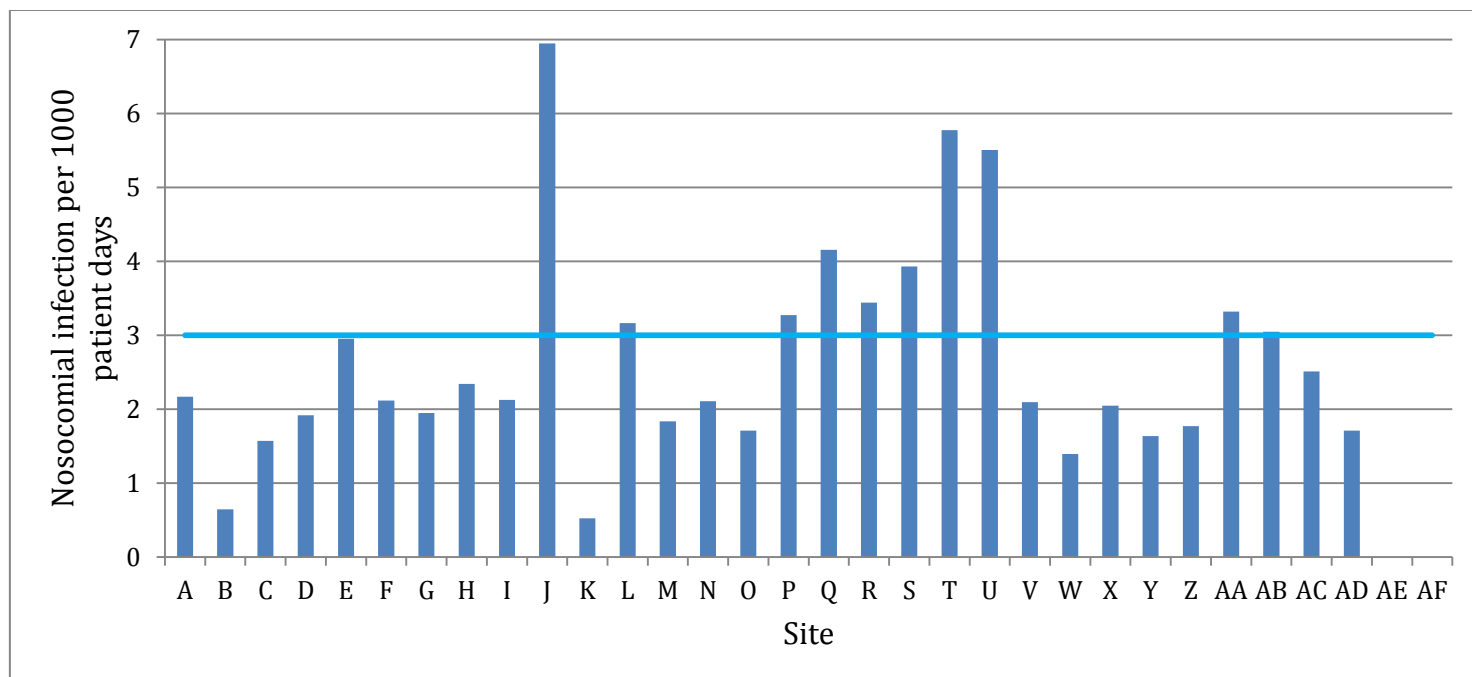
Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

## Presentation #35

Late onset sepsis per 1000 patient days: GA&lt;33 weeks: Site specific crude rates



Site	Infections per 1000 patient days	Site	Infections per 1000 patient days	Site	Infections per 1000 patient days
A	2.2	L	3.2	W	1.4
B	0.6	M	1.8	X	2.0
C	1.6	N	2.1	Y	1.6
D	1.9	O	1.7	Z	1.8
E	3.0	P	3.3	AA	3.3
F	2.1	Q	4.2	AB	3.0
G	2.0	R	3.4	AC	2.5
H	2.3	S	3.9	AD	1.7
I	2.1	T	5.8	AE	0.0
J	6.9	U	5.5	AF	0.0
K	0.5	V	2.1	CNN	3.0

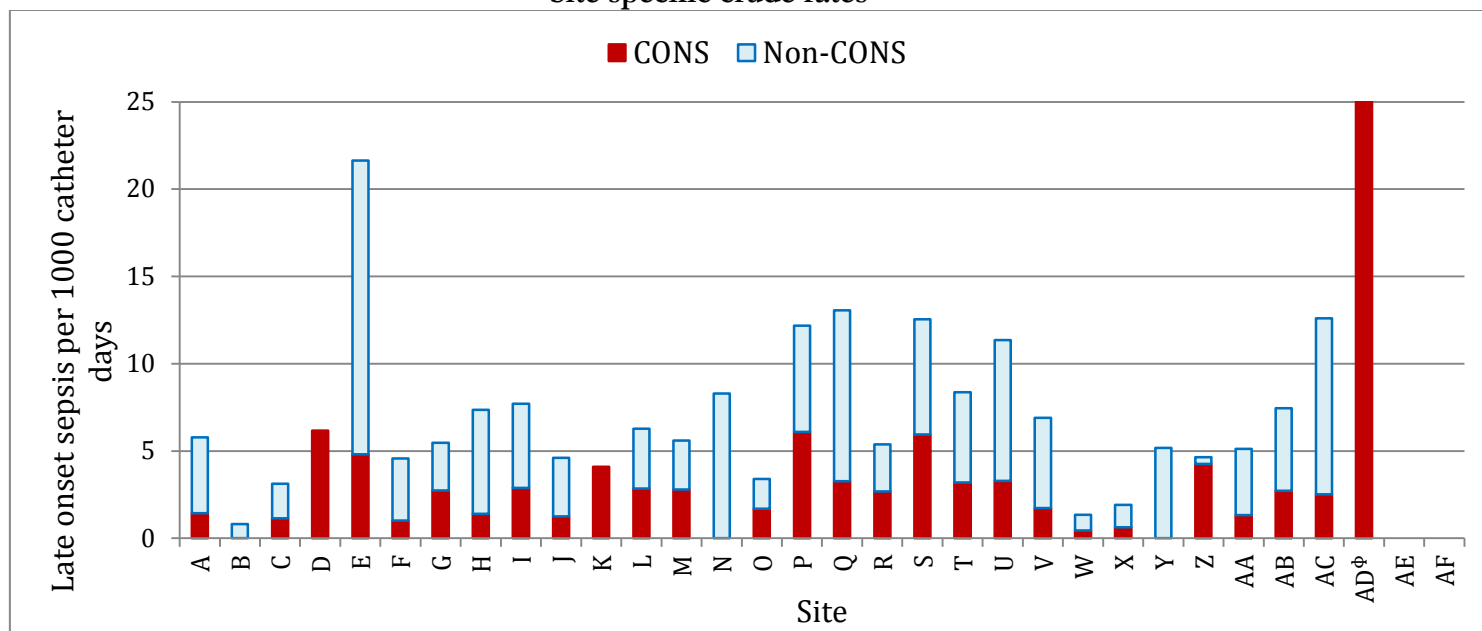
Total number of neonates = 4 482

**COMMENTS:** Late onset sepsis is defined as positive blood and/or cerebrospinal fluid culture after 2 days of age (includes all admissions). Considerable variation exists when late onset sepsis is analyzed as infections per 1000 patient days. Note that it is possible that certain sites with high retro transfer rates may report a high incidence per 1000 patient days since neonates who are transferred out are those with lower acuity. If a neonate had >1 distinct episodes of infection, each episode will be counted as separate infections in the numerator.

In presentations #35 and #36, the infection was assigned to the hospital where the infection happened and not assigned to the hospital where the first episode of sepsis happened.

## Presentation #36a

Central Line-Associated Bloodstream Infections per 1000 central line\* days: GA < 33 weeks:  
Site specific crude rates



Site	CLABSI**		Central line days	CLABSI per 1000 central line days	
	CONS	Non-CONS		CONS	Non-CONS
A	1	3	693	1.4	4.3
B	0	1	1239	0.0	0.8
C	4	7	3526	1.1	2.0
D	2	0	324	6.2	0.0
E	2	7	416	4.8	16.8
F	2	7	1972	1.0	3.5
G	2	2	731	2.7	2.7
H	4	17	2852	1.4	6.0
I	3	5	1037	2.9	4.8
J	6	16	4770	1.3	3.4
K	1	0	244	4.1	0.0
L	5	6	1755	2.8	3.4
M	1	1	357	2.8	2.8
N	0	2	241	0.0	8.3
O	3	3	1768	1.7	1.7
P	7	7	1149	6.1	6.1
Q	4	12	1225	3.3	9.8
R	1	1	372	2.7	2.7
S	18	20	3027	5.9	6.6
T	13	21	4061	3.2	5.2
U	13	32	3965	3.3	8.1
V	1	3	580	1.7	5.2
W	1	2	2225	0.4	0.9
X	1	2	1567	0.6	1.3
Y	0	2	386	0.0	5.2
Z	11	1	2585	4.3	0.4
AA	8	23	6062	1.3	3.8
AB	8	14	2952	2.7	4.7
AC	1	4	397	2.5	10.1
AD <sup>φ</sup>	1	0	23	43.5	0.0
AE	0	0	63	0.0	0.0
AF	0	0	58	0.0	0.0
CNN	124	221	52622	2.4	4.2

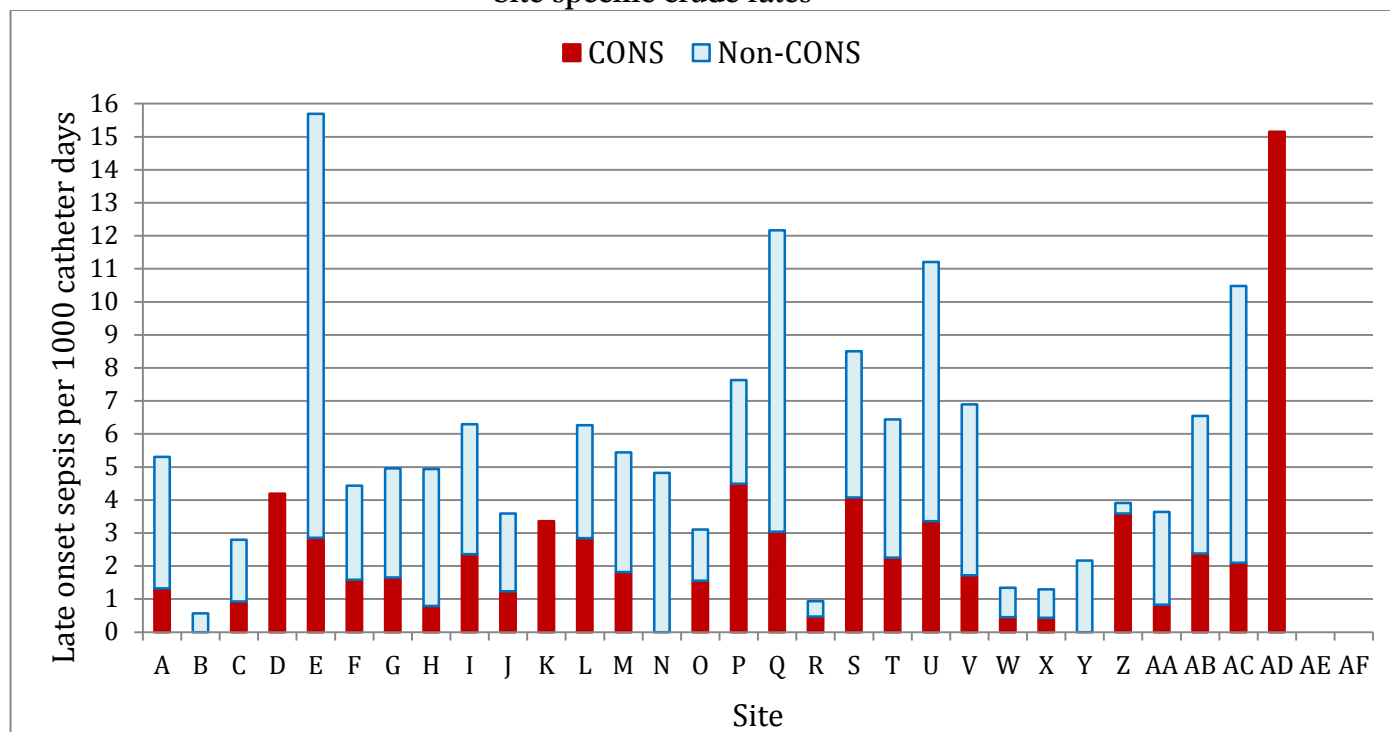
\*Central line = Any of UV, surgical CVL, or PICC

\*\* CLABSI was defined as a primary bloodstream infection in a neonate who developed infection while a central line was in situ or within 2 days of removal of the central line.

<sup>φ</sup>Site AD's rate goes over the y-axis limit in the graph. Refer to the table for site AD's actual rate.

## Presentation #36b

Central Line-Associated Bloodstream Infections per 1000 central line\* days: All neonates:  
Site specific crude rates



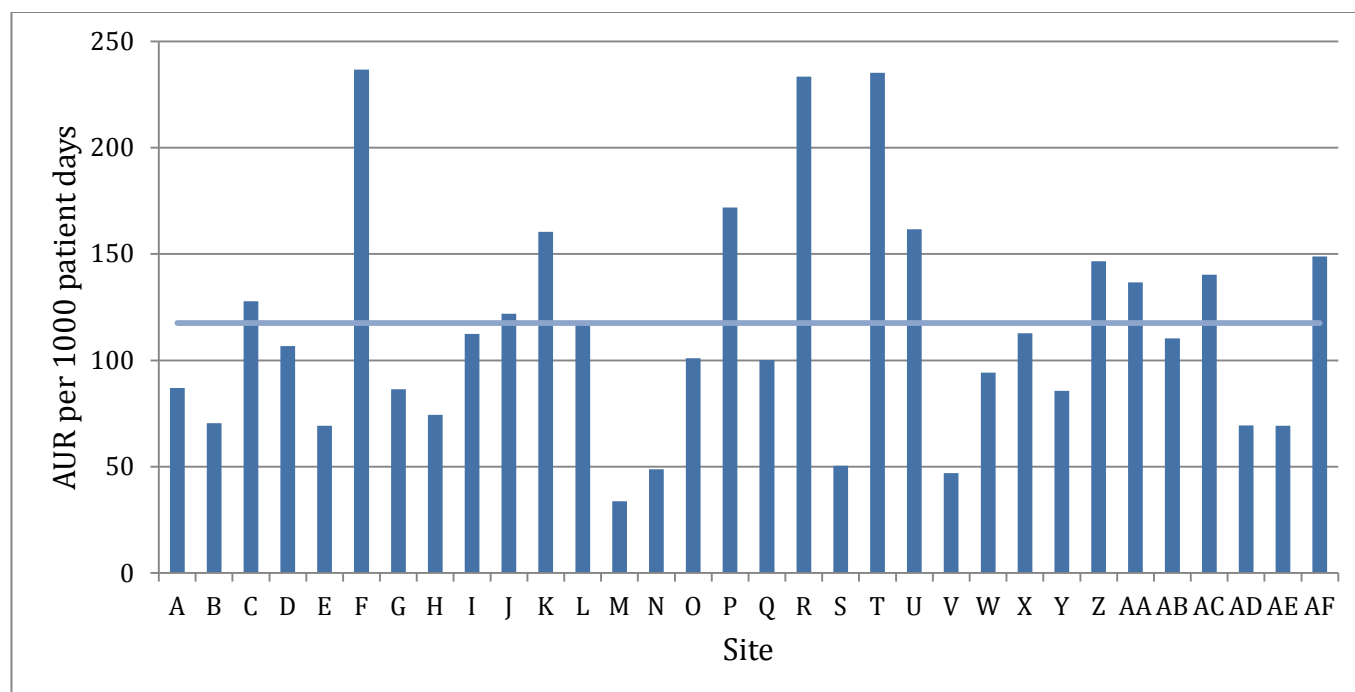
Site	CLABSI**		Central line days	CLABSI per 1000 central line days	
	CONS	Non-CONS		CONS	Non-CONS
A	1	3	754	1.3	4.0
B	0	1	1765	0.0	0.6
C	5	10	5371	0.9	1.9
D	2	0	477	4.2	0.0
E	2	9	701	2.9	12.8
F	5	9	3155	1.6	2.9
G	2	4	1210	1.7	3.3
H	4	21	5067	0.8	4.1
I	3	5	1270	2.4	3.9
J	10	19	8068	1.2	2.4
K	1	0	298	3.4	0.0
L	5	6	1755	2.8	3.4
M	1	2	551	1.8	3.6
N	0	2	415	0.0	4.8
O	3	3	1930	1.6	1.6
P	10	7	2227	4.5	3.1
Q	4	12	1315	3.0	9.1
R	1	1	2139	0.5	0.5
S	23	25	5643	4.1	4.4
T	14	26	6209	2.3	4.2
U	15	35	4460	3.4	7.8
V	1	3	580	1.7	5.2
W	1	2	2225	0.4	0.9
X	1	2	2321	0.4	0.9
Y	0	2	921	0.0	2.2
Z	11	1	3066	3.6	0.3
AA	8	27	9611	0.8	2.8
AB	8	14	3359	2.4	4.2
AC	1	4	477	2.1	8.4
AD	1	0	66	15.2	0.0
AE	0	0	116	0.0	0.0
AF	0	0	76	0.0	0.0
CNN	143	255	77598	1.8	3.3

\*Central line = Any of UV, surgical CVL, or PICC

\*\* CLABSI was defined as a primary bloodstream infection in a neonate who developed infection while a central line was in situ or within 2 days of removal of the central line.

**Presentation #37**

**Days of antimicrobial use per 1000 patient days among neonates who did not develop NEC, early-onset sepsis or late onset sepsis: GA <33 weeks\***



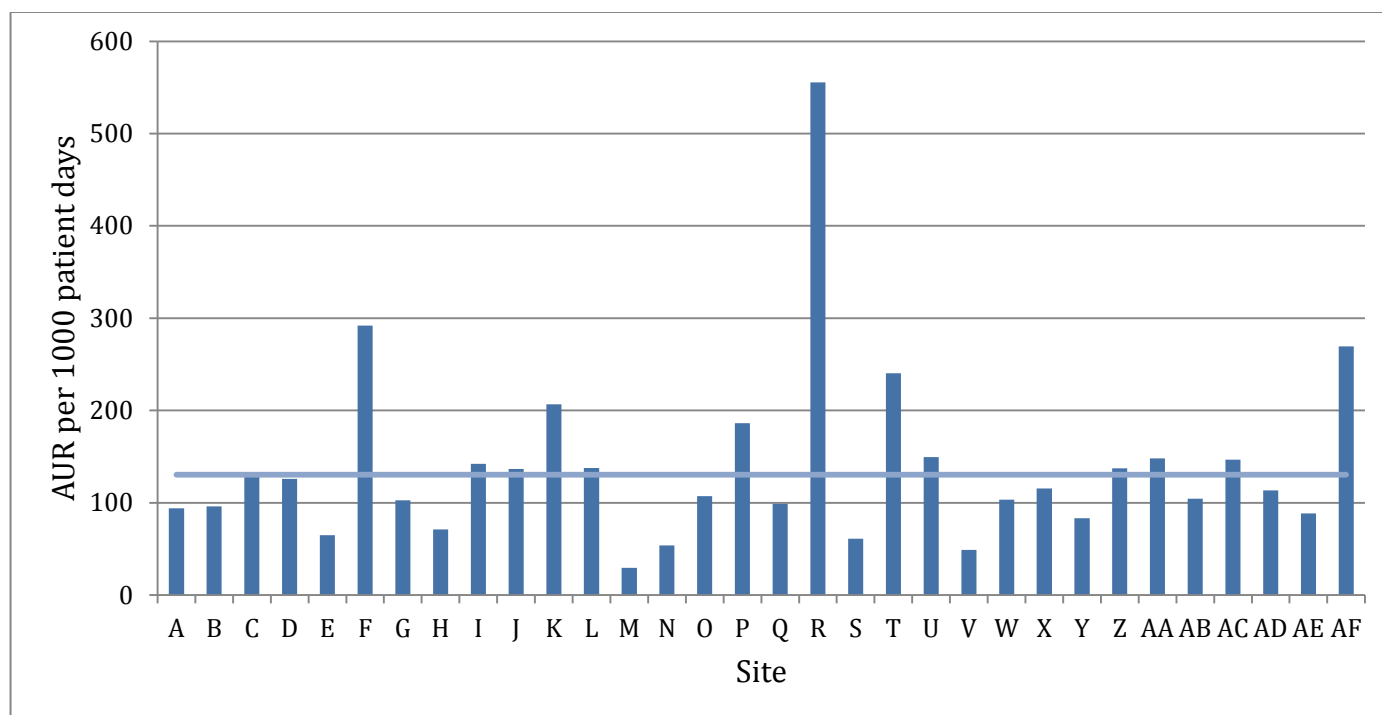
Site	Days of antimicrobial use per 1000 patient days	Site	Days of antimicrobial use per 1000 patient days	Site	Days of antimicrobial use per 1000 patient days
A	87.0	L	118.1	W	94.2
B	70.5	M	33.7	X	112.7
C	127.7	N	48.7	Y	85.6
D	106.7	O	101.0	Z	146.6
E	69.3	P	171.9	AA	136.6
F	236.7	Q	100.1	AB	110.3
G	86.3	R	233.3	AC	140.3
H	74.4	S	50.4	AD	69.3
I	112.5	T	235.1	AE	69.3
J	121.9	U	161.6	AF	148.8
K	160.5	V	47.0	CNN	117.6

\*Denominators were based on neonates born < 33 weeks' GA without major congenital anomaly who did not develop early-onset sepsis, late-onset sepsis or necrotising enterocolitis.

Note: Prophylactic administration of trimethoprim or amoxicillin for the prevention of urinary tract infections with a suspected renal anomaly was not included.

## Presentation #38

Days of antimicrobial use per 1000 patient days among neonates who did not develop NEC, early-onset sepsis or late onset sepsis: GA <29 weeks\*

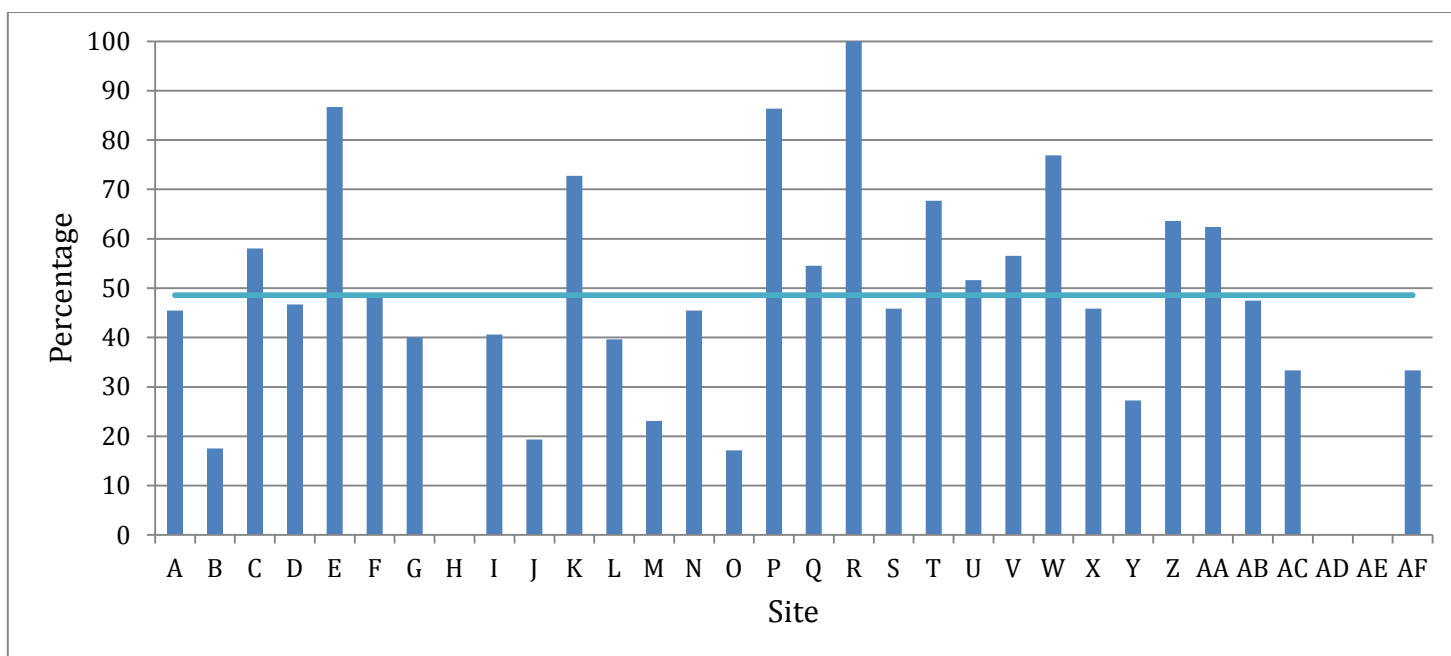


Site	Days of antimicrobial use per 1000 patient days	Site	Days of antimicrobial use per 1000 patient days	Site	Days of antimicrobial use per 1000 patient days
A	93.9	L	137.5	W	103.4
B	96.1	M	29.4	X	115.6
C	129.9	N	53.6	Y	83.3
D	125.9	O	107.2	Z	137.2
E	65.0	P	186.0	AA	148.1
F	292.1	Q	98.8	AB	104.2
G	102.7	R	555.6	AC	146.7
H	71.2	S	61.0	AD	113.4
I	142.2	T	240.3	AE	88.3
J	136.7	U	149.5	AF	269.3
K	206.6	V	48.9	CNN	130.3

\*Denominators were based on neonates born < 29 weeks' GA without major congenital anomaly who did not develop early-onset sepsis, late-onset sepsis or necrotising enterocolitis.

Note: Prophylactic administration of trimethoprim or amoxicillin for the prevention of urinary tract infections with a suspected renal anomaly was not included.

**Presentation #39**  
**Rate of treatment<sup>#</sup> for patent ductus arteriosus (PDA): GA<33 weeks who had PDA\*:**  
**Site specific crude rates**



Site	Treatment <sup>#</sup> for PDA among neonates who had PDA (%)	Site	Treatment <sup>#</sup> for PDA among neonates who had PDA (%)
A	45.5	Q	54.6
B	17.5	R	100.0
C	58.1	S	45.9
D	46.7	T	67.7
E	86.7	U	51.6
F	48.8	V	56.5
G	40.0	W	76.9
H	0.0	X	45.8
I	40.6	Y	27.3
J	19.4	Z	63.6
K	72.7	AA	62.4
L	39.7	AB	47.5
M	23.1	AC	33.3
N	45.5	AD	0.0
O	17.1	AE	0.0
P	86.4	AF	33.3
		CNN	48.6

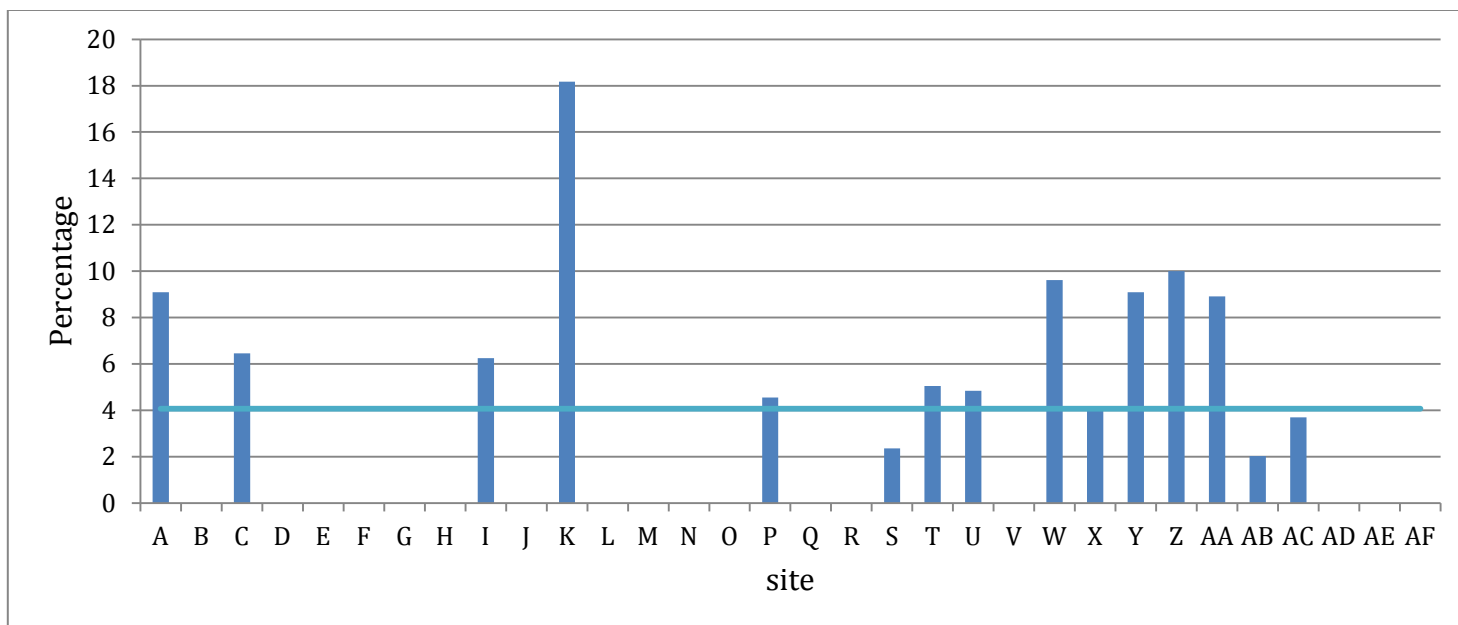
Total number of neonates who had PDA = 1 303

\*PDA diagnosis is based on clinical suspicion and/or echocardiography findings.

<sup>#</sup>Treatment of PDA includes any of indomethacin, ibuprofen, acetaminophen, or ligation.

The percentage of neonates with treated PDA was attributed to the site where the neonate was first admitted.

**Presentation #40**  
**Surgical patent ductus arteriosus (PDA) ligation rate: GA<33 weeks who had PDA:**  
**Site specific crude rates**

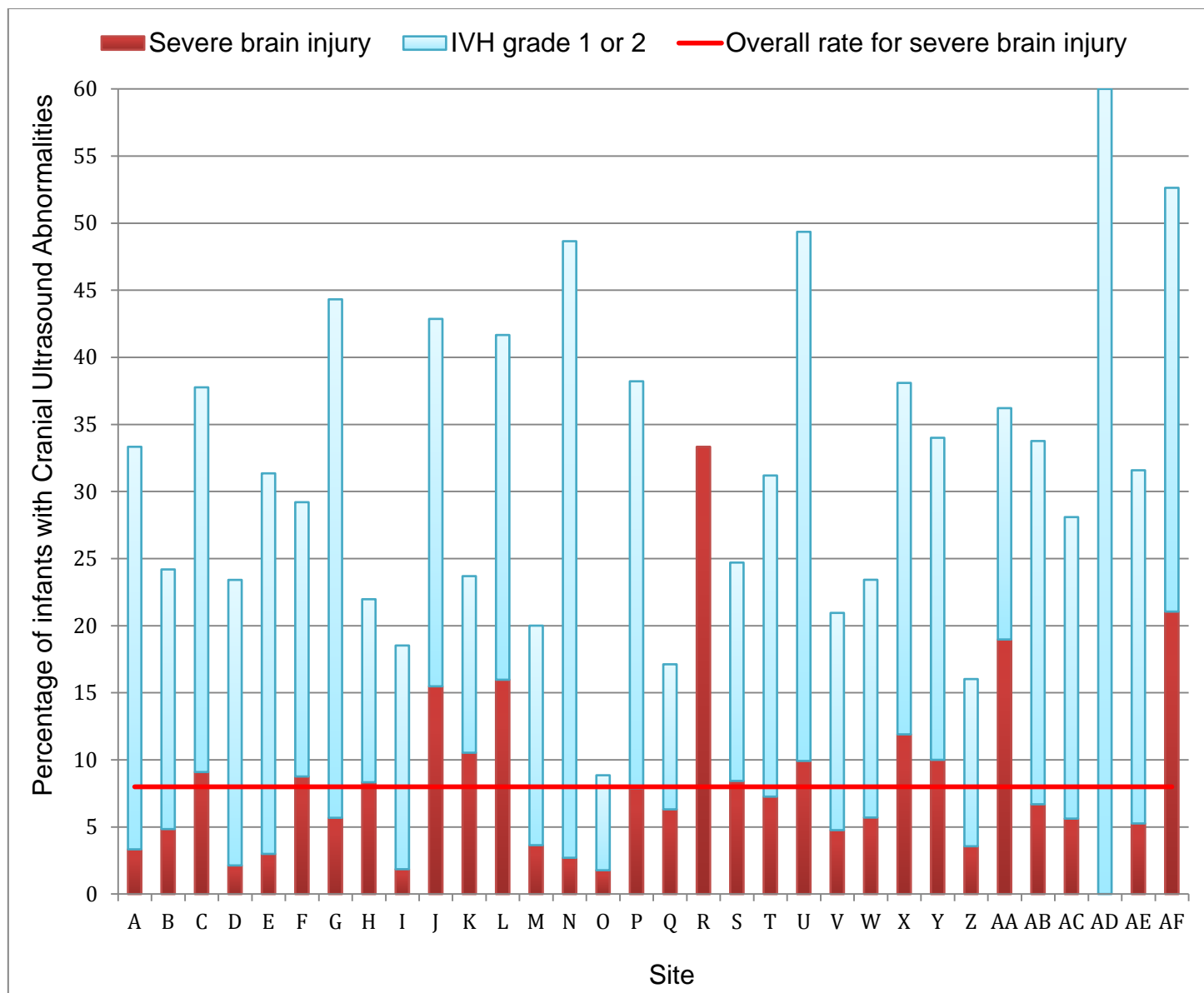


Site	Surgical ligation for PDA among neonates who had PDA (%)	Site	Surgical ligation for PDA among neonates who had PDA (%)
A	9.1	Q	0.0
B	0.0	R	0.0
C	6.5	S	2.4
D	0.0	T	5.1
E	0.0	U	4.8
F	0.0	V	0.0
G	0.0	W	9.6
H	0.0	X	4.2
I	6.3	Y	9.1
J	0.0	Z	10.0
K	18.2	AA	8.9
L	0.0	AB	2.0
M	0.0	AC	3.7
N	0.0	AD	0.0
O	0.0	AE	0.0
P	4.6	AF	0.0
		CNN	4.1

Total number of neonates who had PDA = 1 303

The percentage of neonates with treated PDA was attributed to the site where the neonate was first admitted.

Presentation #41  
Severe brain injury rates: GA<33 weeks: Site specific crude rates



**IVH grade 1 or 2** = Germinal matrix hemorrhage or intraventricular hemorrhage **without** ventricular enlargement

**IVH grade 3 or 4** or PVL (severe brain injury) = Intraventricular hemorrhage **with** ventricular enlargement or persistent parenchymal echogenicity or periventricular leukomalacia

**Presentation #41 (continued)**  
**Severe brain injury rate: GA<33 weeks: Site specific crude rates**

Site	<25	25-26	27-28	29-30	31-32	Overall rate* per site %
A	0.0	0.0	20.0	0.0	4.4	3.33
B	21.4	7.7	3.3	2.8	0.0	4.84
C	8.3	4.4	21.1	4.6	3.9	9.09
D	NA	0.0	6.7	0.0	0.0	2.13
E	0.0	9.1	10.0	0.0	0.0	2.99
F	35.7	12.5	6.3	5.4	2.6	8.76
G	33.3	14.3	9.5	4.8	0.0	5.68
H	13.3	10.3	12.0	3.1	6.5	8.33
I	0.0	6.7	4.6	0.0	0.0	1.85
J	33.3	33.3	11.8	10.5	15.4	15.48
K	66.7	25.0	6.7	0.0	0.0	10.53
L	50.0	41.2	13.5	5.3	2.8	15.97
M	NA	0.0	6.3	0.0	5.6	3.64
N	0.0	14.3	0.0	0.0	0.0	2.7
O	0.0	0.0	10.5	0.0	0.0	1.77
P	22.2	14.3	15.4	0.0	4.0	7.87
Q	40.0	11.8	7.1	2.9	2.4	6.31
R	NA	NA	50.0	NA	0.0	33.33
S	29.2	10.7	6.5	2.8	2.1	8.43
T	25.0	13.7	1.9	3.6	2.0	7.26
U	27.3	14.5	10.5	2.7	3.8	9.92
V	0.0	20.0	11.1	2.2	2.8	4.76
W	14.3	9.1	4.0	8.3	2.9	5.7
X	0.0	42.9	4.2	16.7	9.7	11.9
Y	66.7	20.0	16.7	0.0	0.0	10
Z	10.5	2.3	7.8	2.0	1.5	3.56
AA	59.4	29.4	11.3	4.4	4.0	18.97
AB	9.5	10.8	10.1	1.2	0.0	6.69
AC	30.0	8.3	0.0	5.9	0.0	5.62
AD	NA	NA	0.0	0.0	0.0	0
AE	NA	0.0	50.0	0.0	0.0	5.26
AF	0.0	100.0	33.3	0.0	18.2	21.05
<b>Overall rate** per GA group %</b>	25.1	13.3	9.1	3.1	3.1	8.0

Total number of neonates = 4 482

Severe brain injury includes Grade 3 or 4 IVH or PVL

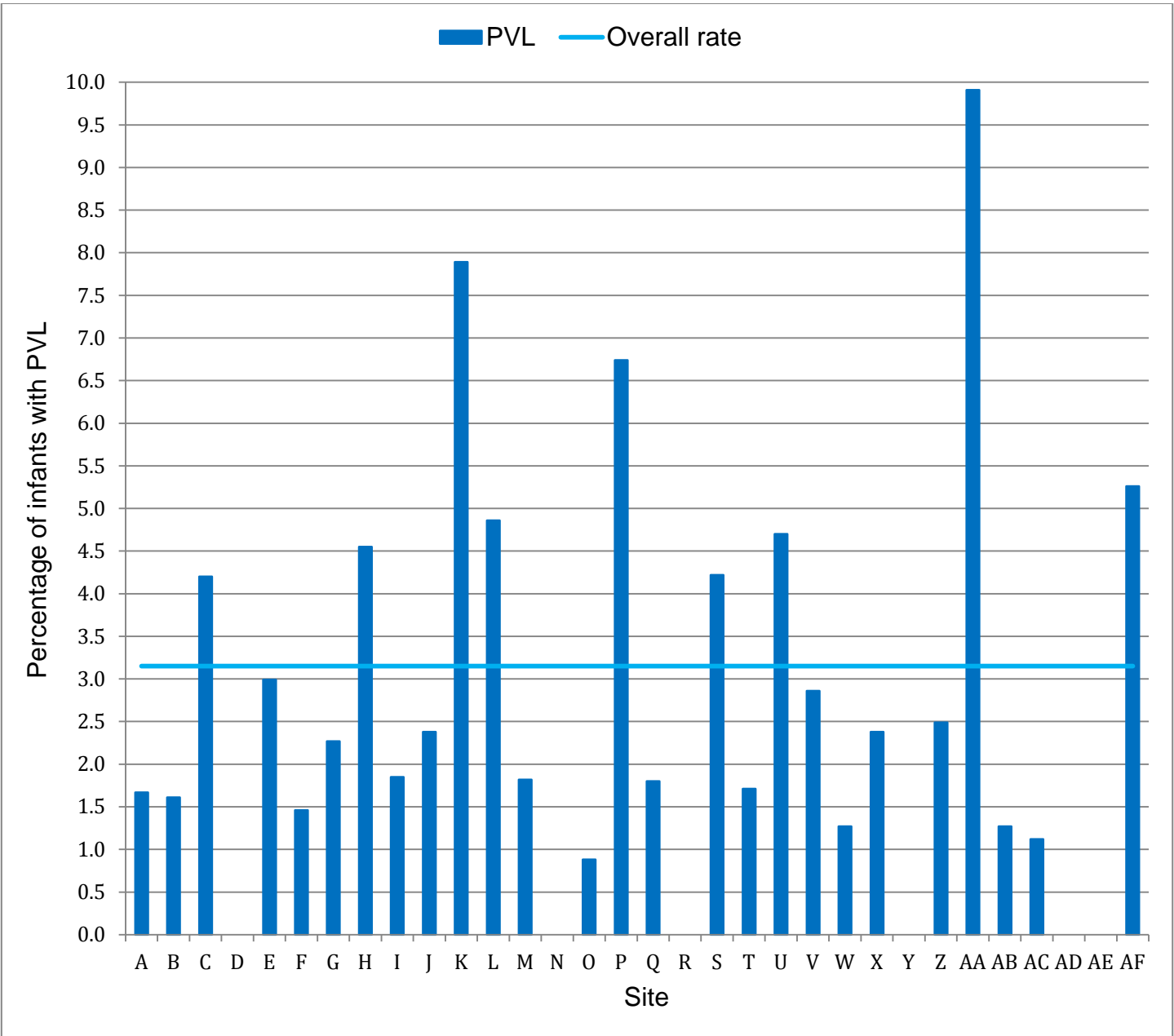
Note that the proportion of neonates with neuroimaging data available varies by GA. 763 neonates were excluded due to neuroimaging data not available.

\*Overall % = (number of neonates with cranial ultrasound abnormalities for site / total number of neonates for site with neuroimaging data available) \*100

\*\*Overall % = (number of neonates with cranial ultrasound abnormalities for GA category / total number of neonates in GA category with neuroimaging data available) \*100

NA = no data available

Presentation #42  
Periventricular leukomalacia (PVL) rates: GA<33 weeks: Site specific crude rates



**Presentation #42 (continued)**  
**Periventricular leukomalacia (PVL) rate: GA<33 weeks: Site specific crude rates**

Site	<25	25-26	27-28	29-30	31-32	Overall rate* per site %
A	0.0	0.0	0.0	0.0	4.4	1.7
B	0.0	7.7	0.0	2.8	0.0	1.6
C	0.0	0.0	13.2	2.3	0.0	4.2
D	NA	0.0	0.0	0.0	0.0	0.0
E	0.0	9.1	10.0	0.0	0.0	3.0
F	0.0	6.3	0.0	2.7	0.0	1.5
G	0.0	14.3	4.8	0.0	0.0	2.3
H	6.7	10.3	4.0	0.0	3.2	4.6
I	0.0	6.7	4.6	0.0	0.0	1.9
J	0.0	0.0	0.0	0.0	5.1	2.4
K	33.3	25.0	6.7	0.0	0.0	7.9
L	0.0	23.5	5.4	2.6	0.0	4.9
M	NA	0.0	0.0	0.0	5.6	1.8
N	0.0	0.0	0.0	0.0	0.0	0.0
O	0.0	0.0	5.3	0.0	0.0	0.9
P	22.2	7.1	15.4	0.0	4.0	6.7
Q	0.0	5.9	0.0	2.9	0.0	1.8
R	NA	NA	0.0	NA	0.0	0.0
S	4.2	7.1	6.5	2.8	2.1	4.2
T	0.0	3.9	0.0	3.6	0.0	1.7
U	12.7	10.1	3.0	0.9	1.3	4.7
V	0.0	0.0	5.6	2.2	2.8	2.9
W	0.0	0.0	0.0	2.8	1.5	1.3
X	0.0	14.3	0.0	5.6	0.0	2.4
Y	0.0	0.0	0.0	0.0	0.0	0.0
Z	5.3	2.3	5.9	2.0	0.0	2.5
AA	34.4	11.8	7.6	2.2	2.0	9.9
AB	2.4	1.4	2.5	0.0	0.0	1.3
AC	10.0	0.0	0.0	0.0	0.0	1.1
AD	NA	NA	0.0	0.0	0.0	0.0
AE	NA	0.0	0.0	0.0	0.0	0.0
AF	0.0	0.0	0.0	0.0	9.1	5.3
<b>Overall rate** per GA group %</b>	7.6	6.0	3.7	1.5	1.2	3.2

Total number of neonates = 4 482

Note that the proportion of neonates with neuroimaging data available varies by GA. 763 neonates were excluded due to neuroimaging data not available.

\*Overall % = (number of neonates with PVL for site / total number of neonates for site) \*100

\*\*Overall % = (number of neonates with PVL for GA category / total number of neonates in GA category) \*100

NA = no data available

**Presentation #43a**  
**IVH grade 3 or 4 or PVL: GA<33 weeks: Adjusted standardized ratios by site**

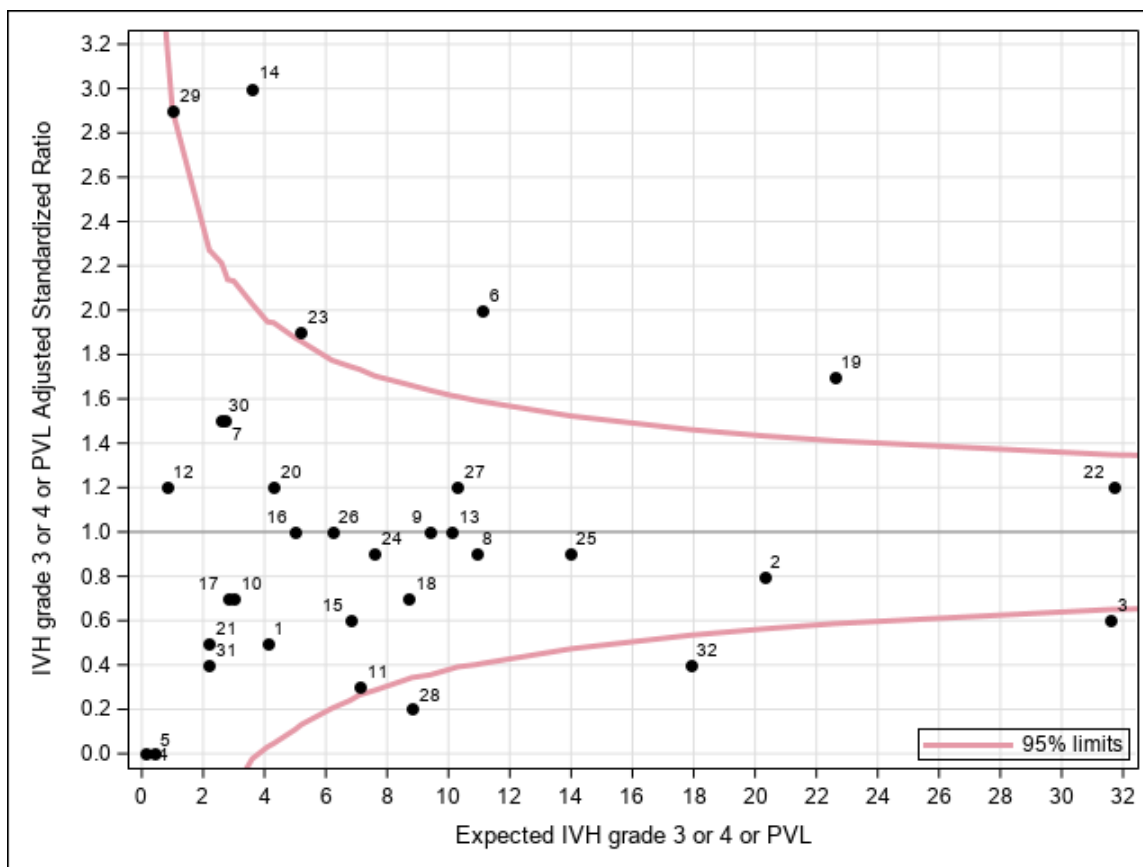
Site	Total number of neonates	Number of neonates with available data	Number of neonates with IVH G3/4 or PVL	Adjusted# expected number of neonates with IVH G3/4 or PVL	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	99	66	2	4.1	0.5	0.1	1.8
2	263	223	17	20.3	0.8	0.5	1.3
3	358	308	20	31.6	0.6	0.4	1.0
4	5	2	0	0.1	0.0	.	42.0
5	9	5	0	0.4	0.0	.	10.3
6	176	141	22	11.1	2.0	1.2	3.0
7	44	38	4	2.7	1.5	0.4	3.9
8	153	128	10	10.9	0.9	0.4	1.7
9	158	153	9	9.4	1.0	0.4	1.8
10	74	60	2	3.0	0.7	0.1	2.4
11	139	103	2	7.1	0.3	0.0	1.0
12	22	19	1	0.8	1.2	0.0	6.9
13	168	129	10	10.1	1.0	0.5	1.8
14	94	77	11	3.6	3.0	1.5	5.4
15	87	86	4	6.8	0.6	0.2	1.5
16	87	85	5	5.0	1.0	0.3	2.3
17	69	55	2	2.8	0.7	0.1	2.6
18	153	119	6	8.7	0.7	0.3	1.5
19	327	214	38	22.6	1.7	1.2	2.3
20	119	104	5	4.3	1.2	0.4	2.7
21	51	37	1	2.2	0.5	0.0	2.5
22	417	365	38	31.7	1.2	0.8	1.6
23	119	82	10	5.2	1.9	0.9	3.6
24	132	107	7	7.6	0.9	0.4	1.9
25	178	158	13	14.0	0.9	0.5	1.6
26	107	86	6	6.2	1.0	0.4	2.1
27	165	137	12	10.3	1.2	0.6	2.0
28	125	111	2	8.8	0.2	0.0	0.8
29	23	18	3	1.0	2.9	0.6	8.6
30	57	48	4	2.6	1.5	0.4	3.9
31	48	47	1	2.2	0.4	0.0	2.5
32	295	263	8	17.9	0.4	0.2	0.9

Numeric site codes were used in Presentations 43a-d and they may not correspond to other presentations in this report.

Neonates with major congenital anomalies are excluded.

## The prediction model was adjusted for GA, SGA, sex, and SNAPII > 20.

**Presentation #43b**  
**IVH grade 3 or 4 or PVL: GA<33 weeks: Adjusted standardized ratios by site**



**Explanation for Presentation 43a**

Column 1: Numeric site codes

Column 2: Total number of neonates at each site (<33 weeks GA and no major anomaly)

Column 3: Number of eligible neonates at each site (<33 weeks GA and no major anomaly) who were actually used to fit the model

Column 4: Number of neonates with outcome of interest among those eligible neonates

Column 5: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAPPII > 20

Column 6: Adjusted standardized ratio calculated based on observed IVH or PVL/expected IVH or PVL

Columns 7 and 8: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 43b**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

**Presentation# 43c**  
**IVH grade 3 or 4 or PVL: GA<29 weeks: Adjusted standardized ratios by site**

Site	Total number of neonates	Number of neonates with available data	Number of neonates with IVH G3/4 or PVL	Adjusted# expected number of neonates with IVH G3/4 or PVL	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	26	23	2	2.9	0.7	0.1	2.5
2	129	125	14	17.6	0.8	0.4	1.3
3	197	190	19	27.6	0.7	0.4	1.1
6	72	69	19	9.3	2.0	1.2	3.2
7	24	22	4	2.2	1.8	0.5	4.6
8	67	66	7	9.3	0.8	0.3	1.5
9	54	53	4	6.8	0.6	0.2	1.5
10	13	13	1	1.6	0.6	0.0	3.4
11	45	44	2	5.5	0.4	0.0	1.3
12	4	4	1	0.4	2.4	0.0	13.4
13	67	61	9	8.1	1.1	0.5	2.1
14	29	25	5	2.3	2.2	0.7	5.0
15	38	38	3	5.5	0.5	0.1	1.6
16	31	30	4	3.5	1.1	0.3	2.9
17	25	22	1	2.0	0.5	0.0	2.8
18	59	55	5	7.0	0.7	0.2	1.7
19	135	130	36	20.1	1.8	1.3	2.5
20	25	24	3	2.0	1.5	0.3	4.4
21	18	17	1	1.7	0.6	0.0	3.2
22	189	184	32	25.8	1.2	0.8	1.7
23	36	35	4	4.0	1.0	0.3	2.5
24	39	36	5	5.5	0.9	0.3	2.1
25	83	81	11	11.9	0.9	0.5	1.7
26	34	34	5	4.7	1.1	0.3	2.5
27	71	70	10	8.4	1.2	0.6	2.2
28	55	53	2	7.2	0.3	0.0	1.0
29	4	4	1	0.6	1.5	0.0	8.6
30	21	19	4	1.9	2.1	0.6	5.3
31	18	17	1	1.6	0.6	0.0	3.5
32	109	106	6	13.4	0.4	0.2	1.0

Numeric site codes were used in Presentations 43a-d and they may not correspond to other presentations in this report.

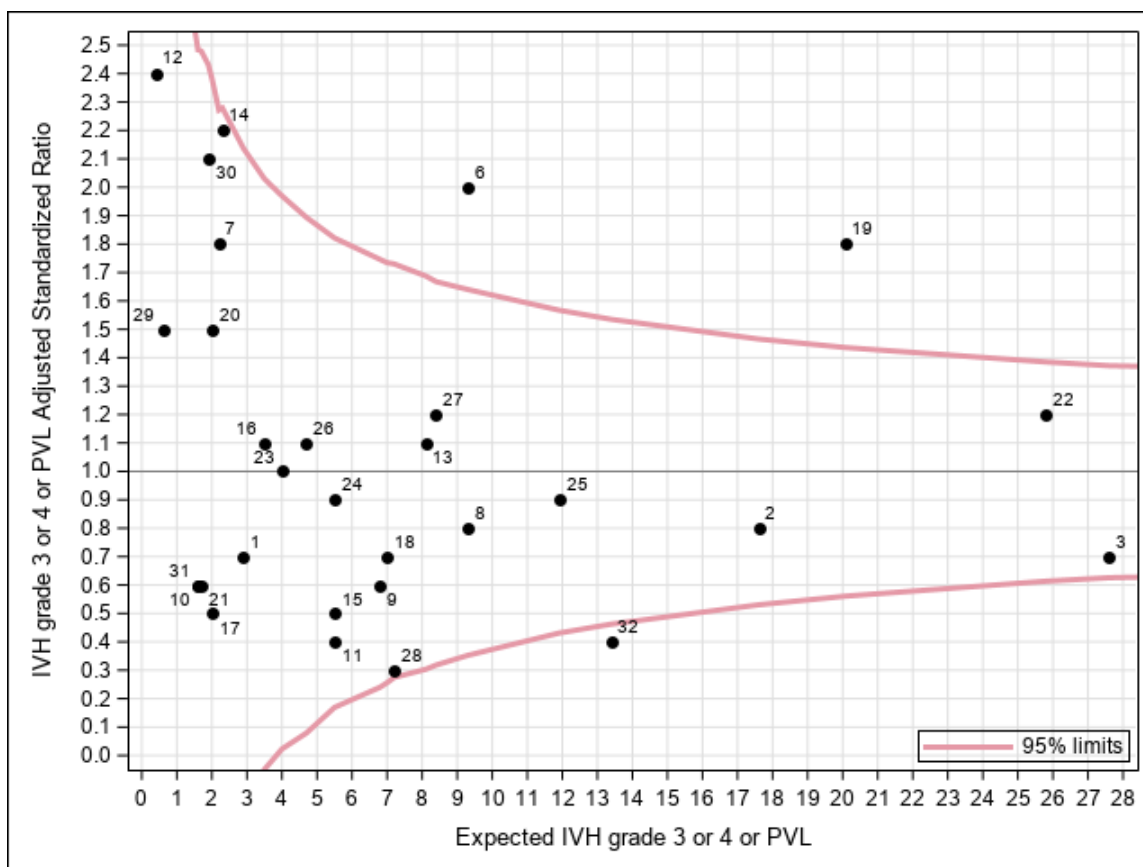
Neonates with major congenital anomalies are excluded.

<sup>#</sup> The prediction model was adjusted for GA, SGA, sex, and SNAP-II > 20.

Note: Sites 4 and 5 were excluded from the analysis due to the small number of eligible neonates.

## Presentation #43d

IVH grade 3 or 4 or PVL: GA&lt;29 weeks: Adjusted standardized ratios by site

**Explanation for Presentation 43c**

Column 1: Numeric site codes

Column 2: Total number of neonates at each site (&lt;29 weeks GA and no major anomaly)

Column 3: Number of eligible neonates at each site (&lt;29 weeks GA and no major anomaly) who were actually used to fit the model

Column 4: Number of neonates with outcome of interest among those eligible neonates

Column 5: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAP-II &gt; 20

Column 6: Adjusted standardized ratio calculated based on observed IVH or PVL/expected IVH or PVL

Columns 7 and 8: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 43d**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

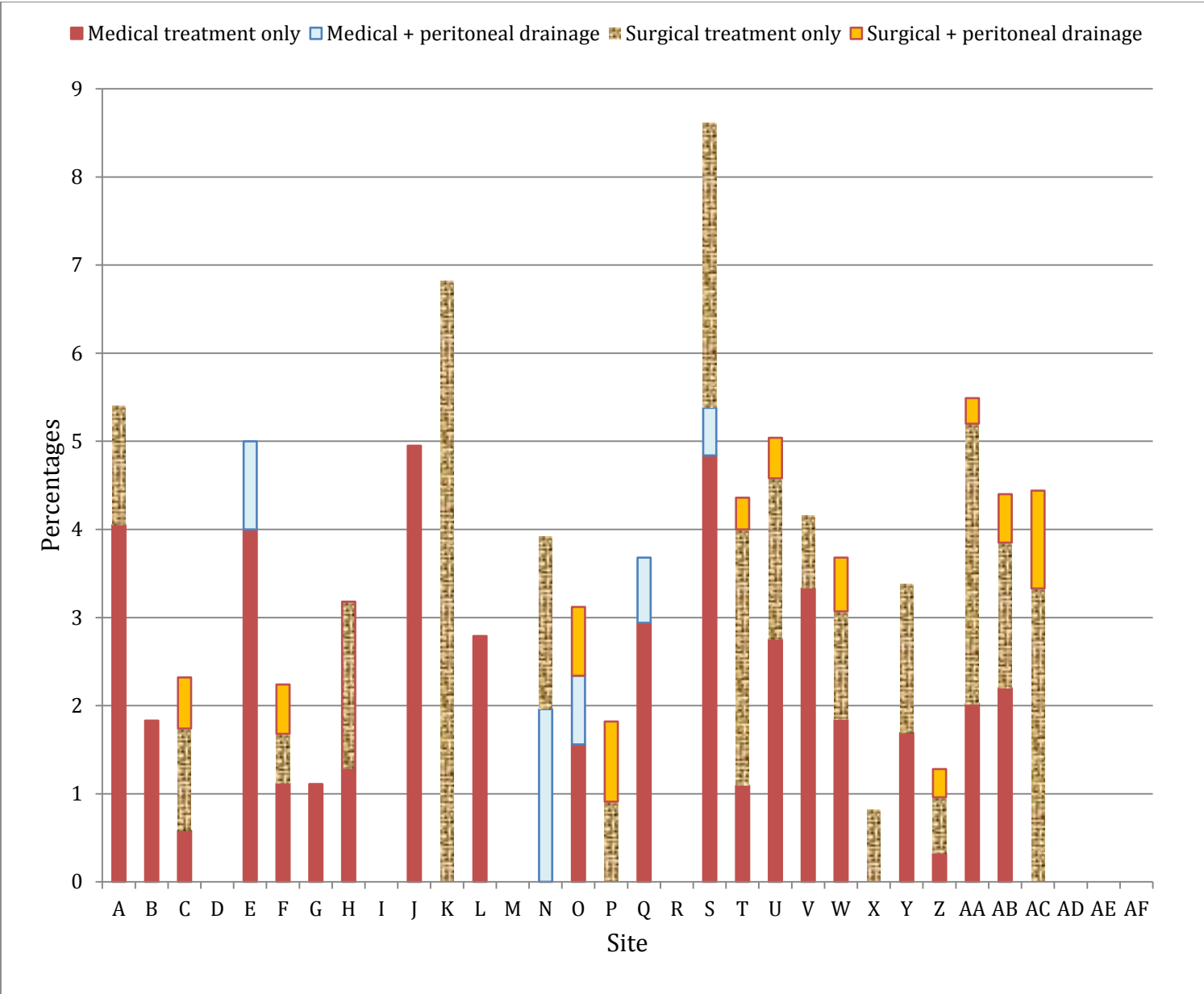
Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

Presentation #44  
Necrotizing enterocolitis (NEC) treatment rates: GA<33 weeks:  
Site specific crude rates



**Presentation #44 (continued)**  
**Necrotizing enterocolitis (NEC) treatment rates: GA<33 weeks:**  
**Site specific crude rates**

Site	Treatment (%)				
	Medical treatment only	Medical + peritoneal drainage	Laparotomy only	Peritoneal drainage + Laparotomy	Any
A	4.1	0.0	1.4	0.0	5.4
B	1.8	0.0	0.0	0.0	1.8
C	0.6	0.0	1.2	0.6	2.3
D	0.0	0.0	0.0	0.0	0.0
E	4.0	1.0	0.0	0.0	5.0
F	1.1	0.0	0.6	0.6	2.2
G	1.1	0.0	0.0	0.0	1.1
H	1.3	0.0	1.9	0.0	3.2
I	0.0	0.0	0.0	0.0	0.0
J	5.0	0.0	0.0	0.0	5.0
K	0.0	0.0	6.8	0.0	6.8
L	2.8	0.0	0.0	0.0	2.8
M	0.0	0.0	0.0	0.0	0.0
N	0.0	2.0	2.0	0.0	3.9
O	1.6	0.8	0.0	0.8	3.1
P	0.0	0.0	0.9	0.9	1.8
Q	2.9	0.7	0.0	0.0	3.7
R	0.0	0.0	0.0	0.0	0.0
S	4.8	0.5	3.2	0.0	8.6
T	1.1	0.0	2.9	0.4	4.4
U	2.8	0.0	1.8	0.5	5.0
V	3.3	0.0	0.8	0.0	4.2
W	1.8	0.0	1.2	0.6	3.7
X	0.0	0.0	0.8	0.0	0.8
Y	1.7	0.0	1.7	0.0	3.4
Z	0.3	0.0	0.6	0.3	1.3
AA	2.0	0.0	3.2	0.3	5.5
AB	2.2	0.0	1.7	0.6	4.4
AC	0.0	0.0	3.3	1.1	4.4
AD	0.0	0.0	0.0	0.0	0.0
AE	0.0	0.0	0.0	0.0	0.0
AF	0.0	0.0	0.0	0.0	0.0
Total	1.8	0.1	1.4	0.3	3.5

**COMMENTS:** These analyses include 4 482 neonates from 32 sites.

**Presentation #45a****Necrotizing enterocolitis (NEC): GA<33 weeks: Adjusted standardized ratios by site**

Site	Number of neonates	Number of neonates with NEC	Adjusted# expected number of neonates with NEC	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	99	5	2.3	2.1	0.7	5.0
2	263	11	11.0	1.0	0.5	1.8
3	358	15	17.4	0.9	0.5	1.4
4	5	0	0.1	0.0	.	57.0
5	9	0	0.1	0.0	.	26.4
6	176	5	6.6	0.8	0.2	1.8
7	44	3	1.6	1.9	0.4	5.6
8	153	5	6.0	0.8	0.3	2.0
9	158	6	4.5	1.3	0.5	2.9
10	74	4	1.4	2.8	0.8	7.2
11	139	0	3.9	0.0	.	0.9
12	22	0	0.4	0.0	.	9.2
13	168	3	6.2	0.5	0.1	1.4
14	94	5	2.2	2.3	0.7	5.4
15	87	2	3.5	0.6	0.1	2.1
16	87	1	2.3	0.4	0.0	2.4
17	69	0	1.6	0.0	.	2.3
18	153	3	5.2	0.6	0.1	1.7
19	327	19	12.7	1.5	0.9	2.3
20	119	5	2.1	2.3	0.8	5.4
21	51	2	1.3	1.6	0.2	5.6
22	417	22	18.5	1.2	0.7	1.8
23	119	1	2.7	0.4	0.0	2.0
24	132	5	4.0	1.3	0.4	2.9
25	178	16	7.9	2.0	1.2	3.3
26	107	2	3.3	0.6	0.1	2.2
27	165	2	5.6	0.4	0.0	1.3
28	125	4	4.9	0.8	0.2	2.1
29	23	0	0.5	0.0	.	7.9
30	57	2	1.5	1.3	0.1	4.8
31	48	0	1.0	0.0	.	3.8
32	295	4	9.8	0.4	0.1	1.0

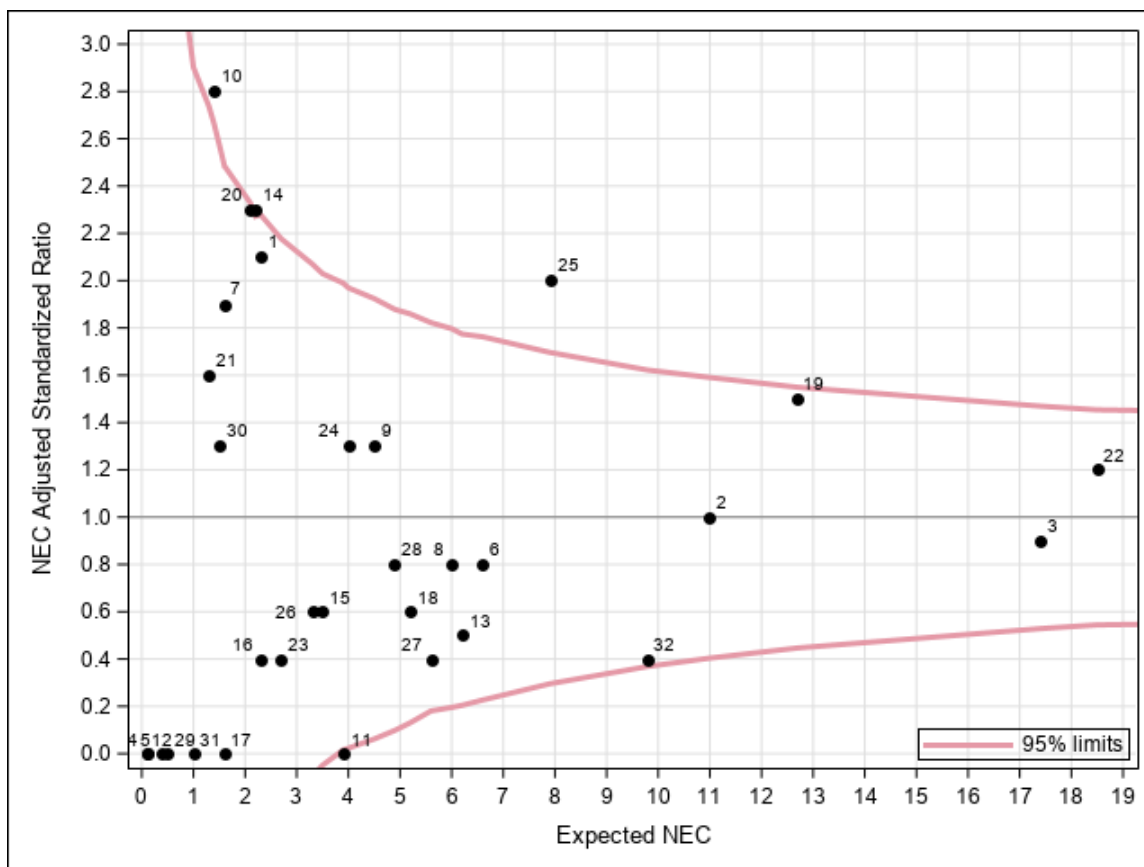
Numeric site codes were used in Presentations 45a-d and they may not correspond to other presentations in this report.

Neonates with major congenital anomalies are excluded.

# Variables adjusted for in the prediction model: GA, SGA, sex, and SNAPII > 20

## Presentation #45b

Necrotizing enterocolitis (NEC): GA&lt;33 weeks: Adjusted standardized ratios by site

**Explanation for Presentation 45a**

Column 1: Numeric site codes

Column 2: Number of eligible neonates at each site (&lt;33 weeks GA and no major anomaly)

Column 3: Number of neonates with outcome of interest among those eligible neonates

Column 4: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAPII &gt; 20

Column 5: Adjusted standardized ratio calculated based on observed NEC/expected NEC

Columns 6 and 7: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 45b**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

**Presentation #45c**  
**NEC: GA<29 weeks: Adjusted standardized ratios by site**

Site	Number of neonates	Number of neonates with NEC	Adjusted# expected number of neonates with NEC	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	26	2	1.7	1.2	0.1	4.3
2	129	9	9.6	0.9	0.4	1.8
3	197	14	15.4	0.9	0.5	1.5
6	72	5	5.4	0.9	0.3	2.2
7	24	3	1.4	2.2	0.4	6.4
8	67	3	5.1	0.6	0.1	1.7
9	54	4	3.5	1.1	0.3	2.9
10	13	2	0.9	2.4	0.3	8.5
11	45	0	3.1	0.0	.	1.2
12	4	0	0.2	0.0	.	18.4
13	67	3	5.1	0.6	0.1	1.7
14	29	0	1.6	0.0	.	2.3
15	38	2	3.0	0.7	0.1	2.4
16	31	1	1.7	0.6	0.0	3.2
17	25	0	1.2	0.0	.	3.0
18	59	3	4.2	0.7	0.1	2.1
19	135	18	10.8	1.7	1.0	2.6
20	25	4	1.1	3.5	1.0	9.1
21	18	2	1.0	2.0	0.2	7.1
22	189	20	15.7	1.3	0.8	2.0
23	36	1	2.0	0.5	0.0	2.7
24	39	2	3.0	0.7	0.1	2.4
25	83	14	6.9	2.0	1.1	3.4
26	34	2	2.6	0.8	0.1	2.8
27	71	2	4.6	0.4	0.0	1.6
28	55	4	4.2	1.0	0.3	2.4
29	4	0	0.3	0.0	.	12.5
30	21	2	1.1	1.7	0.2	6.3
31	18	0	0.7	0.0	.	5.2
32	109	3	7.8	0.4	0.1	1.1

**Numeric site codes were used in Presentations 45a-d and they may not correspond to other presentations in this report.**

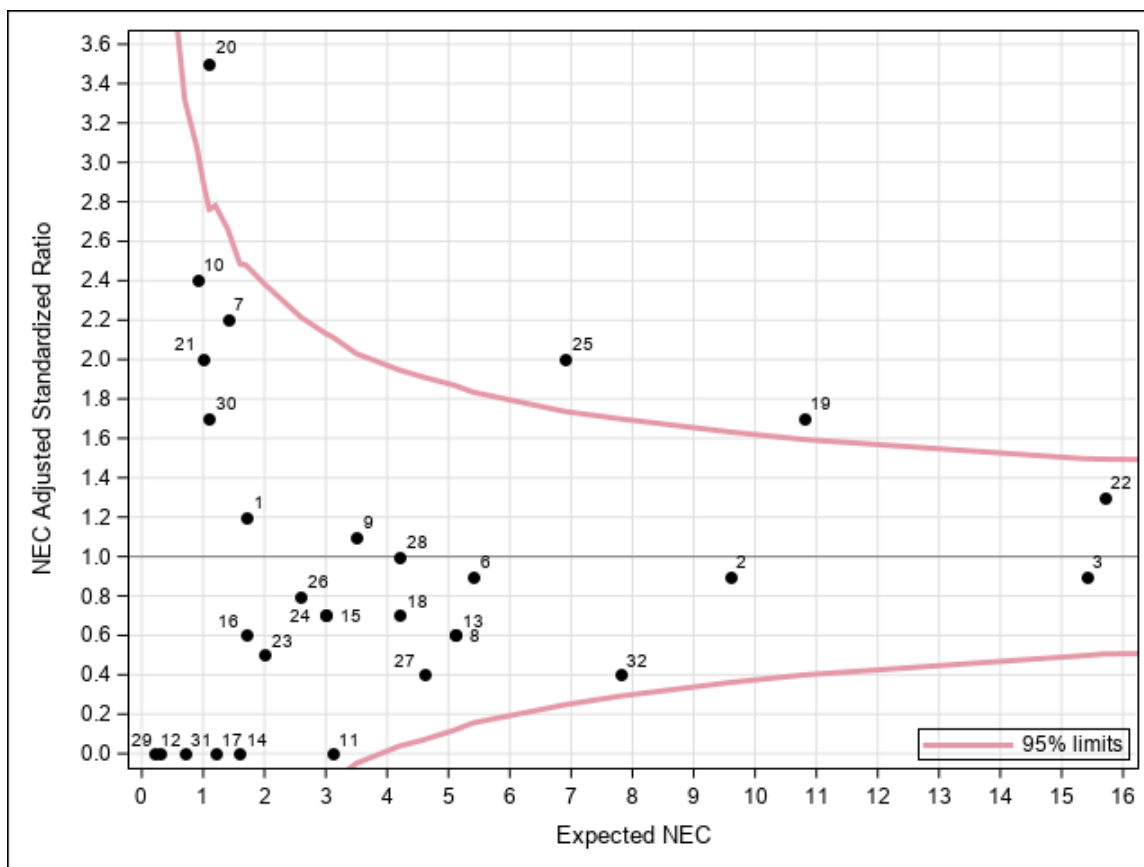
**Neonates with major congenital anomalies are excluded.**

<sup># #</sup> The prediction model was adjusted for GA, SGA, sex, and SNAP II > 20.

Note: Sites 4 and 5 were excluded from the analysis due to the small number of eligible neonates.

## Presentation #45d

NEC: GA<29 weeks: Adjusted standardized ratios by site

**Explanation for Presentation 45c**

Column 1: Numeric site codes

Column 2: Number of eligible neonates at each site (<29 weeks GA and no major anomaly)

Column 3: Number of neonates with outcome of interest among those eligible neonates

Column 4: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAP-II > 20

Column 5: Adjusted standardized ratio calculated based on observed NEC/expected NEC

Columns 6 and 7: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 45d**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

**Presentation #46**  
**Chronic lung disease (CLD): GA<33 weeks: Site specific crude rates**

GA at birth						
Site	<25	25-26	27-28	29-30	31-32	Overall CLD rate for sites
A	50.0	40.0	75.0	12.5	2.7	13.9
B	100.0	100.0	93.9	67.5	56.1	73.7
C	90.0	71.4	35.1	23.8	5.7	30.7
D	NA	0.0	30.8	27.3	5.3	17.8
E	100.0	80.0	10.0	8.7	5.9	16.7
F	88.9	71.4	51.7	30.6	2.9	29.1
G	100.0	80.0	10.5	23.8	10.8	19.3
H	84.6	55.6	30.4	33.3	14.0	34.9
I	100.0	66.7	43.5	3.7	5.8	23.8
J	100.0	80.0	62.5	33.3	15.0	34.6
K	0.0	50.0	30.8	0.0	0.0	15.4
L	70.0	75.0	59.5	12.2	12.3	32.0
M	NA	50.0	12.5	6.3	0.0	9.1
N	100.0	25.0	50.0	25.0	0.0	17.8
O	50.0	27.3	5.9	14.8	4.4	14.3
P	100.0	76.9	69.2	21.9	7.1	33.0
Q	100.0	66.7	38.5	11.8	8.2	21.4
R	NA	NA	100.0	NA	0.0	25.0
S	86.7	85.0	43.3	33.3	7.8	36.4
T	93.3	100.0	86.5	76.3	47.5	74.7
U	73.7	63.5	57.1	23.5	10.3	36.1
V	100.0	60.0	18.8	18.2	8.0	17.1
W	100.0	85.0	58.3	38.2	13.9	38.5
X	100.0	50.0	43.5	11.1	4.6	18.3
Y	NA	40.0	20.0	6.7	4.6	11.5
Z	100.0	81.4	52.0	21.2	10.5	35.9
AA	89.5	65.9	38.0	14.7	7.6	27.2
AB	48.5	24.6	18.8	8.5	6.4	17.6
AC	100.0	36.4	22.2	5.9	0.0	18.6
AD	NA	NA	50.0	0.0	0.0	11.1
AE	NA	0.0	50.0	0.0	0.0	4.6
AF	100.0	100.0	33.3	33.3	6.7	21.7
<b>Overall CLD rate for GA group</b>	81.0	64.2	44.7	23.8	11.3	31.3

Total number of neonates = 4 162

320 neonates were excluded due to death prior to week 36 or first admission after week 36

NA = Data not available

## Presentation #47a

## Chronic lung disease (CLD): GA &lt;33 weeks: Adjusted standardized ratios by site

Site	Total number of neonates	Number of neonates with available data	Number of neonates with CLD at 36w or discharge	Adjusted# expected number of CLD at 36w or discharge	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	99	95	15	22.6	0.7	0.4	1.1
2	263	242	181	84.2	2.2	1.8	2.5
3	358	330	56	131.8	0.4	0.3	0.6
4	5	3	0	0.4	0.0	.	10.0
5	9	9	1	1.9	0.5	0.0	2.9
6	176	166	52	50.5	1.0	0.8	1.4
7	44	39	6	12.9	0.5	0.2	1.0
8	153	146	49	49.1	1.0	0.7	1.3
9	158	151	58	41.3	1.4	1.1	1.8
10	74	72	10	14.5	0.7	0.3	1.3
11	139	138	31	37.8	0.8	0.6	1.2
12	22	22	1	4.8	0.2	0.0	1.2
13	168	150	45	42.3	1.1	0.8	1.4
14	94	75	25	18.4	1.4	0.9	2.0
15	87	83	14	25.7	0.5	0.3	0.9
16	87	81	16	20.1	0.8	0.5	1.3
17	69	66	6	16.6	0.4	0.1	0.8
18	153	142	104	42.1	2.5	2.0	3.0
19	327	299	78	91.1	0.9	0.7	1.1
20	119	116	20	24.0	0.8	0.5	1.3
21	51	45	8	10.8	0.7	0.3	1.5
22	417	379	132	134.3	1.0	0.8	1.2
23	119	112	21	26.7	0.8	0.5	1.2
24	132	122	23	31.9	0.7	0.5	1.1
25	178	158	56	51.1	1.1	0.8	1.4
26	107	103	35	29.4	1.2	0.8	1.7
27	165	157	46	52.1	0.9	0.6	1.2
28	125	116	16	36.1	0.4	0.3	0.7
29	23	22	5	4.6	1.1	0.3	2.5
30	57	51	6	12.1	0.5	0.2	1.1
31	48	45	8	11.0	0.7	0.3	1.4
32	295	288	99	90.6	1.1	0.9	1.3

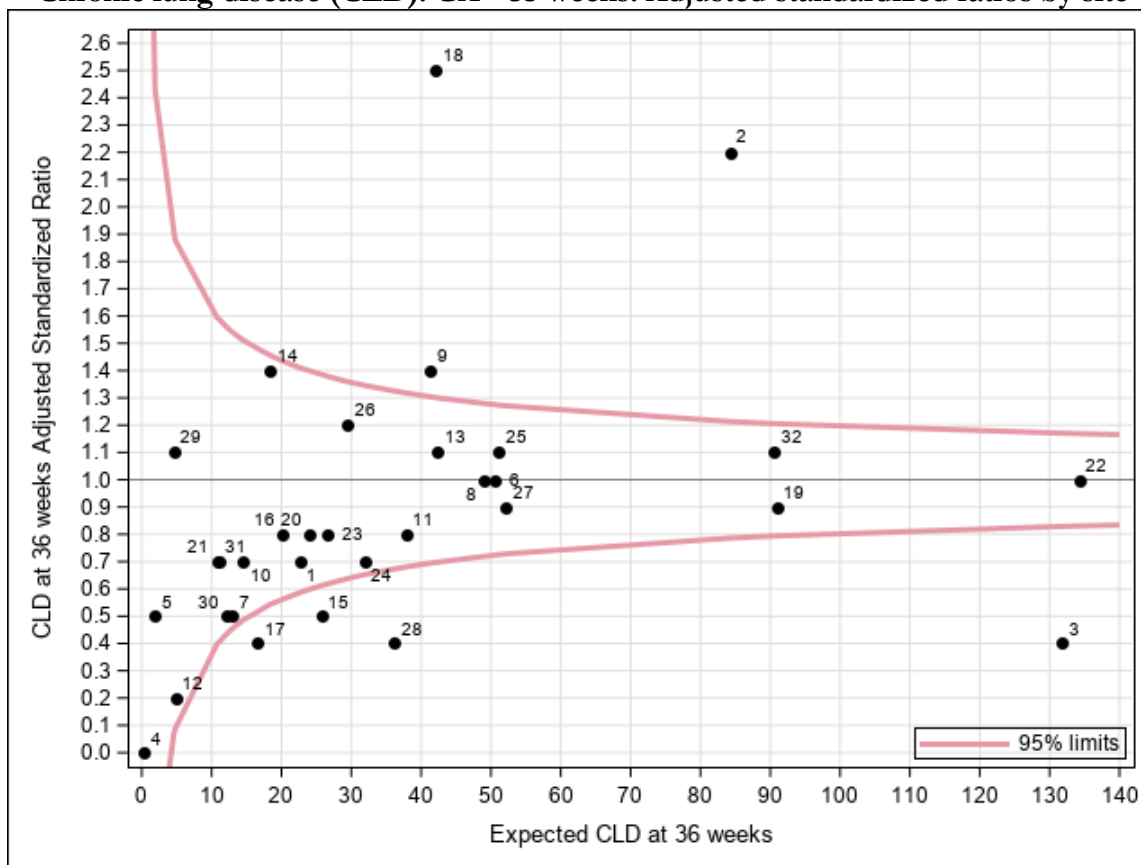
Numeric site codes were used in Presentations 47a-d and they may not correspond to other presentations in this report.

Neonates with major congenital anomalies and death before 36 weeks were excluded.

# The prediction model was adjusted for GA, SGA, sex, and SNAP II > 20.

## Presentation #47b

Chronic lung disease (CLD): GA &lt;33 weeks: Adjusted standardized ratios by site

**Explanation for Presentation 47a**

Column 1: Numeric site codes

Column 2: Total number of neonates at each site (&lt;33 weeks GA and no major anomaly)

Column 3: Number of eligible neonates at each site (&lt;33 weeks GA and no major anomaly) who were actually used to fit the model

Column 4: Number of neonates with outcome of interest among those eligible neonates

Column 5: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAP-II &gt; 20

Column 6: Adjusted standardized ratio calculated based on observed CLD/expected CLD

Columns 7 and 8: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 47b**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

Note: Deaths before 36 weeks were excluded in the denominator.

## Presentation #47c

## Chronic lung disease (CLD): GA &lt;29 weeks: Adjusted standardized ratios by site

Site	Total number of neonates	Number of neonates with available data	Number of neonates with CLD at 36w or discharge	Adjusted# expected number of neonates with CLD at 36w or discharge	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	26	22	11	12.3	0.9	0.4	1.6
2	129	111	103	64.4	1.6	1.3	1.9
3	197	174	44	101.1	0.4	0.3	0.6
6	72	62	40	33.6	1.2	0.9	1.6
7	24	19	6	10.2	0.6	0.2	1.3
8	67	61	31	35.3	0.9	0.6	1.2
9	54	49	36	26.6	1.4	0.9	1.9
10	13	11	6	6.4	0.9	0.3	2.1
11	45	44	27	25.0	1.1	0.7	1.6
12	4	4	1	2.1	0.5	0.0	2.7
13	67	51	33	28.5	1.2	0.8	1.6
14	29	23	16	11.3	1.4	0.8	2.3
15	38	34	13	19.0	0.7	0.4	1.2
16	31	25	7	11.8	0.6	0.2	1.2
17	25	22	5	11.0	0.5	0.1	1.1
18	59	51	49	27.4	1.8	1.3	2.4
19	135	109	62	63.8	1.0	0.7	1.2
20	25	23	8	10.9	0.7	0.3	1.4
21	18	13	6	6.5	0.9	0.3	2.0
22	189	158	98	94.1	1.0	0.8	1.3
23	36	32	16	16.2	1.0	0.6	1.6
24	39	31	18	18.2	1.0	0.6	1.6
25	83	63	41	36.2	1.1	0.8	1.5
26	34	30	25	17.9	1.4	0.9	2.1
27	71	65	35	36.5	1.0	0.7	1.3
28	55	46	11	26.7	0.4	0.2	0.7
29	4	4	3	2.4	1.2	0.2	3.6
30	21	15	4	7.0	0.6	0.2	1.5
31	18	15	4	6.7	0.6	0.2	1.5
32	109	103	71	60.9	1.2	0.9	1.5

Numeric site codes were used in Presentations 47a-d and they may not correspond to other presentations in this report.

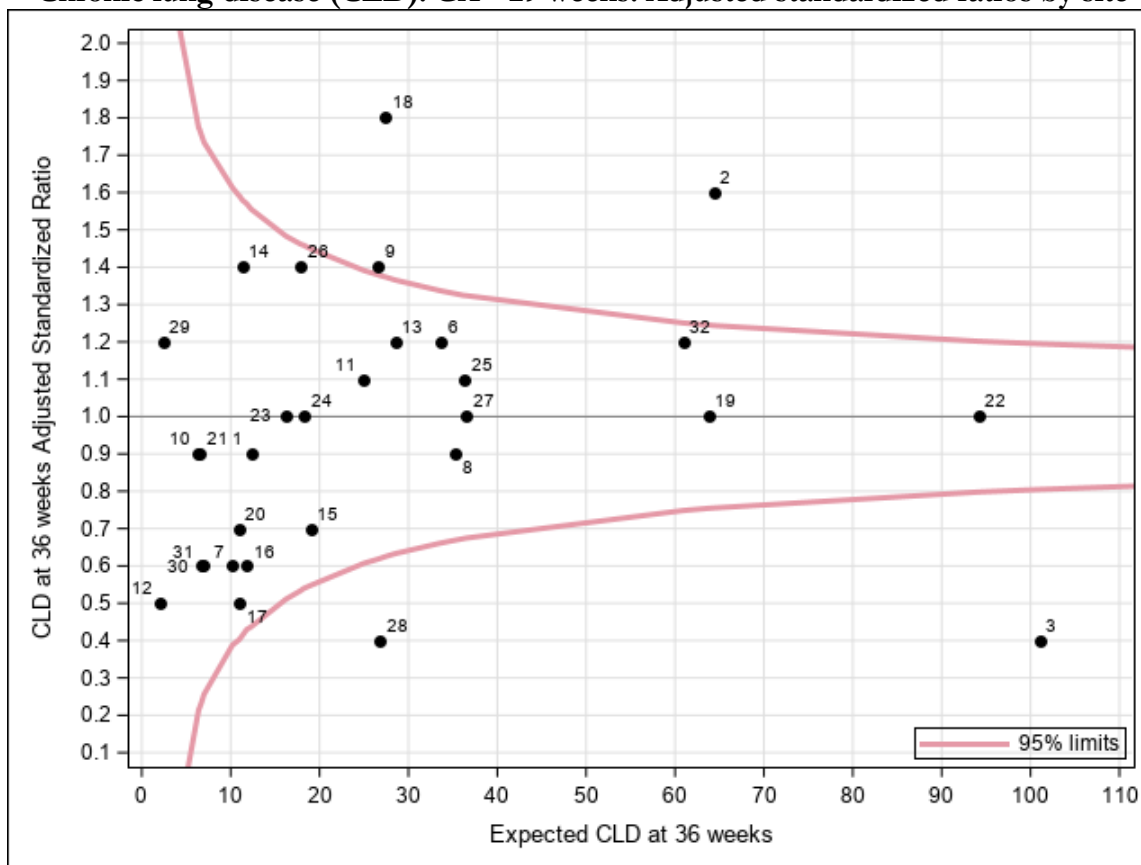
Neonates with major congenital anomalies and death before 36 weeks were excluded.

#The prediction model was adjusted for GA, SGA, sex, and SNAP-II > 20.

Note: Site 5 was excluded from the analysis due to the small number of eligible neonates. Site 4 did not have any eligible neonates in the GA<29 category.

## Presentation #47d

## Chronic lung disease (CLD): GA &lt;29 weeks: Adjusted standardized ratios by site

**Explanation for Presentation 47c**

Column 1: Numeric site codes

Column 2: Total number of neonates at each site (<29 weeks GA and no major anomaly)

Column 3: Number of eligible neonates at each site (<29 weeks GA and no major anomaly) who were actually used to fit the model

Column 4: Number of neonates with outcome of interest among those eligible neonates

Column 5: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAP-II > 20

Column 6: Adjusted standardized ratio calculated based on observed CLD/expected CLD

Columns 7 and 8: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 47d**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

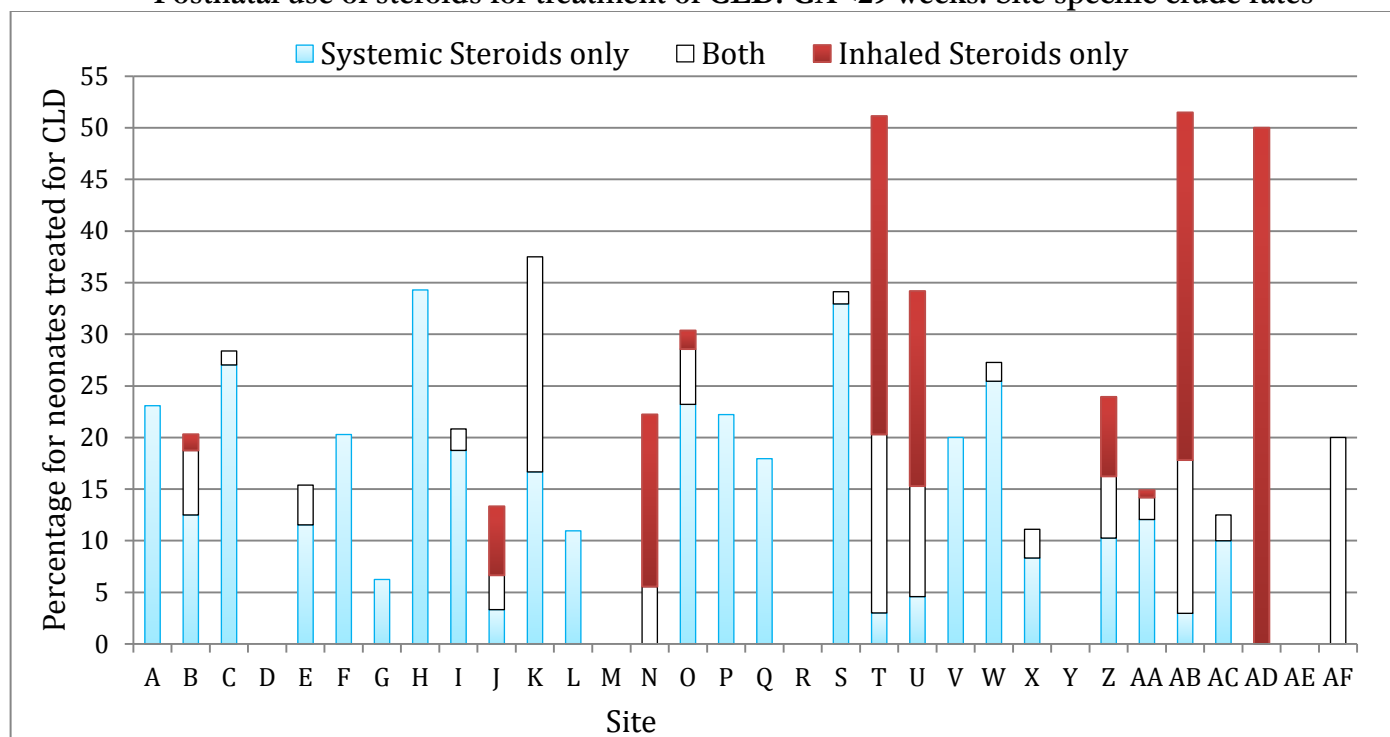
Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

Note: Deaths before 36 weeks were excluded in the denominator.

## Presentation #48a

Postnatal use of steroids for treatment of CLD: GA<29 weeks: Site specific crude rates<sup>†</sup>

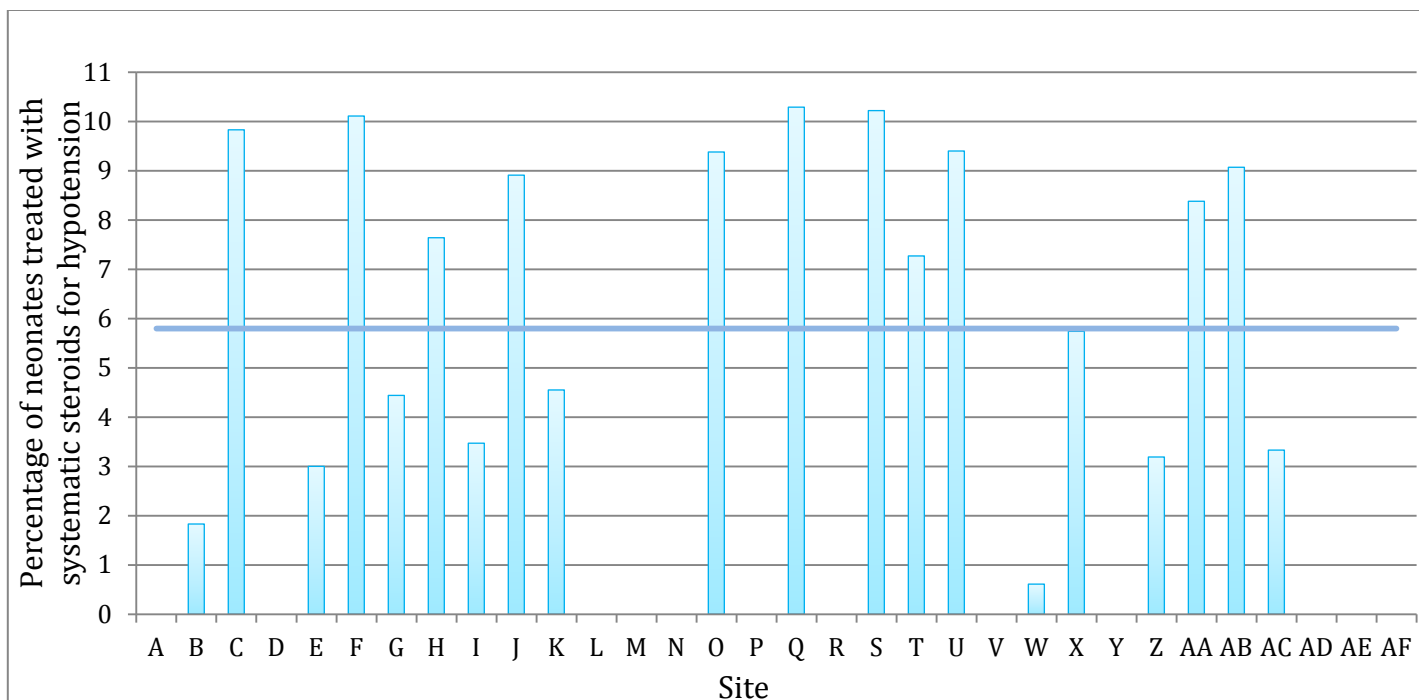
Site	Postnatal steroid use (%)		
	Systemic Steroids only	Both	Inhaled Steroids only
A	23.1	0.0	0.0
B	12.5	6.3	1.6
C	27.0	1.4	0.0
D	0.0	0.0	0.0
E	11.5	3.9	0.0
F	20.3	0.0	0.0
G	6.3	0.0	0.0
H	34.3	0.0	0.0
I	18.8	2.1	0.0
J	3.3	3.3	6.7
K	16.7	20.8	0.0
L	11.0	0.0	0.0
M	0.0	0.0	0.0
N	0.0	5.6	16.7
O	23.2	5.4	1.8
P	22.2	0.0	0.0

Site	Postnatal steroid use (%)		
	Systemic Steroids only	Both	Inhaled Steroids only
Q	18.0	0.0	0.0
R	0.0	0.0	0.0
S	32.9	1.2	0.0
T	3.0	17.3	30.8
U	4.6	10.7	18.9
V	20.0	0.0	0.0
W	25.5	1.8	0.0
X	8.3	2.8	0.0
Y	0.0	0.0	0.0
Z	10.3	6.0	7.7
AA	12.1	2.1	0.7
AB	3.0	14.9	33.7
AC	10.0	2.5	0.0
AD	0.0	0.0	50.0
AE	0.0	0.0	0.0
AF	0.0	20.0	0.0
Total	12.7	6.0	9.2

Total number of neonates = 1 781

<sup>†</sup>Percentage of neonates treated for CLD at each network site; results were attributed to the site of first admission.**COMMENTS:** Specific criteria for these treatments at each site were not documented here.

Presentation #48b  
Systemic steroids for hypotension: GA<33 weeks: Site specific crude rates<sup>†</sup>



Site	Postnatal systemic steroids use for hypotension (%)	Site	Postnatal systemic steroids use for hypotension (%)
A	0.0	Q	10.3
B	1.8	R	0.0
C	9.8	S	10.2
D	0.0	T	7.3
E	3.0	U	9.4
F	10.1	V	0.0
G	4.4	W	0.6
H	7.6	X	5.7
I	3.5	Y	0.0
J	8.9	Z	3.2
K	4.6	AA	8.4
L	0.0	AB	9.1
M	0.0	AC	3.3
N	0.0	AD	0.0
O	9.4	AE	0.0
P	0.0	AF	0.0
		Total	5.8

Total number of neonates = 4 482

<sup>†</sup>Percentage of neonates treated with systemic steroids for hypotension at each network site; results were attributed to the site of first admission.

**COMMENTS:** Specific criteria for these treatments at each site were not documented here.

**Presentation #49a**  
**ROP  $\geq$  Stage 3: GA < 33 weeks: Adjusted standardized ratios by site**

Site	Total number of neonates	Number of neonates with available data	Number of neonates with ROP $\geq$ Stage 3	Adjusted# expected number of neonates with ROP $\geq$ Stage 3	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	99	43	3	2.4	1.2	0.2	3.6
2	263	105	15	12.8	1.2	0.7	1.9
3	358	157	22	24.9	0.9	0.6	1.3
6	176	92	3	6.6	0.5	0.1	1.3
7	44	23	4	1.8	2.3	0.6	5.8
8	153	99	4	8.3	0.5	0.1	1.2
9	158	65	3	3.1	1.0	0.2	2.8
10	74	27	2	1.0	2.1	0.2	7.5
11	139	50	11	5.7	1.9	1.0	3.5
12	22	15	1	0.3	3.4	0.0	19.0
13	168	82	14	7.4	1.9	1.0	3.2
14	94	13	1	1.8	0.6	0.0	3.1
15	87	49	3	4.9	0.6	0.1	1.8
16	87	49	0	1.4	0.0	.	2.7
17	69	44	1	1.4	0.7	0.0	3.9
18	153	59	6	4.0	1.5	0.5	3.2
19	327	77	19	11.9	1.6	1.0	2.5
20	119	52	1	1.5	0.7	0.0	3.8
21	51	21	0	1.0	0.0	.	3.5
22	417	188	14	24.9	0.6	0.3	0.9
23	119	38	4	2.5	1.6	0.4	4.1
24	132	75	6	4.3	1.4	0.5	3.0
25	178	107	7	9.2	0.8	0.3	1.6
26	107	52	5	5.0	1.0	0.3	2.3
27	165	48	8	4.8	1.7	0.7	3.3
28	125	82	6	7.3	0.8	0.3	1.8
29	23	15	0	0.5	0.0	.	8.0
30	57	34	1	0.8	1.3	0.0	7.3
31	48	36	0	0.6	0.0	.	6.5
32	295	190	13	15.9	0.8	0.4	1.4

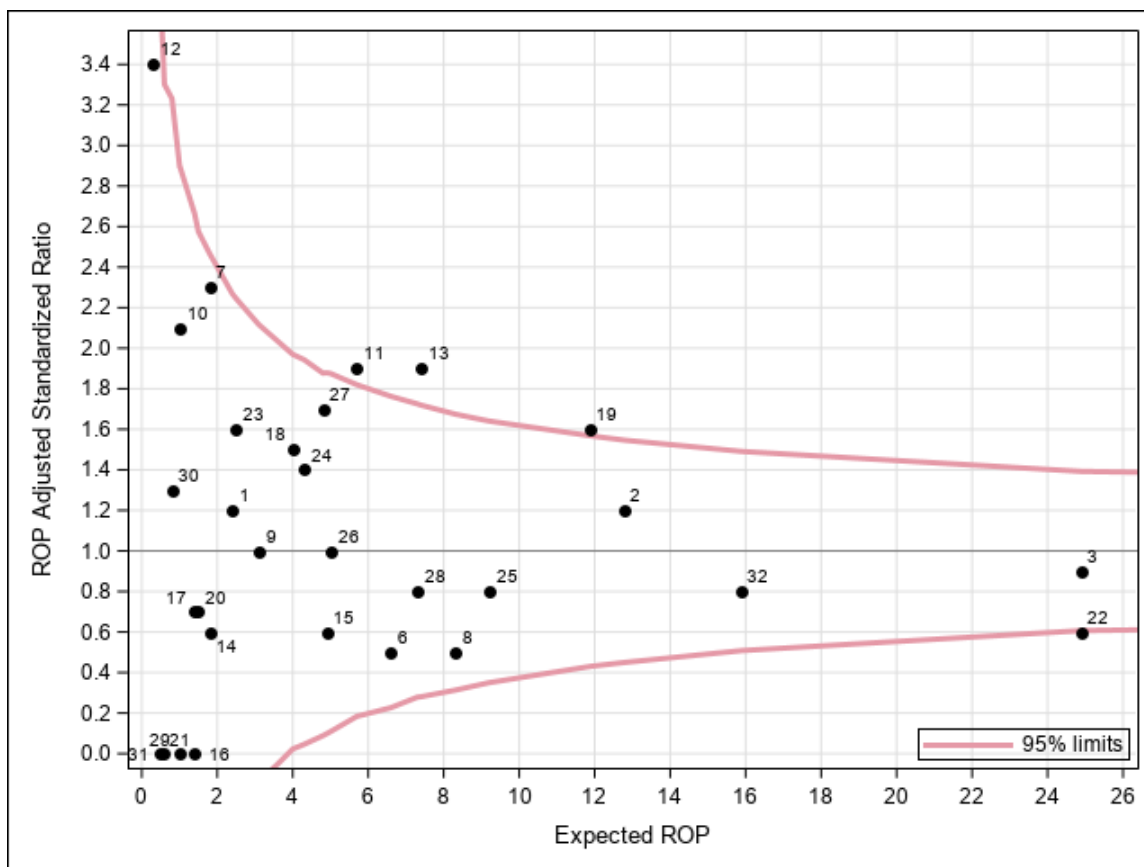
Numeric site codes were used in Presentations 49a-d and they may not correspond to other presentations in this report.

Neonates with major congenital anomalies are excluded.

<sup># #</sup> The prediction model was adjusted for GA, SGA, sex, and SNAP II > 20.

Note: Site 4 and 5 were excluded from the analysis due to the small number of eligible neonates.

**Presentation #49b**  
**ROP  $\geq$  Stage 3: GA < 33 weeks: Adjusted standardized ratios by site**

**Explanation for Presentation 49a**

Column 1: Numeric site codes

Column 2: Total number of neonates at each site (<33 weeks GA and no major anomaly)

Column 3: Number of eligible neonates at each site (<33 weeks GA and no major anomaly) who were actually used to fit the model

Column 4: Number of neonates with outcome of interest among those eligible neonates

Column 5: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAP-II > 20

Column 6: Adjusted standardized ratio calculated based on observed ROP/expected ROP

Columns 7 and 8: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 49b**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

**Note:** site 25 is not shown in the funnel plot due to high ASR. Refer to the table for site 25.

**Presentation# 49c**  
**ROP  $\geq$  Stage 3: GA<29 weeks: Adjusted standardized ratios by site**

Site	Total number of neonates	Number of neonates with available data	Number of neonates with ROP $\geq$ Stage 3	Adjusted# expected number of neonates with ROP $\geq$ Stage 3	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	26	22	3	2.3	1.3	0.3	3.8
2	129	92	15	12.8	1.2	0.7	1.9
3	197	144	22	24.6	0.9	0.6	1.4
6	72	56	3	6.3	0.5	0.1	1.4
7	24	18	4	1.7	2.3	0.6	5.9
8	67	62	4	8.0	0.5	0.1	1.3
9	54	33	3	3.0	1.0	0.2	3.0
10	13	7	2	0.9	2.2	0.3	8.1
11	45	38	9	5.6	1.6	0.7	3.1
12	4	4	1	0.2	4.5	0.1	24.9
13	67	48	14	7.1	2.0	1.1	3.3
14	29	10	1	1.8	0.6	0.0	3.1
15	38	34	3	4.8	0.6	0.1	1.8
16	31	25	0	1.2	0.0	.	3.1
17	25	22	1	1.4	0.7	0.0	4.1
18	59	44	6	3.8	1.6	0.6	3.5
19	135	65	18	11.8	1.5	0.9	2.4
20	25	22	1	1.3	0.7	0.0	4.2
21	18	13	0	1.0	0.0	.	3.7
22	189	147	14	24.4	0.6	0.3	1.0
23	36	24	4	2.4	1.7	0.4	4.2
24	39	32	6	4.1	1.5	0.5	3.2
25	83	66	6	8.8	0.7	0.2	1.5
26	34	28	5	4.7	1.1	0.3	2.5
27	71	41	8	4.8	1.7	0.7	3.3
28	55	46	6	7.2	0.8	0.3	1.8
29	4	3	0	0.4	0.0	.	8.5
30	21	15	0	0.7	0.0	.	5.5
31	18	14	0	0.5	0.0	.	7.6
32	109	102	13	15.3	0.8	0.5	1.4

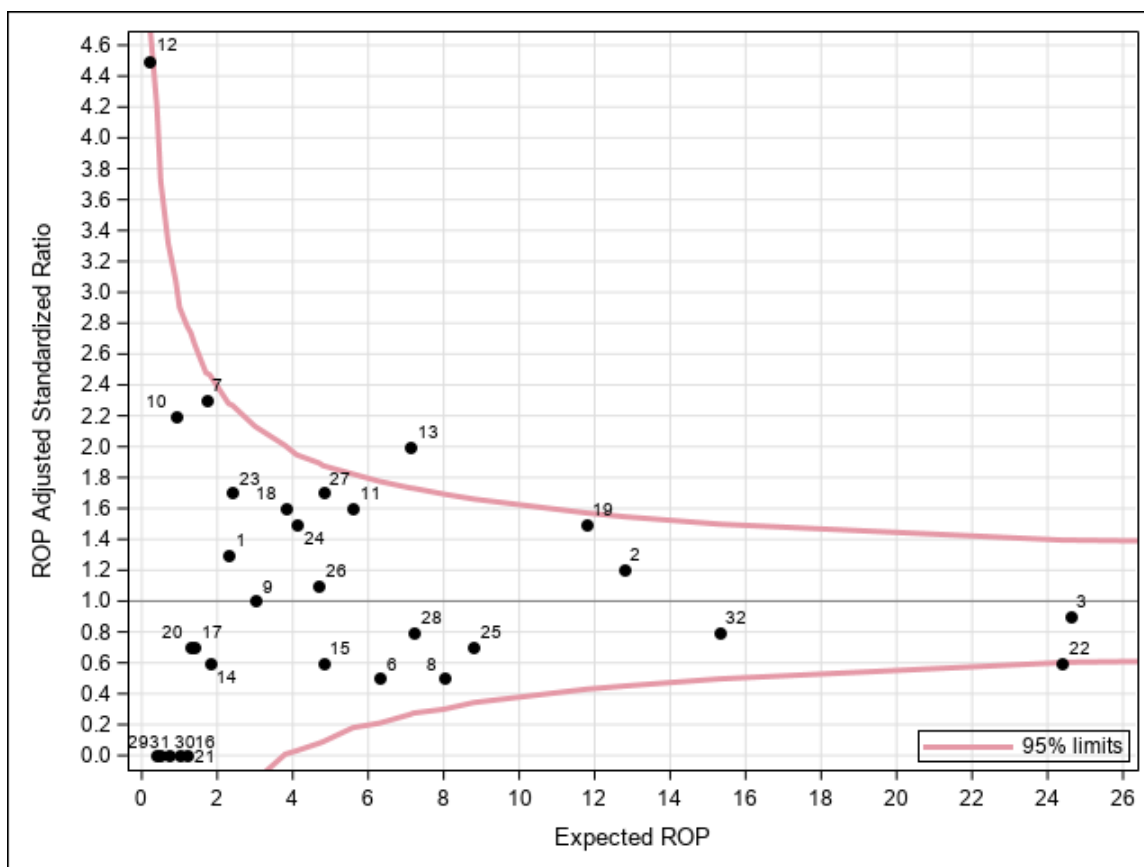
Numeric site codes were used in Presentations 49a-d and they may not correspond to other presentations in this report.

Neonates with major congenital anomalies are excluded.

<sup># #</sup> The prediction model was adjusted for GA, SGA, sex, and SNAP II > 20.

Note: Sites 4 and 5 were excluded from the analysis due to the small number of eligible neonates.

## Presentation #49d

ROP  $\geq$  Stage 3: GA < 29 weeks: Adjusted standardized ratios by site**Explanation for Presentation 49c**

Column 1: Numeric site codes

Column 2: Total number of neonates at each site (&lt;29 weeks GA and no major anomaly)

Column 3: Number of eligible neonates at each site (&lt;29 weeks GA and no major anomaly) who were actually used to fit the model

Column 4: Number of neonates with outcome of interest among those eligible neonates

Column 5: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAP II &gt; 20

Column 6: Adjusted standardized ratio calculated based on observed ROP/expected ROP

Columns 7 and 8: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 49d**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

## Presentation #50a

## Mortality or major morbidity: GA &lt; 33 weeks: Adjusted standardized ratios by site

Site	Number of neonates	Number of neonates with mortality or major morbidities	Adjusted# expected number of neonates with mortality or major morbidities	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	99	26	30.9	0.8	0.5	1.2
2	263	207	120.7	1.7	1.5	2.0
3	358	111	183.7	0.6	0.5	0.7
4	5	0	1.1	0.0	.	3.4
5	9	2	2.7	0.7	0.1	2.7
6	176	72	71.9	1.0	0.8	1.3
7	44	14	19.9	0.7	0.4	1.2
8	153	70	65.7	1.1	0.8	1.3
9	158	71	55.7	1.3	1.0	1.6
10	74	17	19.9	0.9	0.5	1.4
11	139	41	47.7	0.9	0.6	1.2
12	22	2	6.1	0.3	0.0	1.2
13	168	63	65.8	1.0	0.7	1.2
14	94	48	30.5	1.6	1.2	2.1
15	87	24	35.3	0.7	0.4	1.0
16	87	25	30.7	0.8	0.5	1.2
17	69	14	23.5	0.6	0.3	1.0
18	153	115	60.2	1.9	1.6	2.3
19	327	119	136.0	0.9	0.7	1.0
20	119	32	32.6	1.0	0.7	1.4
21	51	15	17.6	0.9	0.5	1.4
22	417	193	194.6	1.0	0.9	1.1
23	119	38	37.5	1.0	0.7	1.4
24	132	44	46.7	0.9	0.7	1.3
25	178	84	79.5	1.1	0.8	1.3
26	107	43	39.1	1.1	0.8	1.5
27	165	65	70.9	0.9	0.7	1.2
28	125	32	51.7	0.6	0.4	0.9
29	23	7	5.9	1.2	0.5	2.4
30	57	16	20.4	0.8	0.4	1.3
31	48	12	16.1	0.7	0.4	1.3
32	295	117	117.1	1.0	0.8	1.2

Major morbidity = IVH 3 or 4 or PVL or BPD or ROP >stage 2 or NEC or nosocomial sepsis

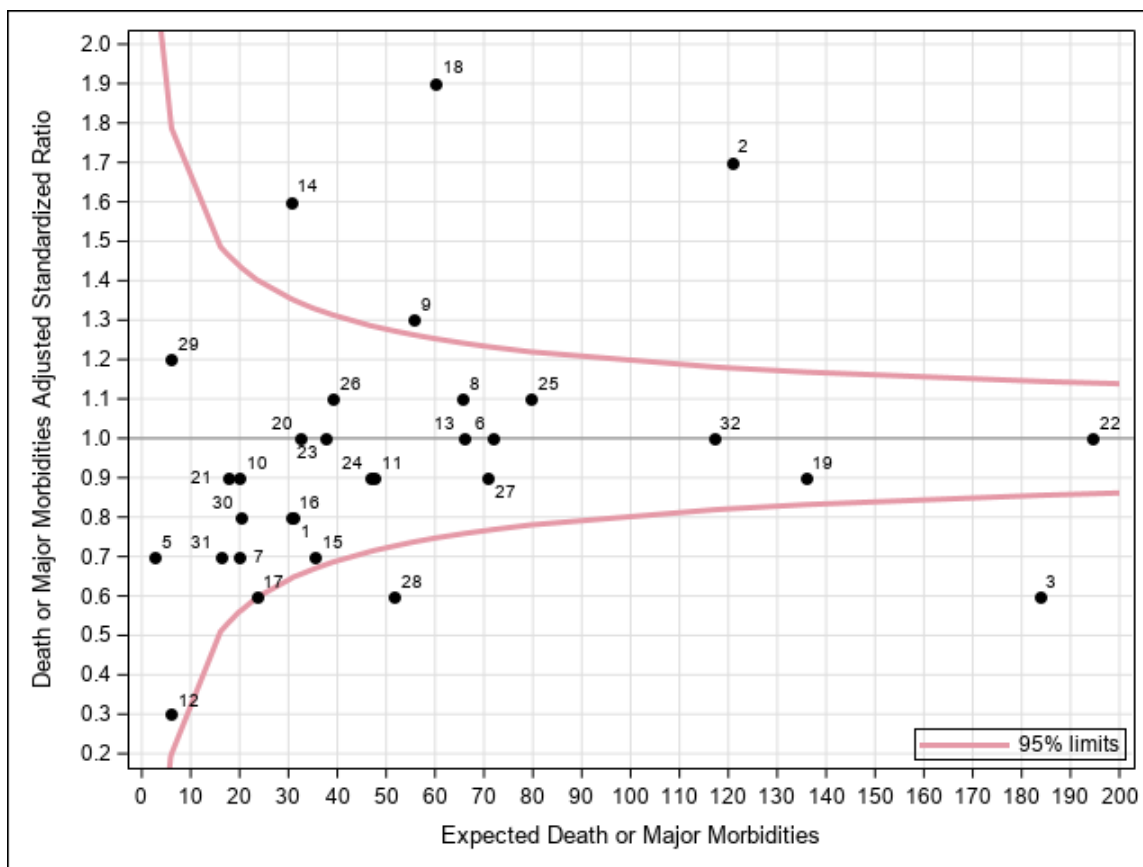
**Numeric site codes were used in Presentations 50a-d and they may not correspond to other presentations in this report.**

**Neonates with major congenital anomalies were excluded.**

<sup>##</sup> The prediction model was adjusted for GA, SGA, sex, and SNAP II > 20.

## Presentation #50b

Mortality or major morbidity: GA &lt; 33 weeks: Adjusted standardized ratios by site

**Explanation for Presentation 50a**

Column 1: Numeric site codes

Column 2: Number of eligible neonates at each site (&lt;33 weeks GA and no major anomaly)

Column 3: Number of neonates with outcome of interest among those eligible neonates

Column 4: Expected number of neonates with outcome of interest after adjustment for GA, small for gestational age, sex, and SNAP-II &gt; 20

Column 5: Adjusted standardized ratio calculated based on observed death or morbidities/expected deaths or morbidities

Columns 6 and 7: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 50b**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

## Presentation #50c

Mortality or major morbidity: GA &lt; 29 weeks: Adjusted standardized ratios by site

Site	Number of neonates	Number of neonates with mortality or major morbidities	Adjusted# expected number of neonates with mortality or major morbidities	Adjusted# standardized ratio	95% confidence interval for adjusted standardized ratio	
1	26	16	17.7	0.9	0.5	1.5
2	129	123	93.4	1.3	1.1	1.6
3	197	93	140.7	0.7	0.5	0.8
6	72	56	49.7	1.1	0.9	1.5
7	24	14	16.0	0.9	0.5	1.5
8	67	45	47.7	0.9	0.7	1.3
9	54	42	35.6	1.2	0.9	1.6
10	13	10	9.4	1.1	0.5	2.0
11	45	33	30.9	1.1	0.7	1.5
12	4	2	2.6	0.8	0.1	2.8
13	67	48	46.8	1.0	0.8	1.4
14	29	21	18.5	1.1	0.7	1.7
15	38	20	26.4	0.8	0.5	1.2
16	31	16	19.4	0.8	0.5	1.3
17	25	11	16.0	0.7	0.3	1.2
18	59	57	40.3	1.4	1.1	1.8
19	135	96	98.8	1.0	0.8	1.2
20	25	15	14.3	1.1	0.6	1.7
21	18	12	11.8	1.0	0.5	1.8
22	189	148	139.0	1.1	0.9	1.3
23	36	22	22.8	1.0	0.6	1.5
24	39	29	28.5	1.0	0.7	1.5
25	83	65	60.5	1.1	0.8	1.4
26	34	30	24.7	1.2	0.8	1.7
27	71	49	49.5	1.0	0.7	1.3
28	55	25	39.0	0.6	0.4	0.9
29	4	3	3.0	1.0	0.2	3.0
30	21	13	13.5	1.0	0.5	1.6
31	18	7	10.1	0.7	0.3	1.4
32	109	84	78.0	1.1	0.9	1.3

Major morbidity = IVH 3 or 4 or PVL or BPD or ROP &gt;stage 2 or NEC or nosocomial sepsis

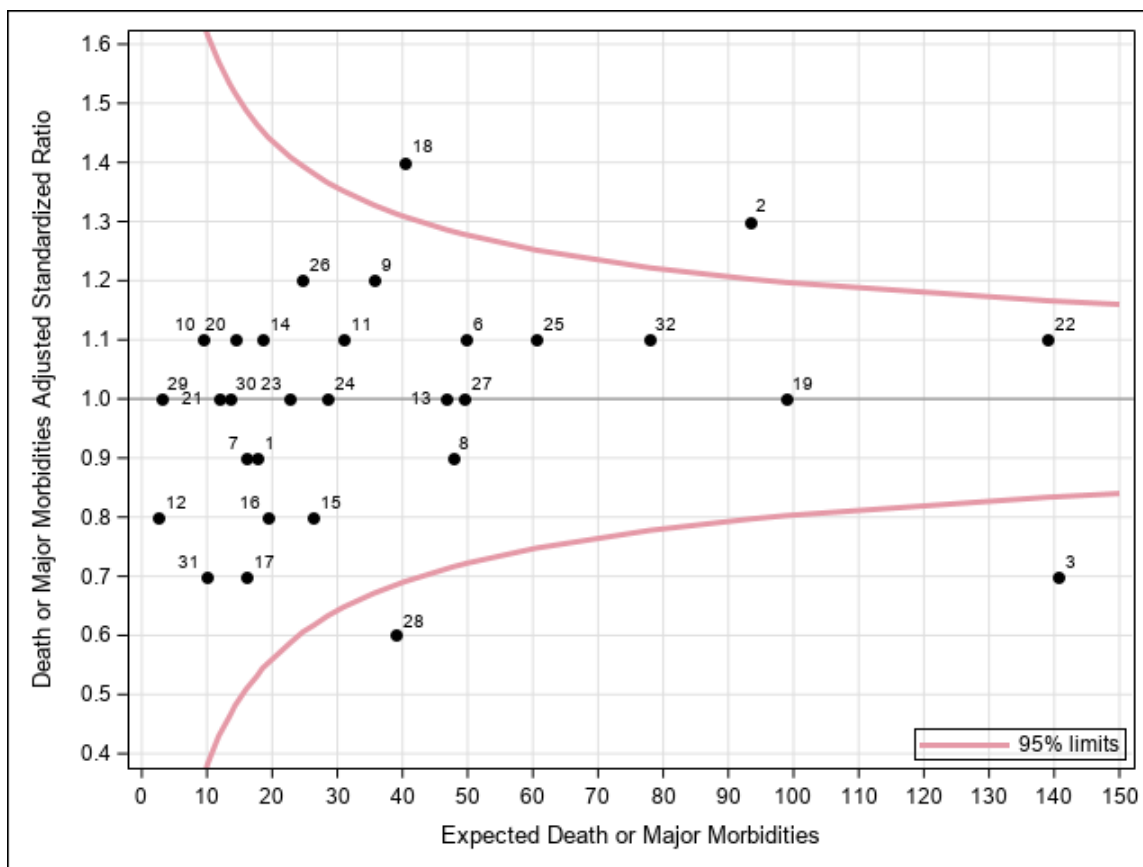
**Numeric site codes were used in Presentations 50a-d and they may not correspond to other presentations in this report.****Neonates with major congenital anomalies were excluded.**

# # The prediction model was adjusted for GA, SGA, sex, and SNAP II &gt; 20.

Note: Sites 4 and 5 were excluded from the analysis due to the small number of eligible neonates.

## Presentation #50d

Mortality or major morbidity: GA &lt; 29 weeks: Adjusted standardized ratios by site

**Explanation for Presentation 50c**

Column 1: Numeric site codes

Column 2: Number of eligible neonates at each site (&lt;29 weeks GA and no major anomaly)

Column 3: Number of neonates with outcome of interest among those eligible neonates

Column 4: Expected number of neonates with outcome of interest after adjustment for GA, SGA, sex, and SNAPII &gt; 20

Column 5: Adjusted standardized ratio calculated based on observed death or morbidities/expected deaths or morbidities

Columns 6 and 7: 95% CI around the adjusted standardized ratio for the outcome

**Explanation for Presentation 50d**

X-axis: Expected number of neonates with outcome (value from Column 4 of previous presentation)

Y-axis: Adjusted standardized ratio (value from Column 5 of previous presentation)

Dark points with numerical notation: Site and its location matching x and y axis values

Red funnel shaped lines: 95% confidence limits based on entire network information.

Sites outside of red lines represent higher or lower (depending upon position in graph) adjusted standardized ratio. However, for determining whether site is statistically different from others, one should also assess 95% CI and check whether both upper and lower boundaries are also outside of the funnel area or not.

## **F. Discharge Disposition and Status**

## Presentation #51

## Final discharge destination: All GA: Crude rates

		GA (completed weeks)								Total
		< 25	25-26	27-28	29-30	31-32	33-34	35-36	≥37	
Home	N	122	239	329	397	664	1107	1354	3586	7798
	%	32.8	39.5	40.9	36.3	41.3	51.7	55.1	56.1	50.4
Community hospital	N	64	199	359	603	778	744	465	600	3812
	%	17.2	32.9	44.7	55.1	48.4	34.7	18.9	9.4	24.6
Tertiary hospital	N	21	21	18	11	19	37	63	335	525
	%	5.7	3.5	2.2	1.0	1.2	1.7	2.6	5.2	3.4
Died	N	130	80	55	28	28	35	19	63	438
	%	35.0	13.2	6.8	2.6	1.7	1.6	0.8	1.0	2.8
Palliative care (home/other institute)	N	1	1	2	5	3	2	3	15	32
	%	0.3	0.2	0.3	0.5	0.2	0.1	0.1	0.2	0.2
Another inpatient area in site	N	34	64	39	46	115	217	552	1793	2860
	%	9.1	10.6	4.9	4.2	7.2	10.1	22.5	28.0	18.5
Out of country discharge	N	0	1	2	4	0	0	0	2	9
	%	0.0	0.2	0.3	0.4	0.0	0.0	0.0	0.0	0.1
Total neonates included	N	372	605	804	1094	1607	2143	2456	6396	15477
	%	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Discharge destination missing	N									3
GA missing	N									7
Total number of neonates	N									15484

## Presentation #52

## Support at discharge: Neonates who were discharged directly home: Crude rates

		GA (completed weeks)								Total
		< 25	25-26	27-28	29-30	31-32	33-34	35-36	≥37	
<b>Total available</b>	N	372	605	804	1094	1607	2143	2456	6396	15477
<b>Number of neonates who survived and were discharged home directly from the NICU</b>	N	122	239	329	397	664	1107	1354	3586	7798
<b>Oxygen</b>	N	46	55	38	25	18	36	26	69	313
	%	37.7	23.0	11.6	6.3	2.7	3.3	1.9	1.9	4.0
<b>Monitor</b>	N	12	28	21	20	22	30	27	117	277
	%	9.8	11.7	6.4	5.0	3.3	2.7	2.0	3.3	3.6
<b>Enterostomy</b>	N	0	1	4	0	2	1	2	13	23
	%	0.0	0.4	1.2	0.0	0.3	0.1	0.2	0.4	0.3
<b>Gavage</b>	N	16	24	21	15	13	22	25	68	204
	%	13.1	10.0	6.4	3.8	2.0	2.0	1.9	1.9	2.6
<b>Tracheostomy</b>	N	1	3	1	0	1	0	0	2	8
	%	0.8	1.3	0.3	0.0	0.2	0.0	0.0	0.1	0.1
<b>Gastrostomy</b>	N	7	6	7	5	3	2	6	20	56
	%	5.7	2.5	2.1	1.3	0.5	0.2	0.4	0.6	0.7
<b>Ventilation</b>	N	0	2	0	0	1	0	0	3	6
	%	0.0	0.8	0.0	0.0	0.2	0.0	0.0	0.1	0.1
<b>CPAP</b>	N	2	5	3	1	0	0	0	2	13
	%	1.6	2.1	0.9	0.3	0.0	0.0	0.0	0.1	0.2
<b>Feeding status at discharge directly home</b>										
<b>Breast milk only</b>	N	42	70	108	127	254	401	430	1122	2554
	%	34.4	29.3	32.8	32.0	38.3	36.2	31.8	31.3	32.8
<b>Formula only</b>	N	42	90	122	121	179	262	324	760	1900
	%	34.4	37.7	37.1	30.5	27.0	23.7	23.9	21.2	24.4
<b>Both breast milk and formula</b>	N	34	68	90	127	206	393	569	1565	3052
	%	27.9	28.5	27.4	32.0	31.0	35.5	42.0	43.6	39.1

Note: In this presentation, denominators were based on the number of neonates who survived and were discharged directly home.

## **G. Hypoxic Ischemic Encephalopathy**

## Presentation #53

## Hypoxic Ischemic Encephalopathy

## A. Sarnat staging at the time of admission and receipt of hypothermia

		Sarnat's staging of HIE on admission				
		Stage 1	Stage 2	Stage 3	Unknown stage	Total
Hypothermia treatment	Yes	50	162	54	40	306
	No	69	16	24	41	150
	Unknown	8	12	1	89	110
	Total	127	190	79	170	566

## B. Reason for not receiving hypothermia treatment\*

Reason	Number
Chromosomal anomalies	1
Major congenital anomalies	0
Weight < 2000g or GA < 35 weeks	35
Extreme condition	15
Head trauma or intracranial hemorrhage	1
Mild HIE	77
Unit policy	8
Health care team preference	10
Delayed transfer	16
Parental request	3
Unknown	13

\*One neonate can have more than one reasons.

## C. Time of admission

Time	Number
<6 hours from birth	354
6 – 12 hours from birth	151
>12 hours from birth	59
Total**	564

\*\*2 neonates are missing either time of birth or time of admission.

## Presentation #53 (continued)

## Hypoxic Ischemic Encephalopathy

## D. Characteristics of neonates who received hypothermia (N=306)

Characteristics	N		Results
Method	306	Selective head	5 (2%)
		Whole body cooling	301 (98%)
Target temperature	306	< 33°C	3 (1%)
		33-34°C	229 (75%)
		33.5-34.5°C	54 (18%)
		34-35°C	4 (1%)
		34.5-35.5°C	4 (1%)
		Unknown	12 (4%)
Seizures at initiation	306		80 (26%)
Seizures at completion	306		29 (9%)
GA < 33 weeks	306		1 (0%)
Birthweight < 2000g	306		0 (0%)
During hypothermia	295	Hypotension	85 (29%)
	292	Thrombocytopenia	54 (18%)
	296	Coagulopathy	83 (28%)
	289	Persistent metabolic acidosis	46 (16%)
Death	306		22 (7%)
Discharge on palliation	305		8 (3%)

## E. Encephalopathy stage in relation to hypothermia treatment

Encephalopathy stage*		At the end of hypothermia					Total
		Stage 1	Stage 2	Stage 3	Unknown	Normal	
At the start of hypothermia	Stage 1	15	8	0	8	21	52
	Stage 2	27	60	5	31	41	164
	Stage 3	2	13	25	9	2	51
	Unknown	0	0	1	23	13	37
	Total	44	81	31	72	78	306

\*The numbers may be different from table A because table E presents encephalopathy staging at the start and end of hypothermia, whereas table A presents encephalopathy staging at the first assessment.

**Presentation #53** (continued)  
**Hypoxic Ischemic Encephalopathy**  
For neonates\* who received hypothermia (N=306)

Characteristics		N	Mean (h)	SD (h)	Min (h)	1 <sup>st</sup> Q (h)	Median (h)	3 <sup>rd</sup> Q (h)	Max (h)	Outside of recommendation	Time taken to achieve target
<b>Timing** of hypothermia (in hours)</b>	<b>Initiation</b>	301	4.6	4.9	0.0	1.6	3.6	5.9	46.0	After 6 hours 69 (23%)	
	<b>Target temp achieved</b>	301	7.5	11.1	0.4	3.6	5.8	8.2	174.1	After 10 hours 47 (16%)	After 4 hours of initiation 38 (13%)
	<b>Age at re-warming</b>	301	72.5	16.8	1.8	73.9	76.0	78.2	121.2	After 78 hours 82 (27%)	Re-warming started >72 hours after initiation 49 (16%)
	<b>Age at return to normal temp</b>	289	87.2	19.7	12.8	82.4	85.8	92.7	164.8	After 86 hours 137 (47%)	Took >8 hours to return temperature to normal after starting re-warming 161 (56%)
<b>Temperature during hypothermia</b>	<b>Lowest temp during hypothermia</b>	306	32.8	0.8	25.0	32.5	33.0	33.2	34.5	Lowest temp < 32.5C 70 (23%)	
	<b>Highest temp during hypothermia</b>	306	34.3	0.8	32.6	33.8	34.0	34.5	37.3	Highest temp > 35.5C 27 (9%)	

\*Neonates with time of initiation > 72 hours were excluded.

\*\*All timings were calculated from time of birth in hours of age.

## H. Trend Analyses over last 9 years

This section includes trend analyses of specific outcomes from the last 9 years (2010-18) for neonates <33 weeks' GA in CNN sites. The following table describes the number of neonates in the respective GA categories that were included in these trend analyses. Delivery room deaths were excluded.

**Number of neonates by admission year and GA**

Year	Number of Sites	GA											Total
		<23	23	24	25	26	27	28	29	30	31	32	
2010	27	9	73	172	270	333	388	371	480	611	678	788	4173
2011	30	15	86	166	242	318	332	391	467	553	643	828	4041
2012	30	28	85	184	285	294	348	416	510	610	738	872	4370
2013	29	16	76	197	247	267	357	434	479	620	733	836	4262
2014	31	8	81	226	250	332	362	412	517	585	743	871	4387
2015	30	14	99	177	248	289	317	425	470	536	662	793	4030
2016	30	16	79	214	275	272	380	431	437	551	722	861	4238
2017	31	16	133	215	257	294	325	434	467	606	743	868	4358
2018	32	25	132	215	271	334	380	424	518	576	744	863	4482

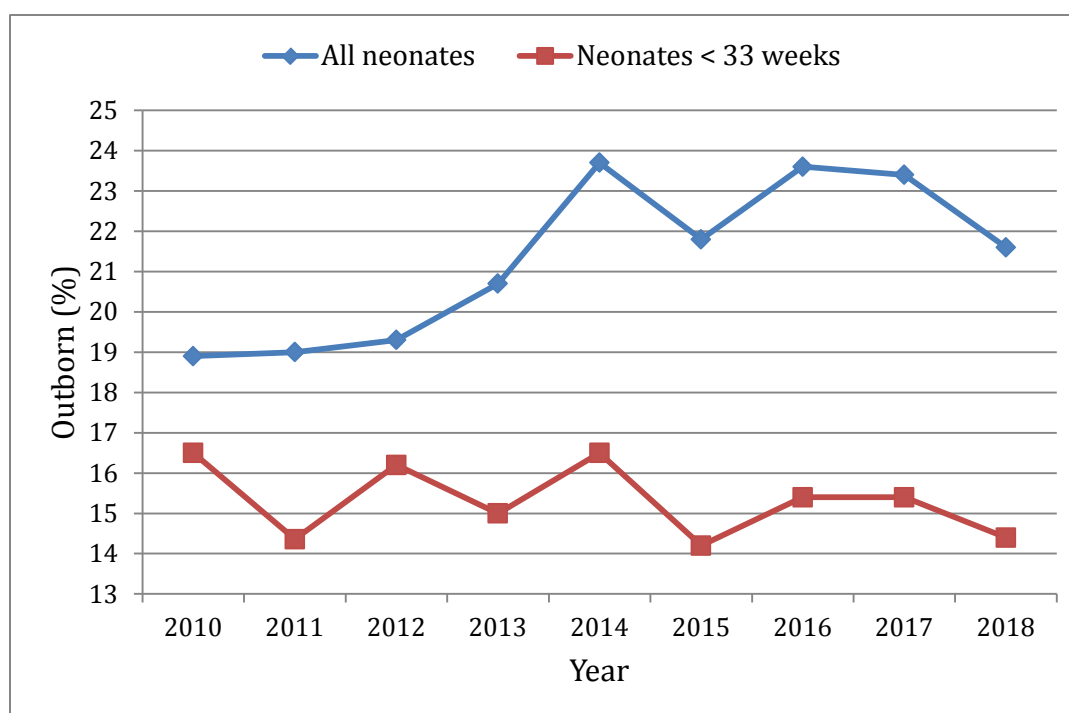
**Number of neonates by admission year and birth weight**

Year	Number of Sites	Birth weight					Total
		< 500	500 - 749	750 - 999	1000 – 1249	1250 – 1499	
2010	27	32	436	792	819	879	2958
2011	30	31	383	660	680	794	2548
2012	30	48	441	696	815	922	2922
2013	29	36	428	651	842	919	2876
2014	31	36	458	760	804	922	2980
2015	30	40	406	680	792	864	2782
2016	30	40	472	710	744	901	2867
2017	31	38	478	678	806	920	2920
2018	32	55	508	739	807	977	3086

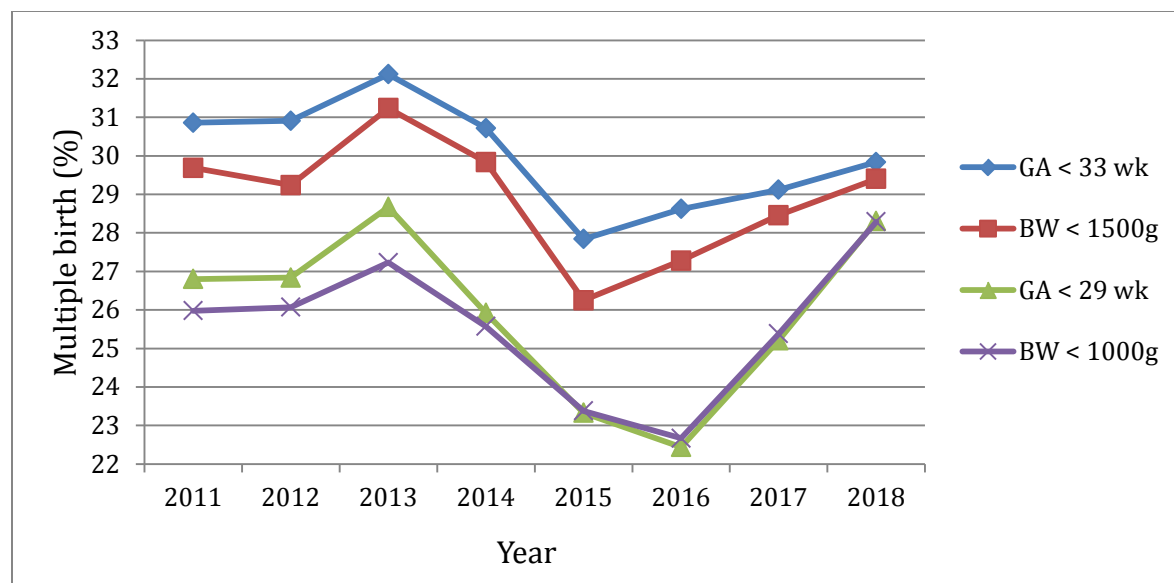
## 1. Neonates in the participating sites: Admission status:

Year	Number of Sites	All neonates			Infants with GA<33 weeks		
		Total Number of Neonates*	Inborn (%)	Outborn (%)	Number of Neonates* with GA<33	Inborn (%)	Outborn (%)
2010	27	13 147	10 662 (81.1%)	2 485 (18.9%)	3 383	2 824 (83.5%)	559 (16.5%)
2011	30	13 548	10 972 (81.0%)	2 576 (19.0%)	4 040	3 460 (85.6%)	580 (14.4%)
2012	30	14 222	11 475 (80.7%)	2 747 (19.3%)	4 370	3 663 (83.8%)	707 (16.2%)
2013	29	14 489	11 487 (79.2%)	3 002 (20.7%)	4 262	3 624 (85.0%)	638 (15.0%)
2014	31	14 038	11 473 (76.3%)	3 565 (23.7%)	4 383	3 658 (83.5%)	725 (16.5%)
2015	30	14 814	11 583 (78.2%)	3 231 (21.8%)	4 030	3 459 (85.8%)	571 (14.2%)
2016	30	14 905	11 388 (76.4%)	3 517 (23.6%)	4 238	3 585 (84.6%)	653 (15.4%)
2017	31	14 773	11 320 (76.6%)	3453 (23.4%)	4 358	3 685 (84.6%)	673 (15.4%)
2018	32	15 479	12 134 (78.4%)	3345 (21.6%)	4 481	3 836 (85.6%)	645 (14.4%)

\*total number of neonates excluding those who are missing admission status

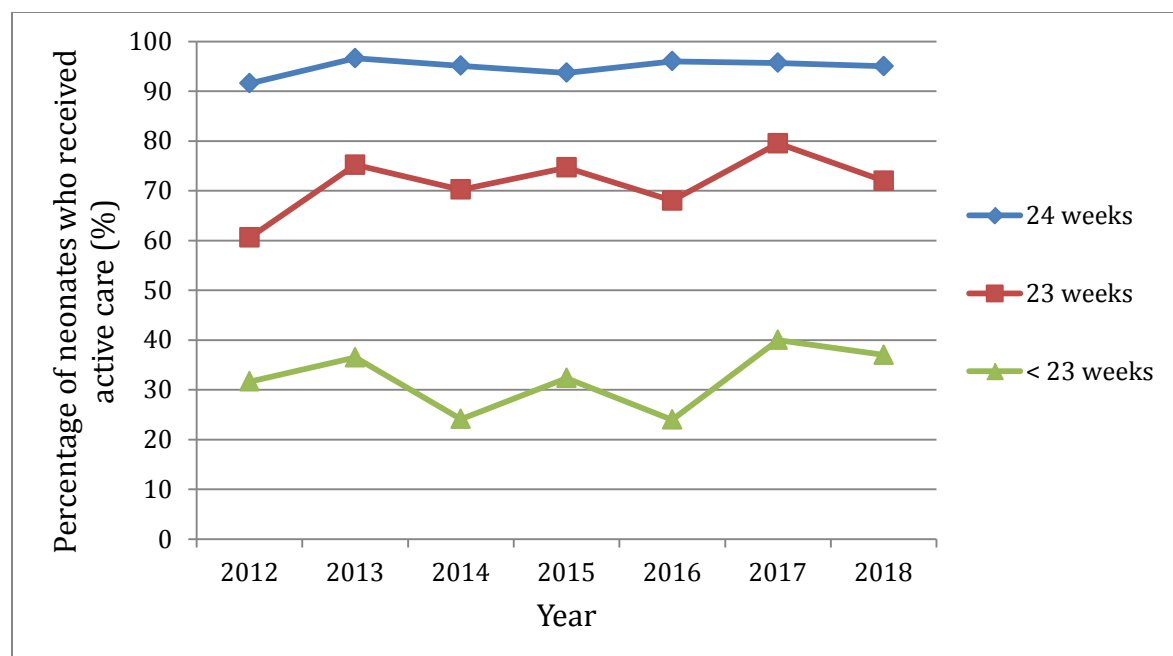


## 2. Multiple births



		2011	2012	2013	2014	2015	2016	2017	2018
<b>GA &lt; 29 weeks</b>	Total	1550	1639	1594	1671	1569	1667	1674	1780
	Multiple	416 (27%)	437 (27%)	460 (29%)	441 (26%)	366 (23%)	374 (22%)	422 (25%)	504 (28%)
	Twin	368	397	398	415	321	345	375	466
	Higher-Order	48	40	62	26	45	29	47	38
<b>GA &lt; 33 weeks</b>	Total	4040	4369	4262	4387	4030	4238	4358	4481
	Multiple	1248 (31%)	1352 (31%)	1380 (32%)	1356 (31%)	1122 (28%)	1213 (29%)	1269 (29%)	1337 (30%)
	Twin	1099	1175	1193	1229	996	1094	1156	1202
	Higher-Order	149	177	187	127	126	119	113	135
<b>BW &lt; 1000g</b>	Total	1145	1184	1115	1254	1126	1222	1194	1301
	Multiple	299 (26%)	305 (26%)	306 (27%)	329 (26%)	264 (23%)	277 (23%)	303 (25%)	368 (28%)
	Twin	261	273	259	306	236	260	269	338
	Higher-Order	38	32	47	23	28	17	34	30
<b>BW &lt; 1500g</b>	Total	2747	2921	2876	2980	2782	2867	2920	3085
	Multiple	816 (30%)	851 (29%)	905 (31%)	900 (30%)	731 (26%)	782 (27%)	831 (28%)	907 (29%)
	Twin	713	736	769	802	634	703	747	812
	Higher-Order	103	115	136	98	97	79	84	95

### 3. Proportion of neonates who received active care out of all (including delivery room (DR) deaths)



		2012	2013	2014	2015	2016	2017	2018
<23 weeks	Number of neonates who received active care $(a-c) + e$	25	23	14	22	16	26	35
	Total number of neonates including DR deaths $a+d+e$	79	63	58	68	67	65	95
	Percentage of neonates who received active care	32%	37%	24%	32%	24%	40%	37%
23 weeks	Number of neonates who received active care $(a-c) + e$	83	85	92	106	82	136	133
	Total number of neonates including DR deaths $a+d+e$	137	113	131	142	121	171	185
	Percentage of neonates who received active care	61%	75%	70%	75%	68%	80%	72%
24 weeks	Number of neonates who received active care $(a-c) + e$	185	200	233	178	217	221	224
	Total number of neonates including DR deaths $a+d+e$	202	207	245	190	227	231	235
	Percentage of neonates who received active care	92%	97%	95%	94%	96%	96%	95%

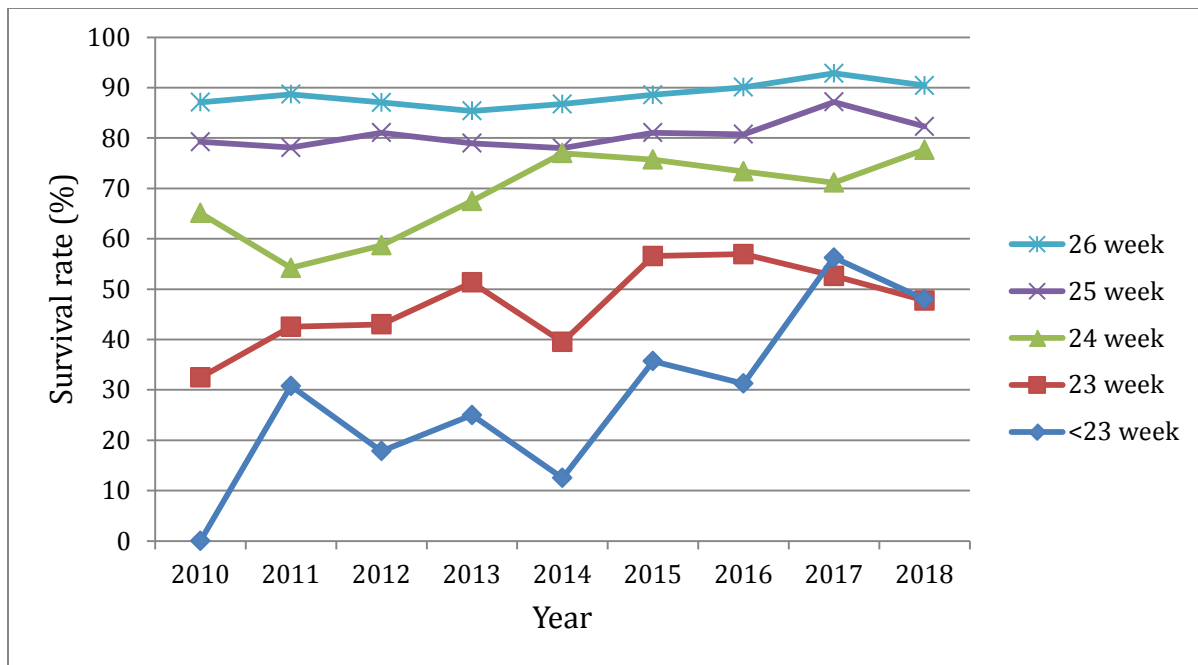
Note: Refer to presentation #4 for detailed breakdown of neonates by GA in 2018.

The alphabet notations used in the table above are carried from presentation #4.

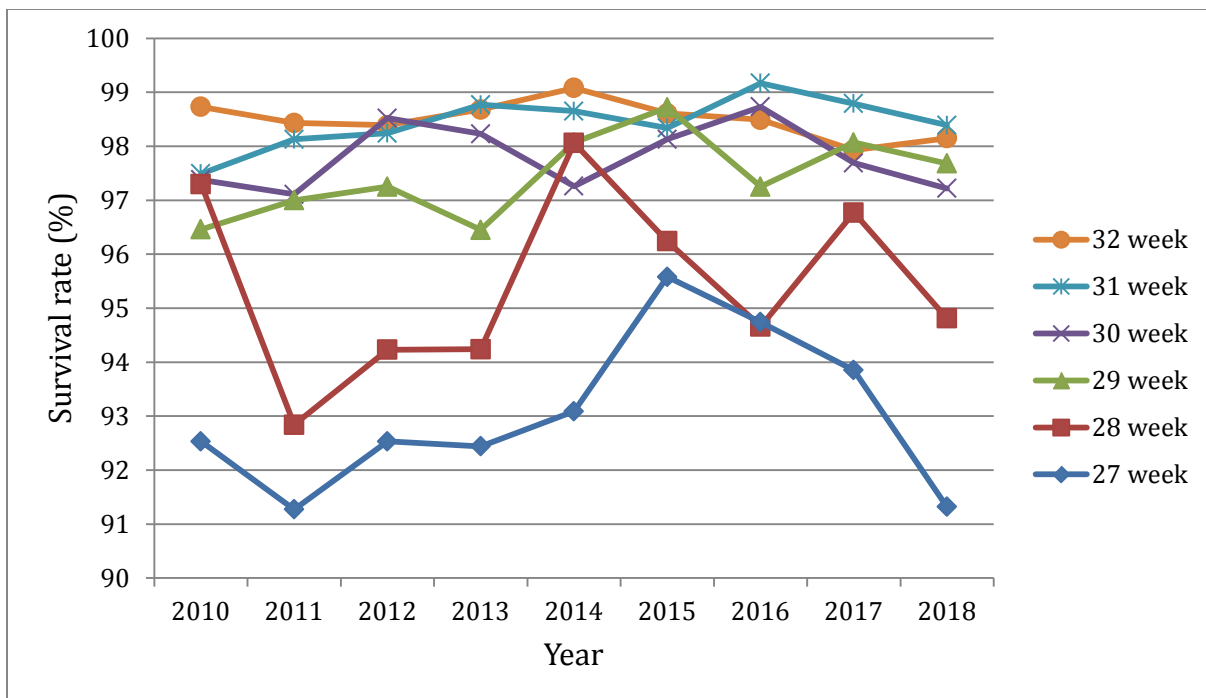
**Information should be interpreted with caution as not all sites provided data on delivery room deaths. Active care refers to infants who received cardiopulmonary resuscitation at birth.**

#### 4. Survival rate among those who were admitted to NICU:

##### a. 22-26 weeks' GA:

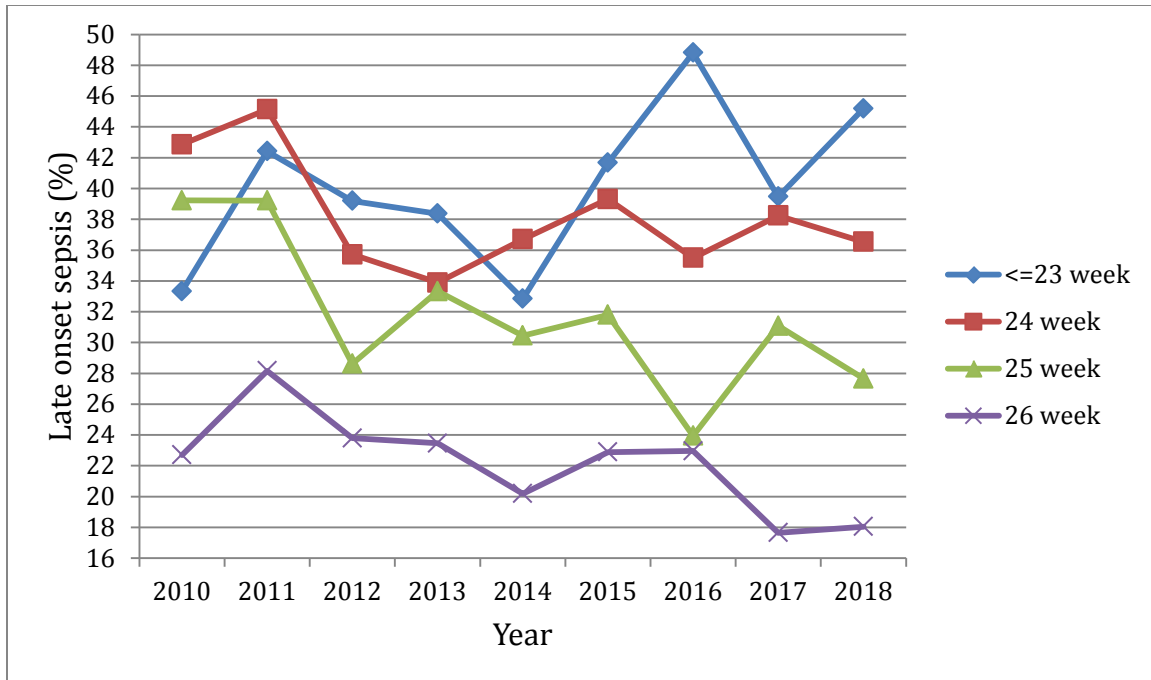


##### b. 27-32 weeks' GA:

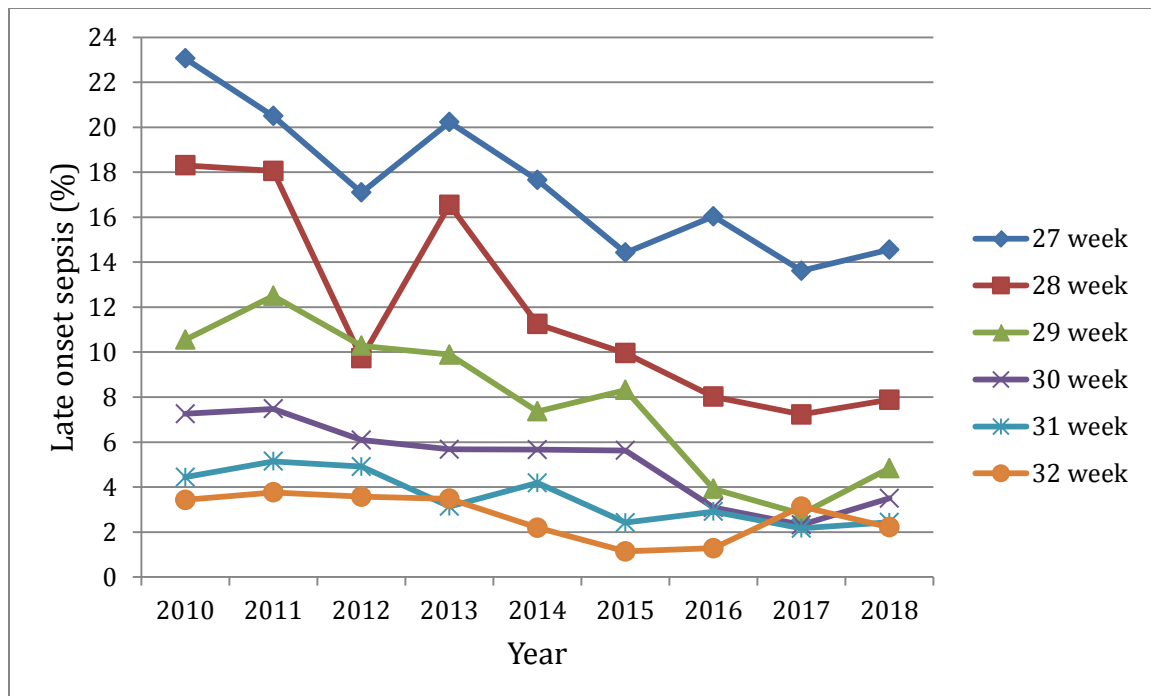


### 5. Late onset sepsis (with at least one infection) among neonates who survived beyond 2 days post birth

a. 23-26 weeks' GA:

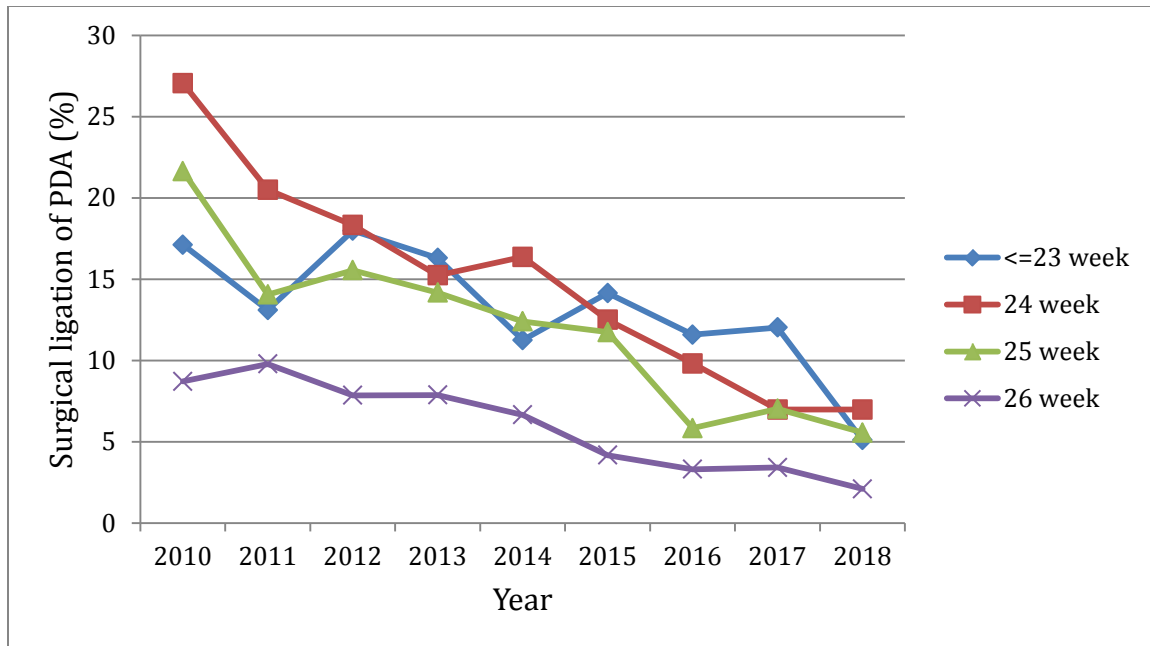


b. 27-32 weeks' GA:

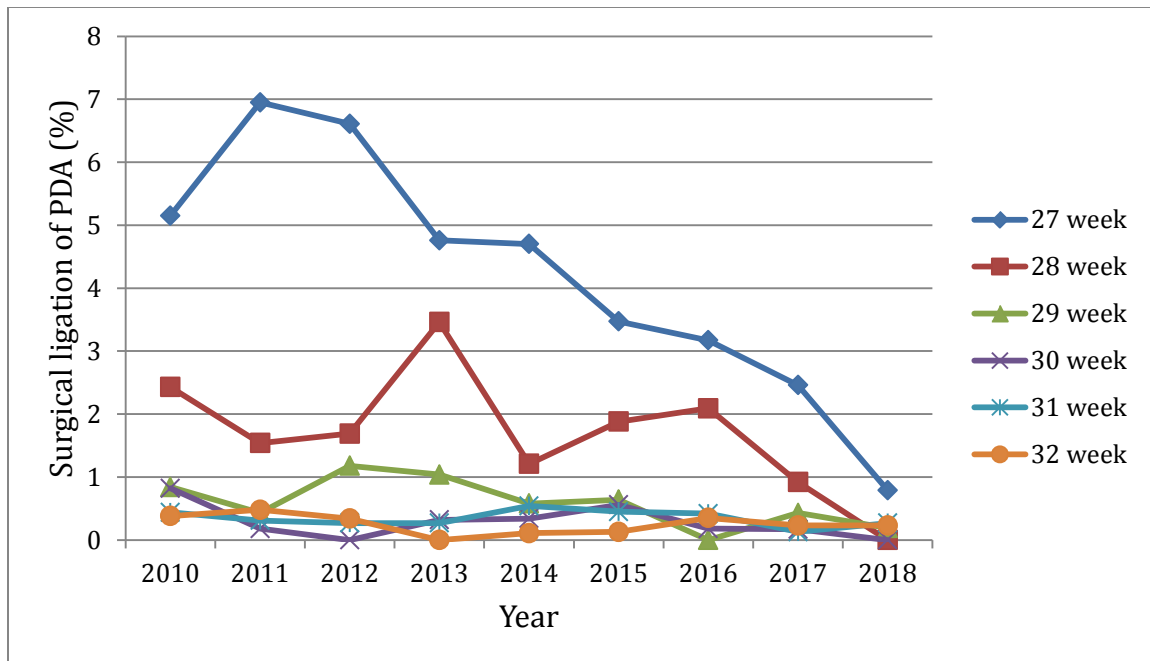


## 6. Surgical ligation of PDA among all neonates

a. 23-26 weeks' GA:

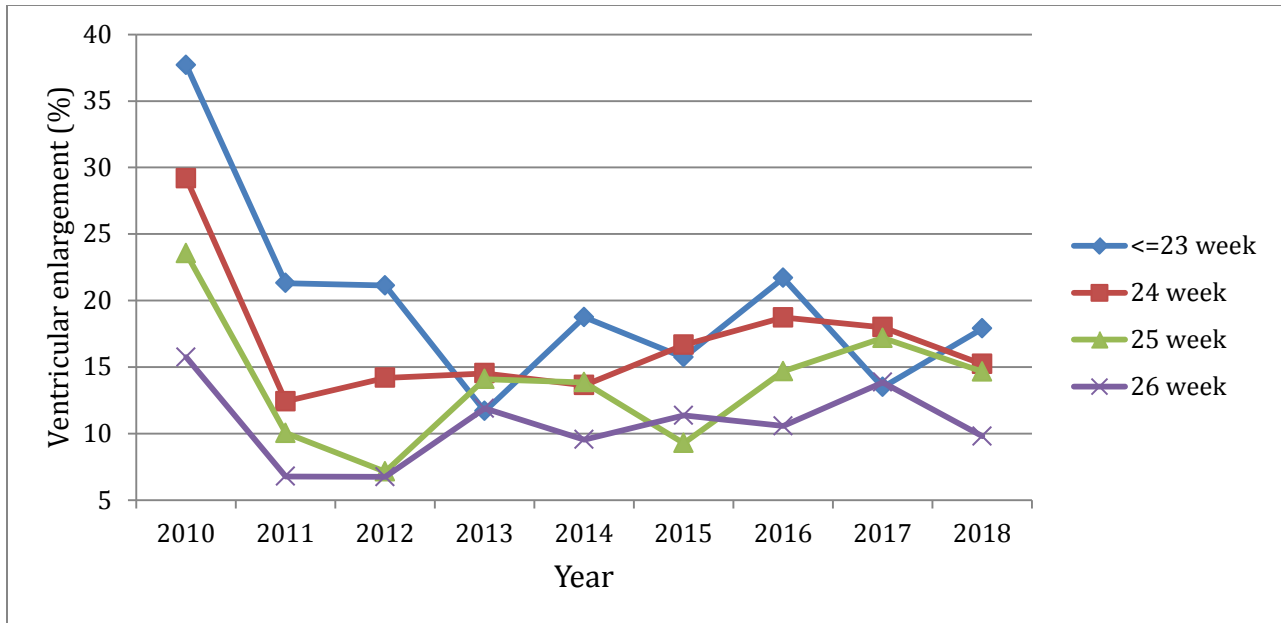


b. 27-32 weeks' GA:

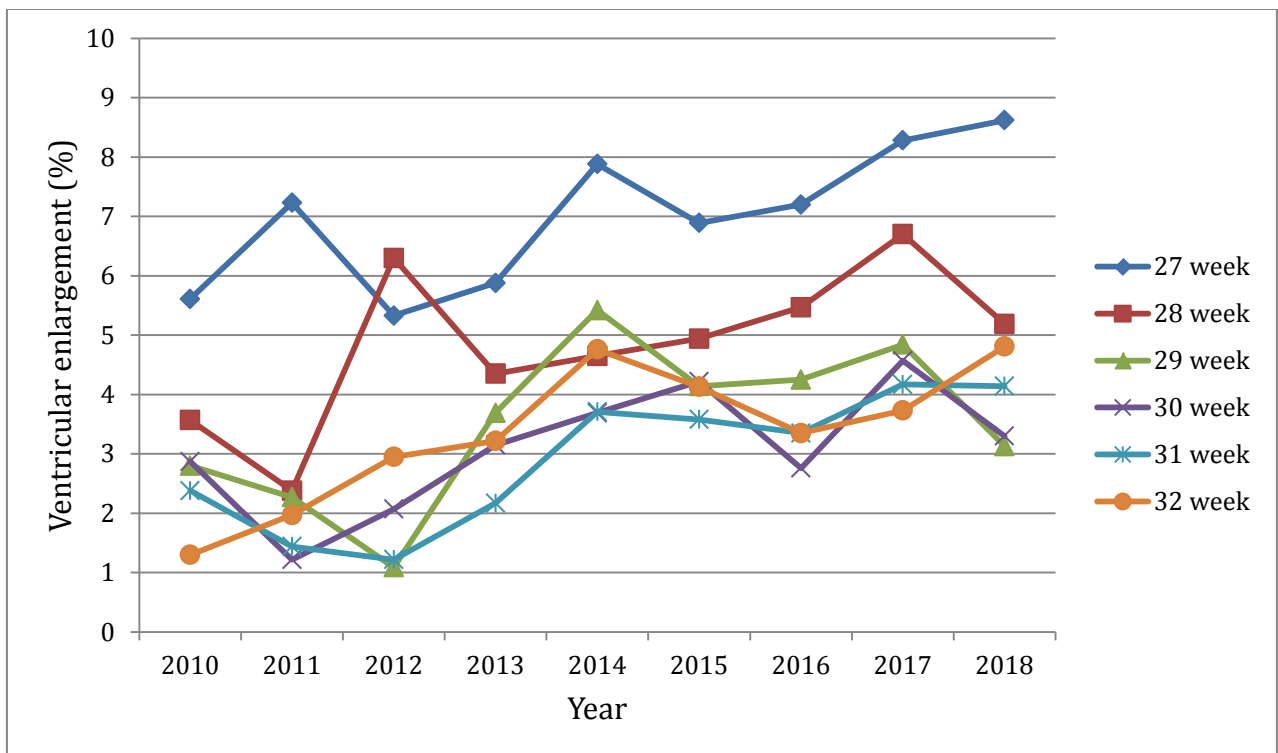


# 7. Ventricular enlargement (VE): (moderate and severe VE only; among neonates who received ultrasound exams)

a. 23-26 weeks' GA:

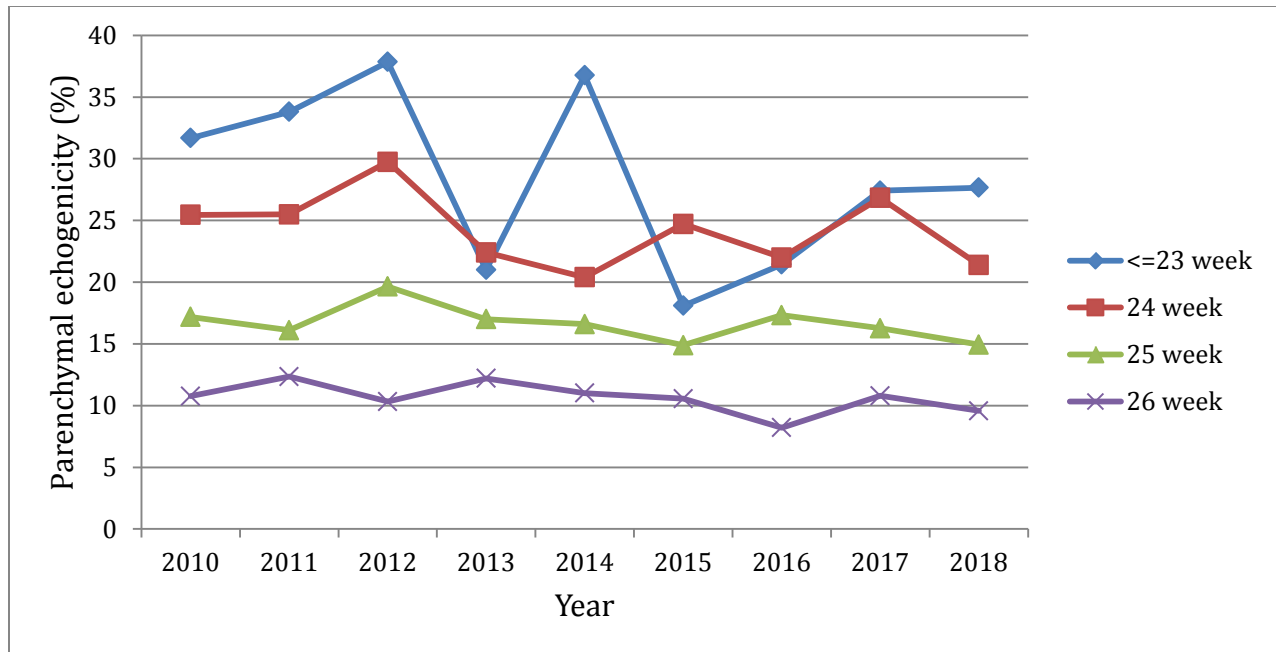


b. 27-32 weeks' GA:

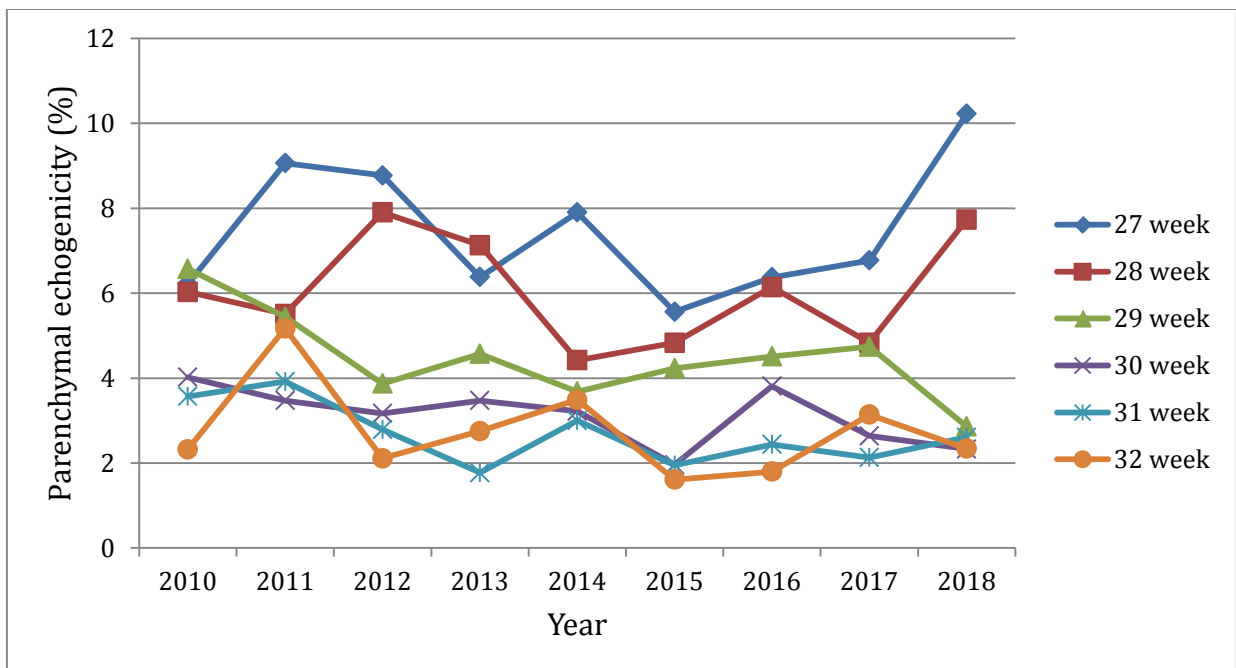


# 8. Parenchymal echogenicity (among neonates who received ultrasound exams)

a. 23-26 weeks' GA:

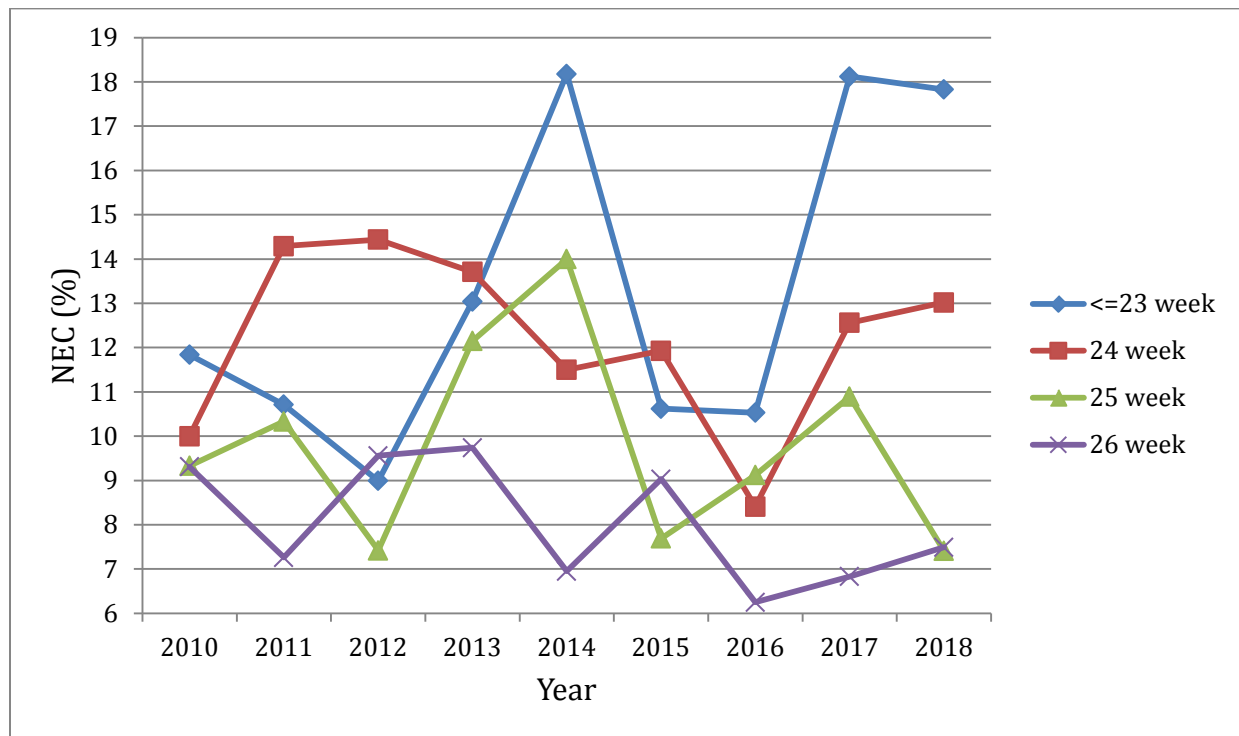


b. 27-32 weeks GA:

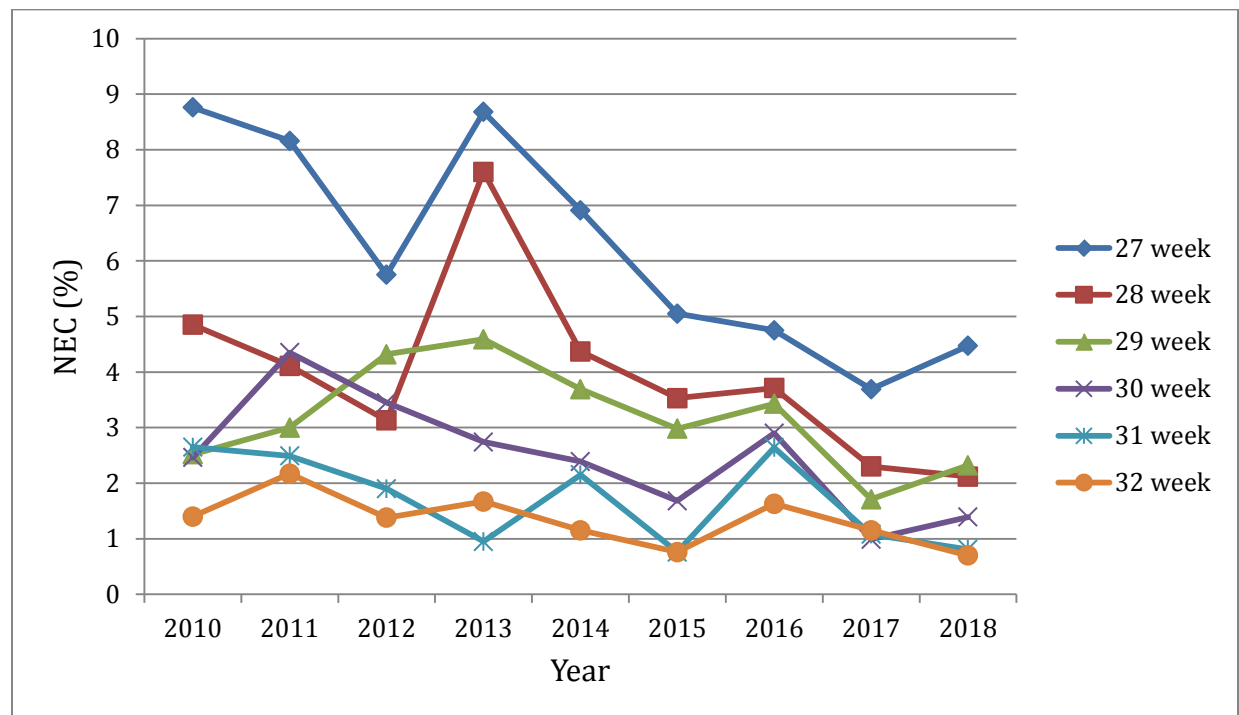


# 9. NEC:

a. 23-26 weeks' GA:

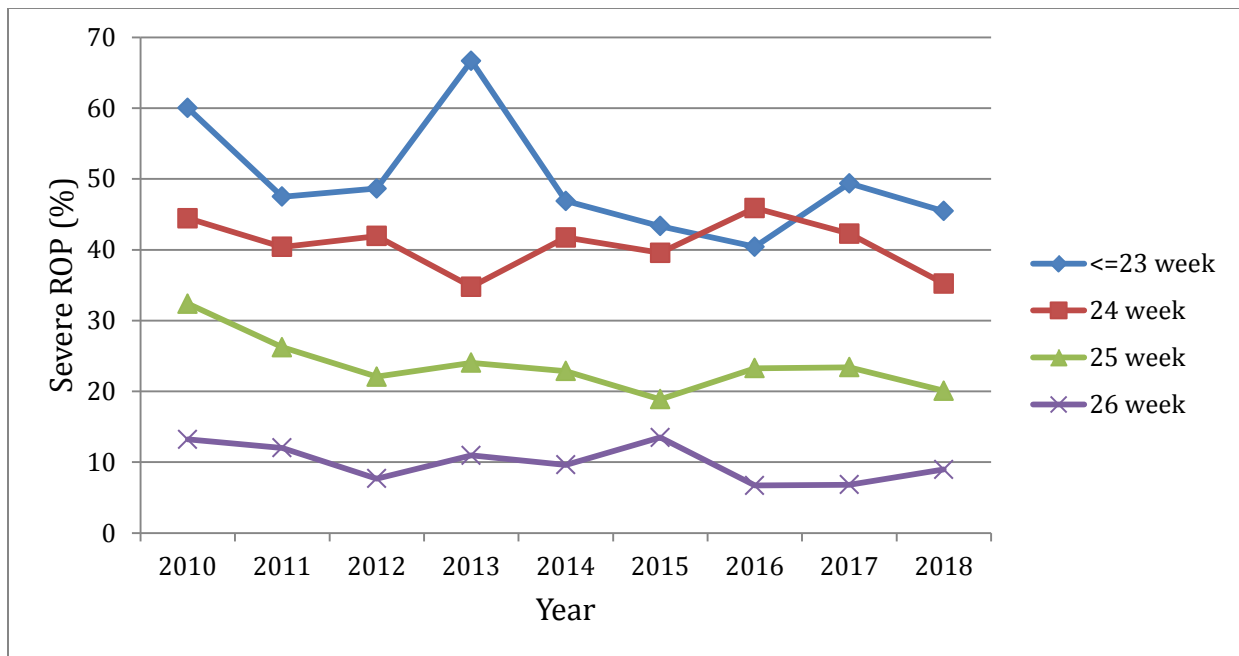


b. 27-32 weeks' GA:

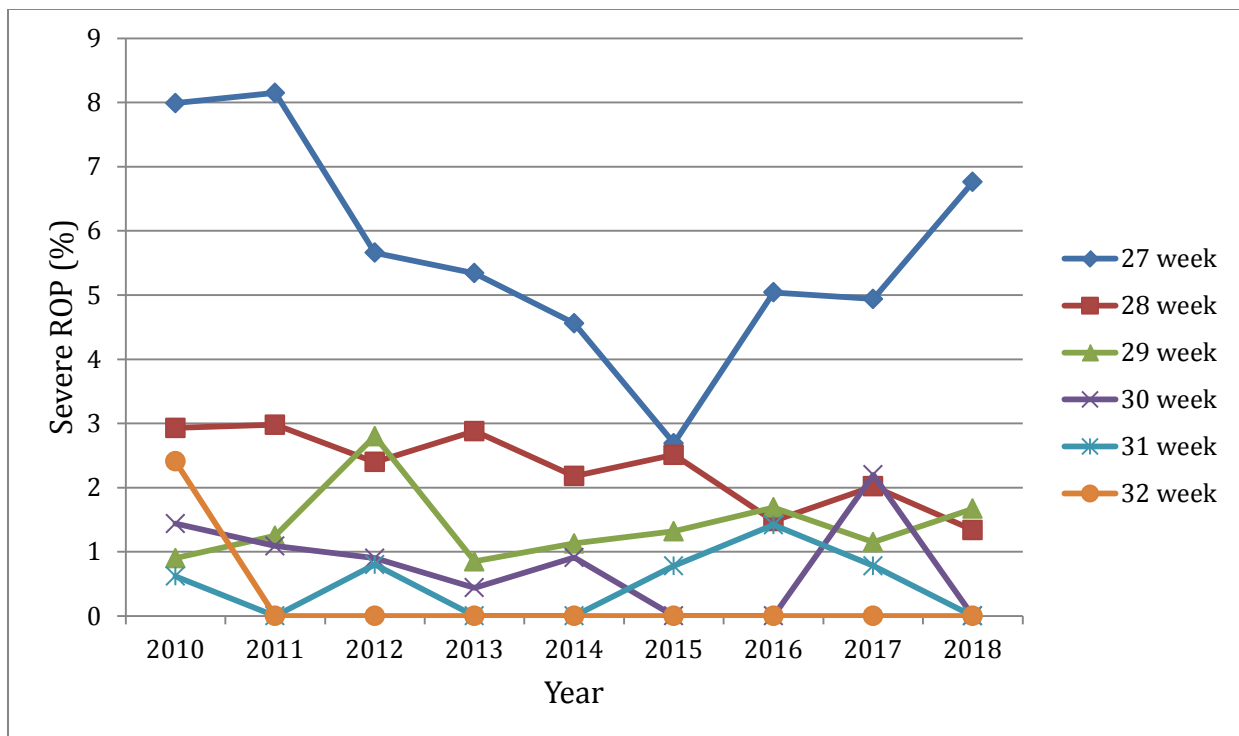


### 10. Severe ROP ( $\geq$ Stage 3 or ROP treatment) among neonates who received eye exams:

a. 23-26 weeks' GA:

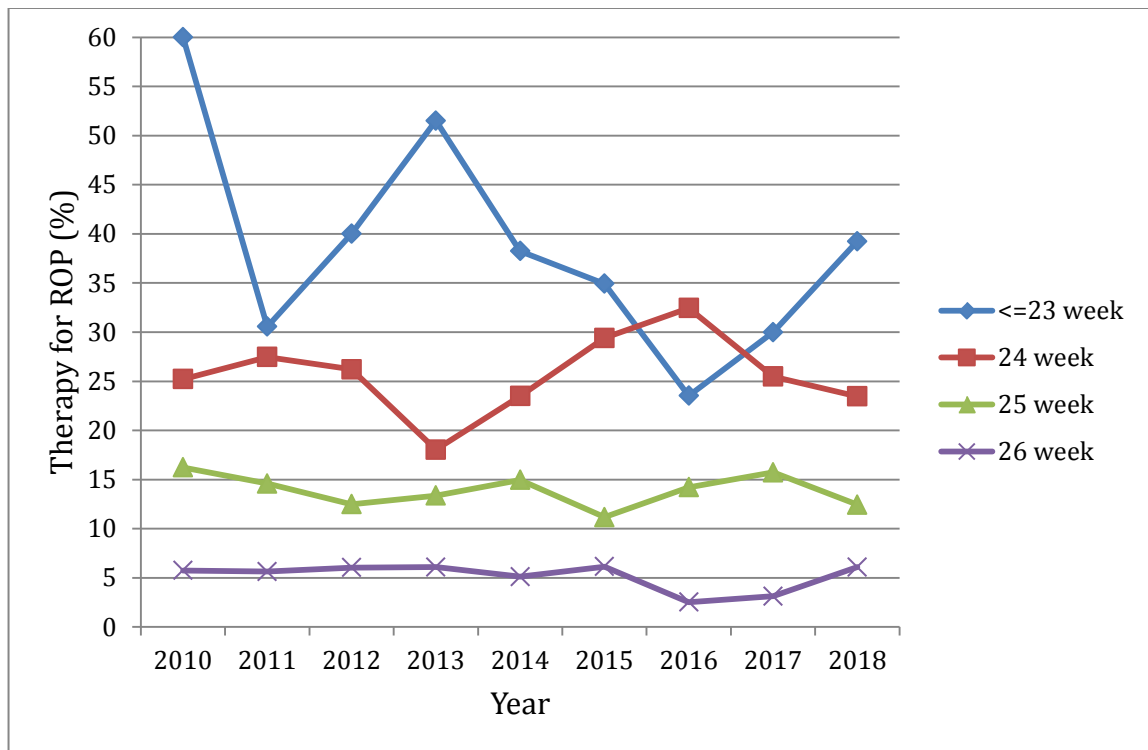


b. 27-32 weeks' GA:

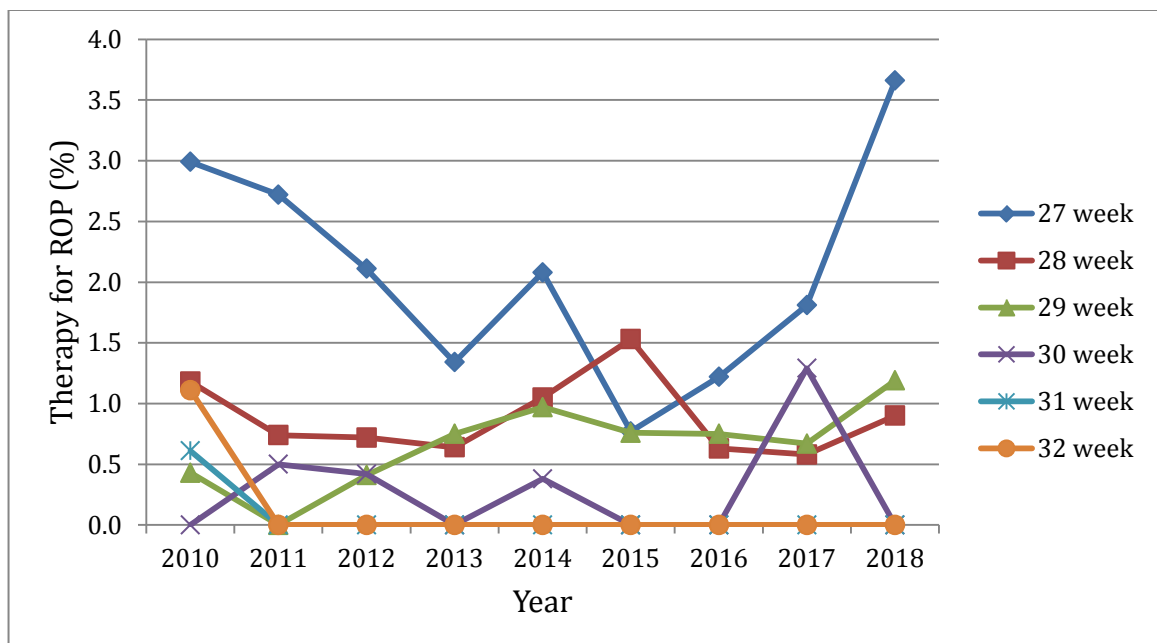


# 11. Therapy for ROP (among neonates who received eye exams)

a. 23-26 weeks' GA :

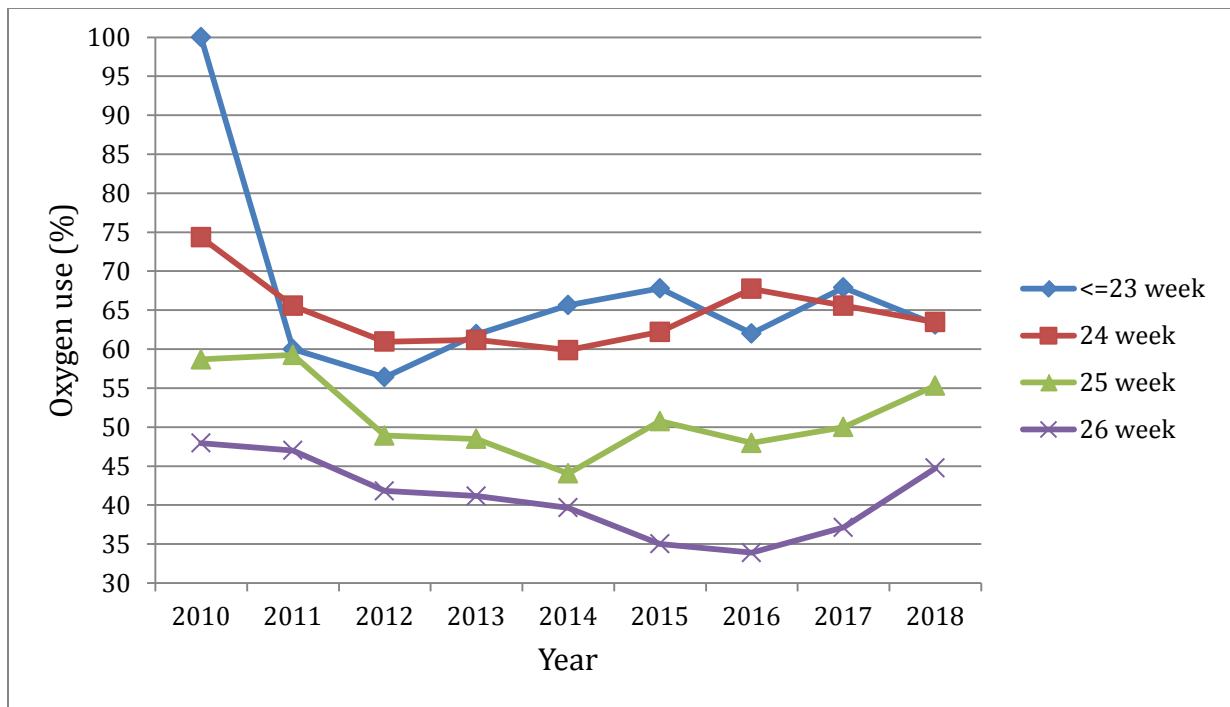


b. 27-32 weeks' GA:

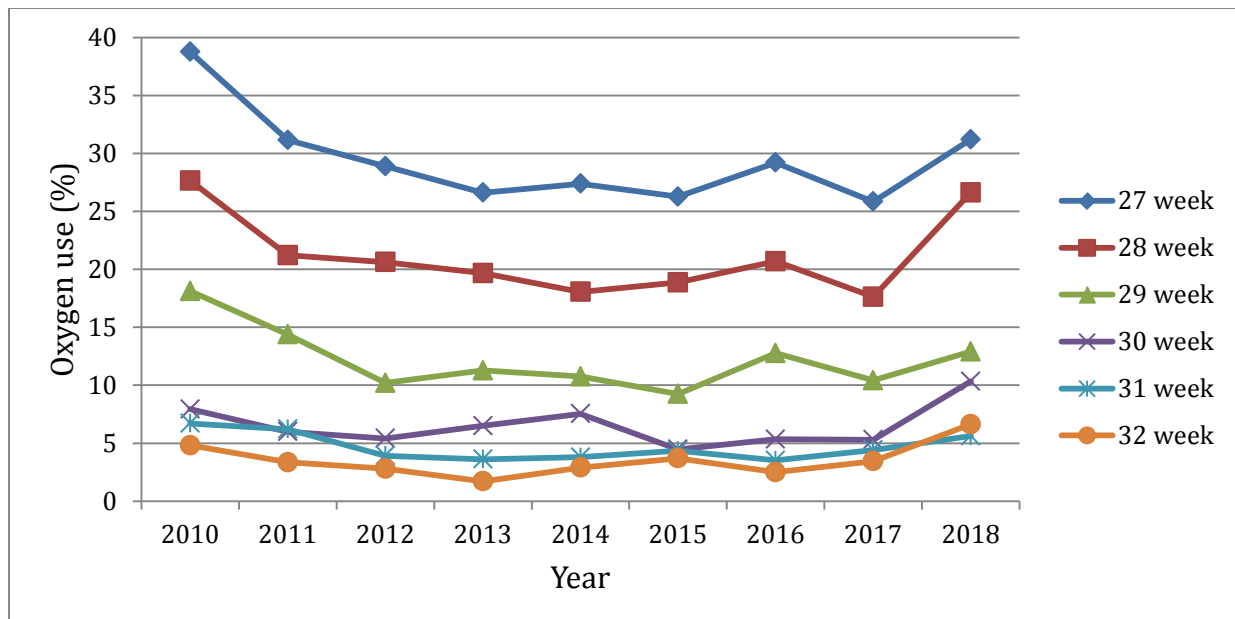


## 12a. Oxygen use at 36 weeks or at discharge:

a. 23-26 weeks' GA:

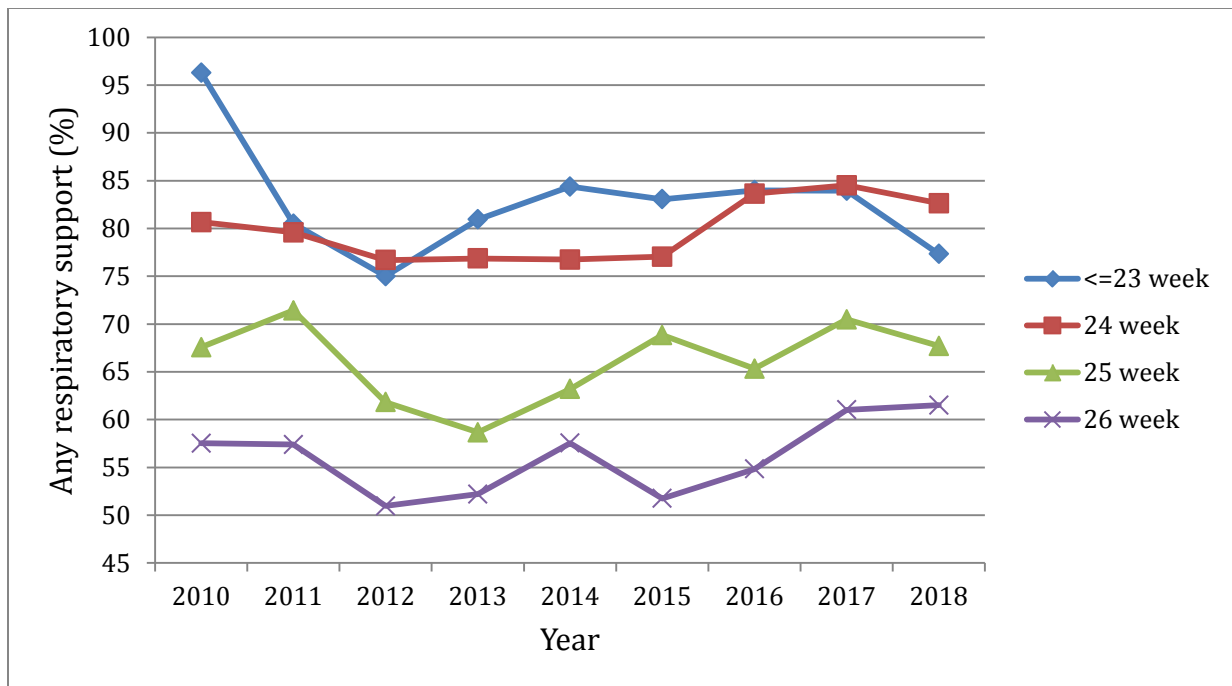


b. 27-32 weeks' GA:

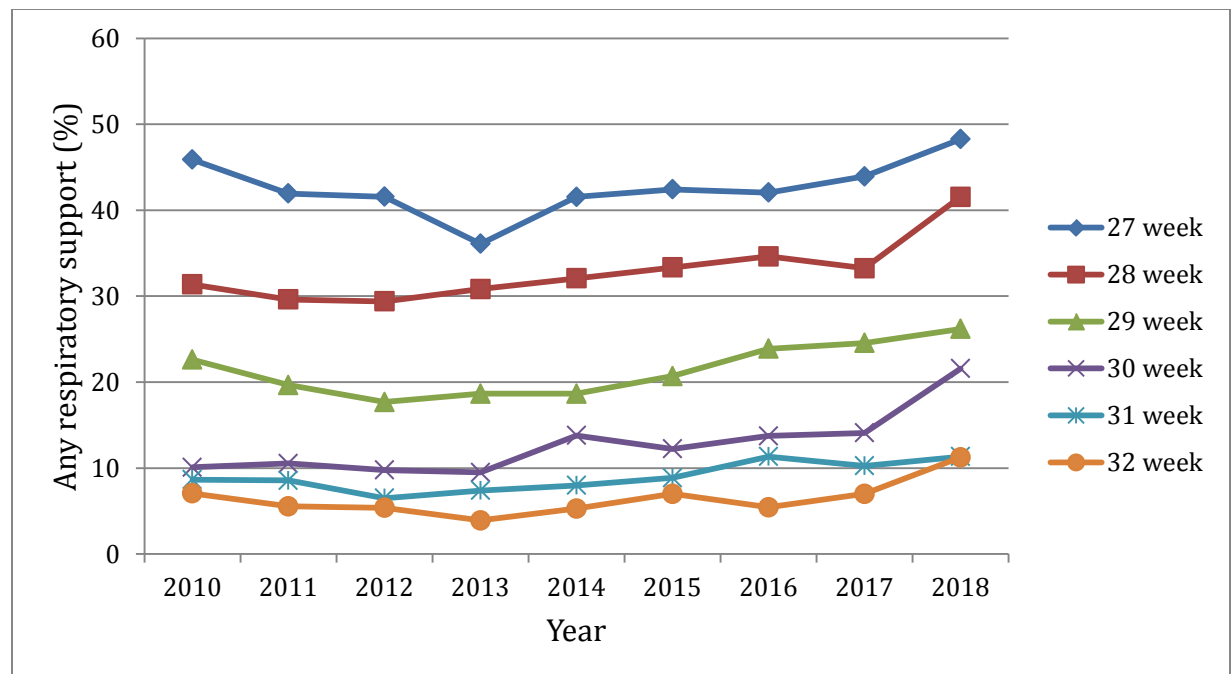


**12b. Any respiratory support at 36 weeks or at discharge:**

a. 23-26 weeks' GA:

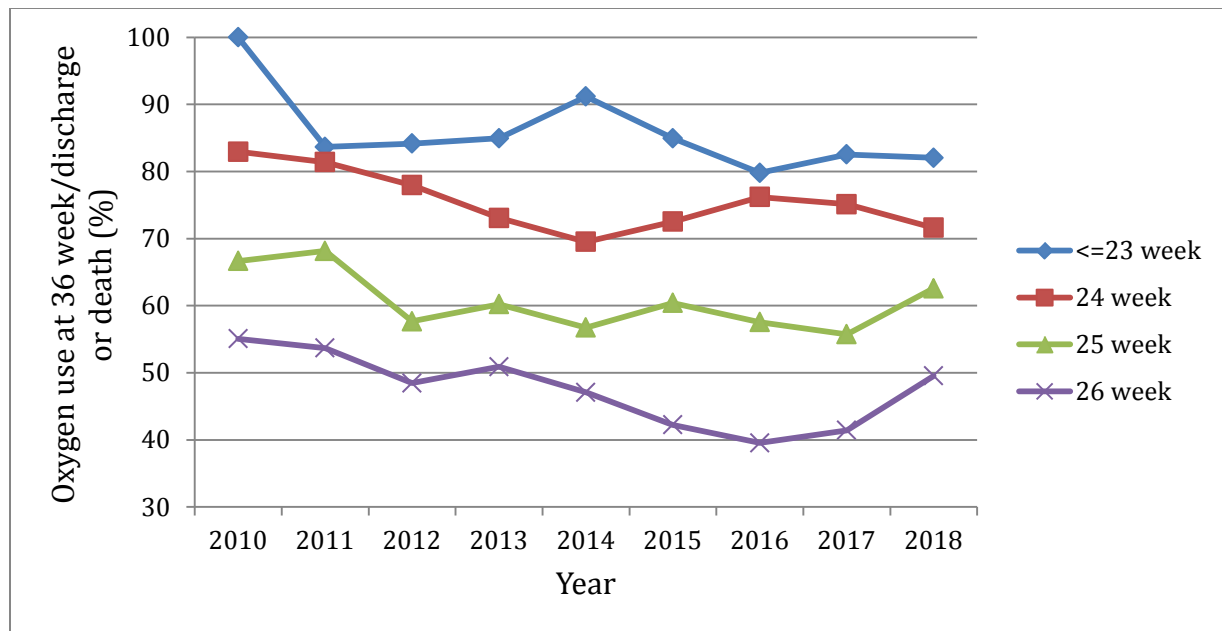


b. 27-32 weeks' GA:

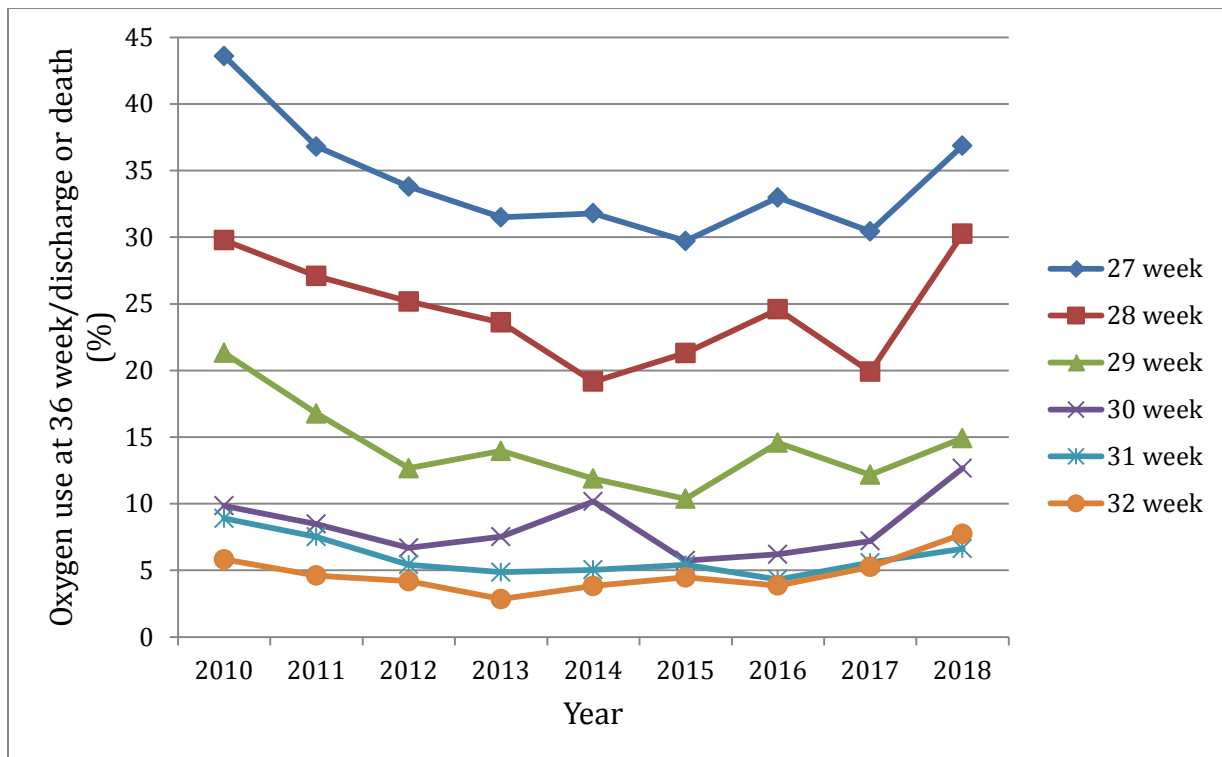


**13a. Oxygen use at 36 weeks/discharge or death:**

a. 23-26 weeks' GA:

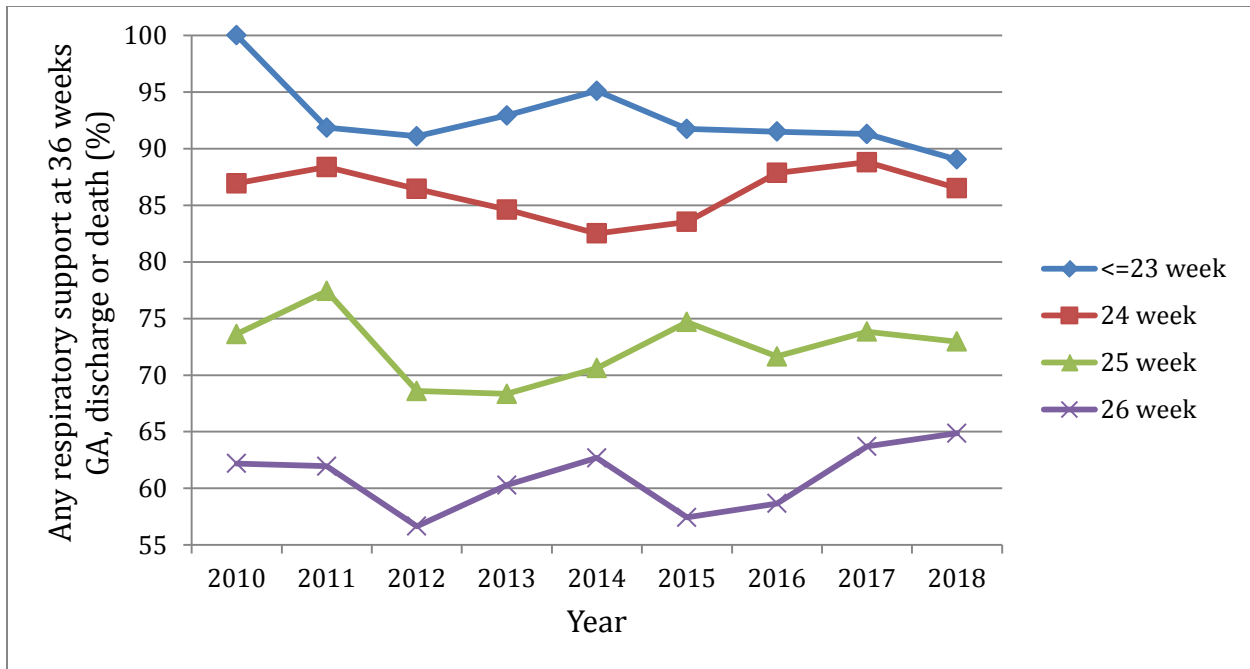


b. 27-32 weeks' GA:

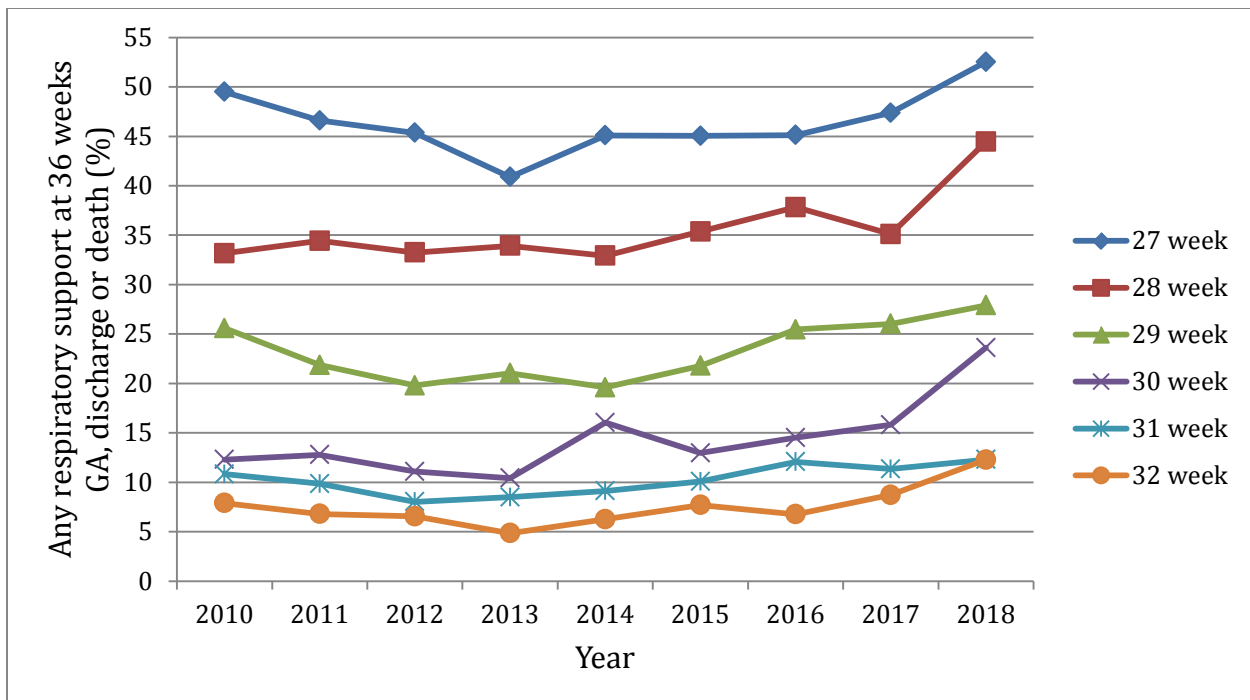


### 13b. Any respiratory support at 36 weeks/discharge or death:

#### a. 23-26 weeks' GA:

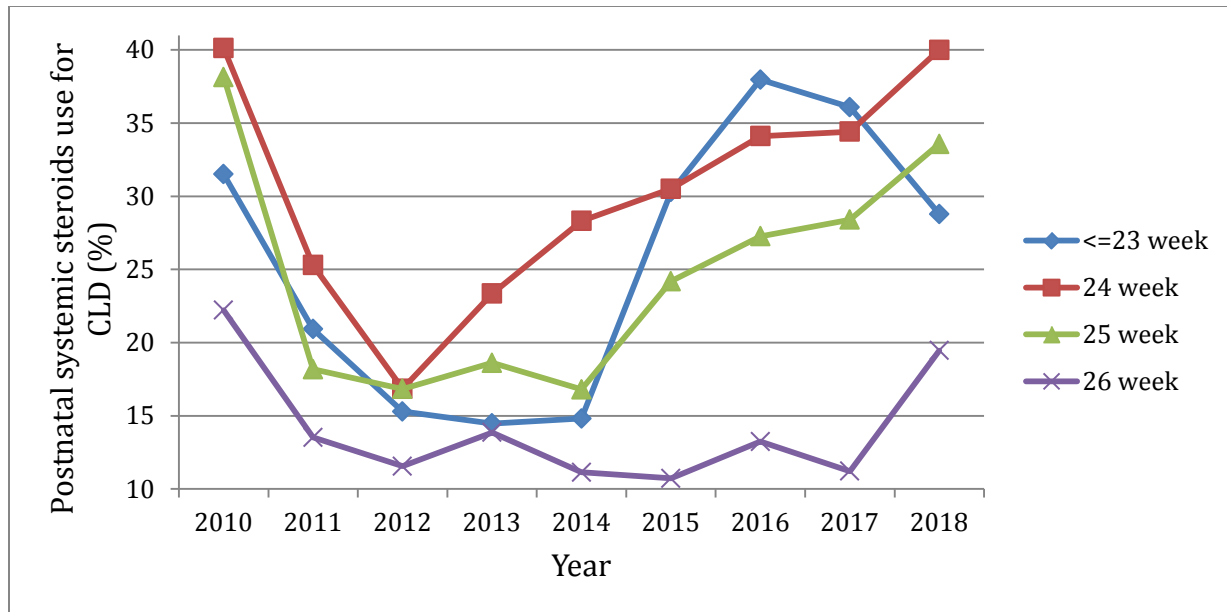


#### b. 27-32 weeks' GA:

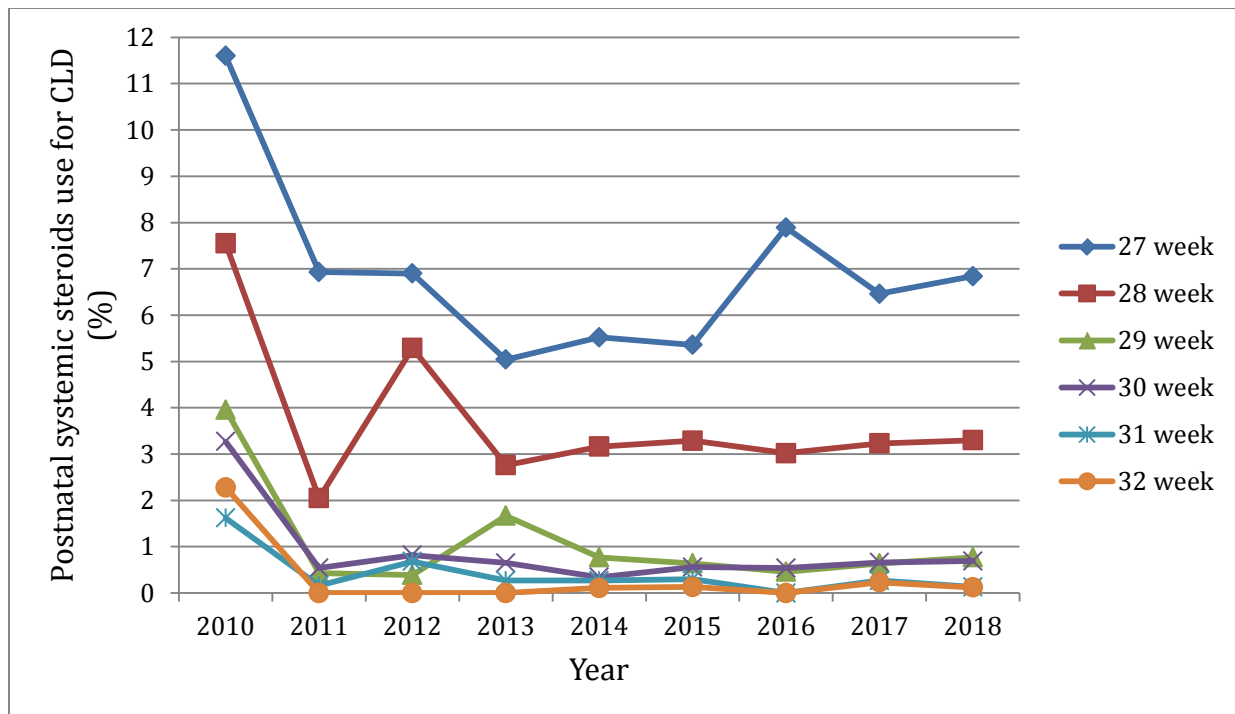


#### 14. Postnatal systemic steroids use for chronic lung disease (CLD)

a. 23-26 weeks' GA:



b. 27-32 weeks' GA:

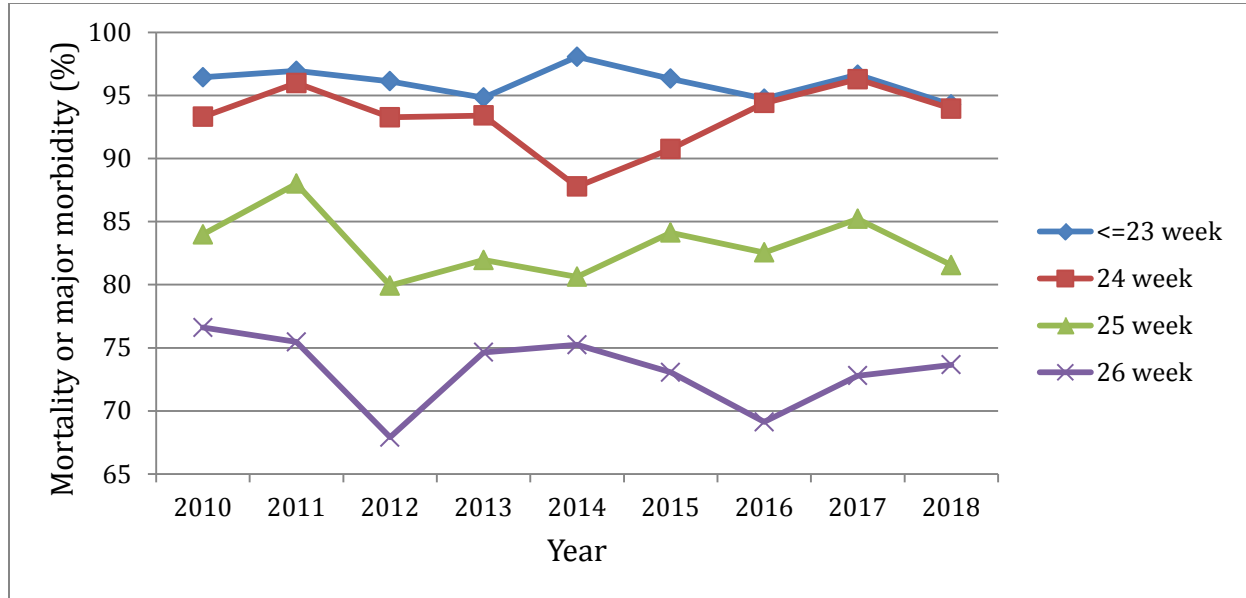


### 15. Mortality or major morbidity including CLD

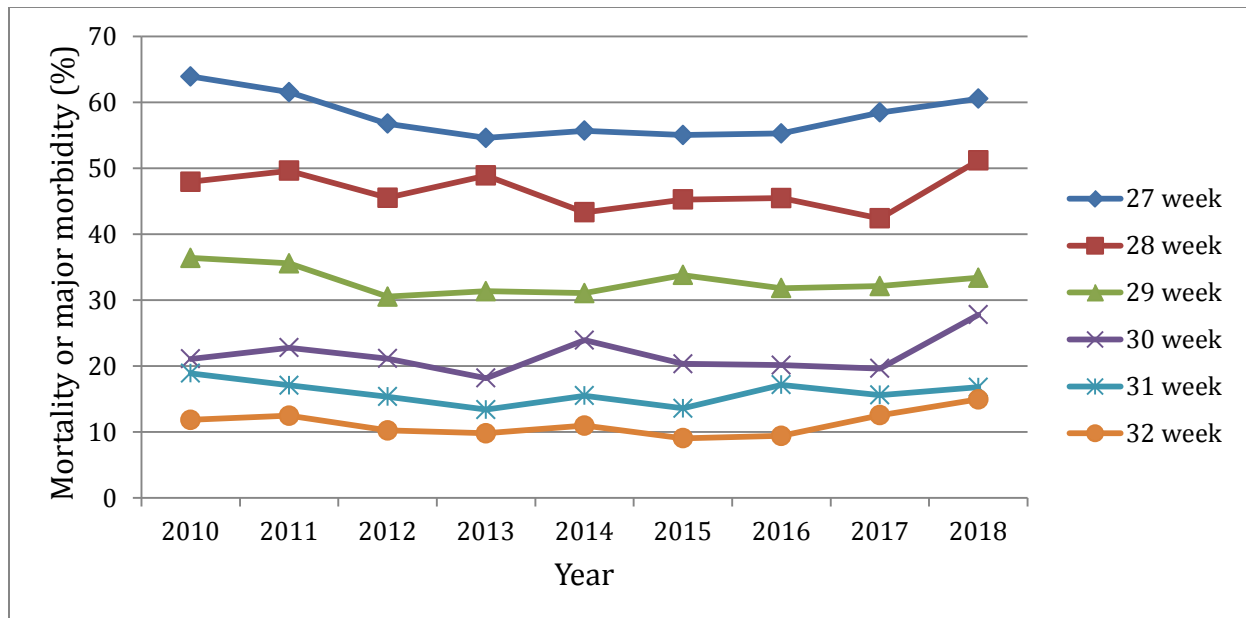
Major morbidity was counted as any one of the following:

1. CLD (any grade)
2. Severe ROP (stage 3,4,5 and/or those with ROP treatment)
3. Severe neurological injury (IVH grade 3 or grade 4 or PVL)
4. NEC (stage 2 or 3)
5. Late onset sepsis (any positive blood and/or cerebrospinal fluid culture after 2 days of age)

a. 23-26 weeks' GA:



b. 27-32 weeks' GA:

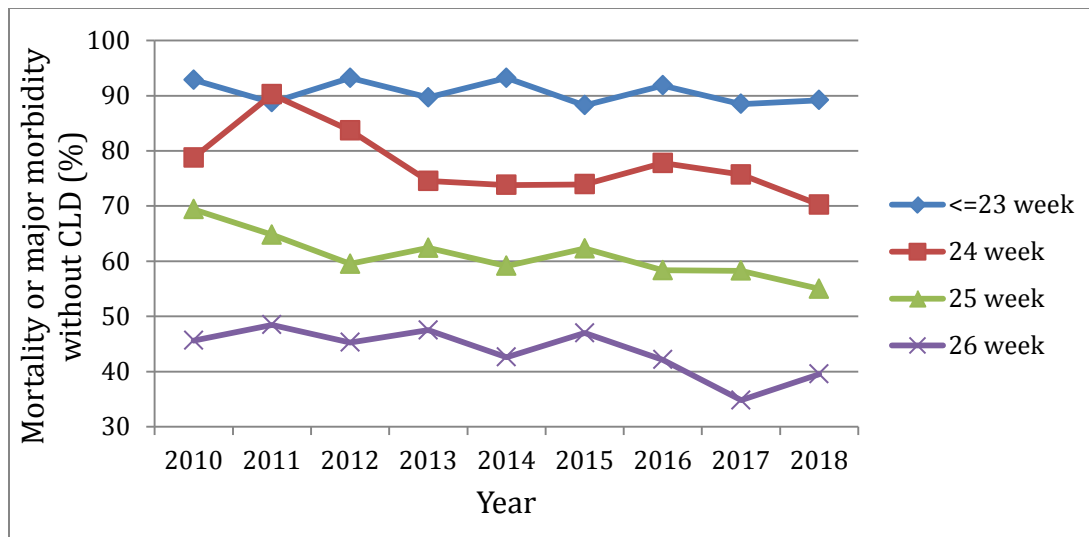


## 16. Mortality or major morbidity excluding CLD

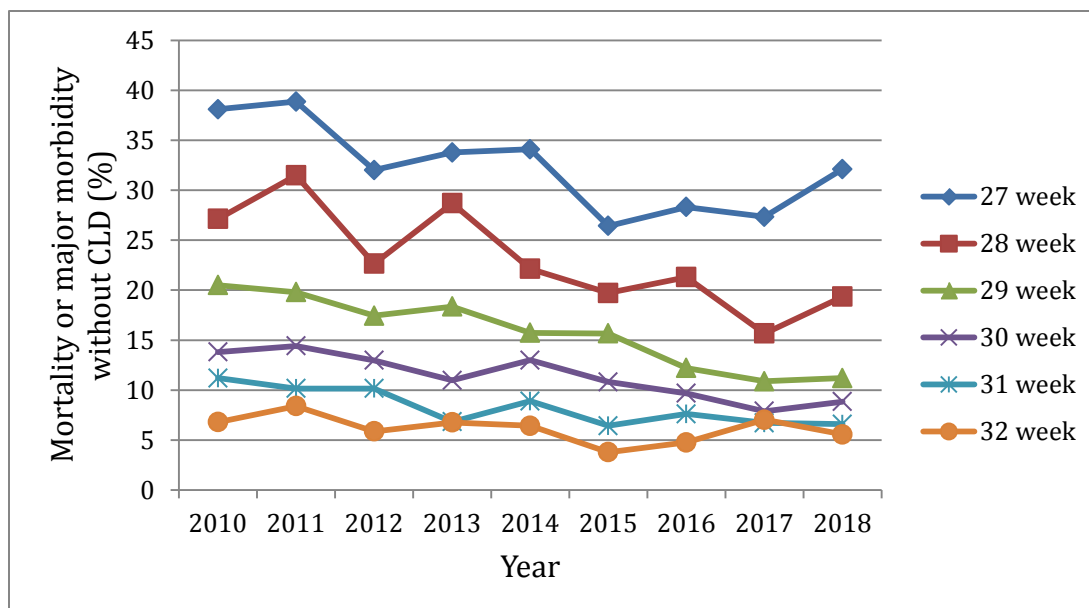
Major morbidity was counted as any one of the following:

1. Severe ROP (stage 3,4,5 and/or those with ROP treatment)
2. Severe neurological injury (IVH grade 3 or grade 4 or PVL)
3. NEC (stage 2 or 3)
4. Late onset sepsis (any positive blood and/or cerebrospinal fluid culture after 2 days of age)

a. 23-26 weeks' GA:



b. 27-32 weeks' GA:



## **I. 2018 CNN publications**

### **Peer reviewed publications**

- 1) Stockley EL, Ting JY, Kingdom J, McDonald SD, Barrett J, Synnes A, Monterrosa L, Shah PS, Canadian Neonatal Network, Canadian Neonatal Follow-Up Network and Canadian Preterm Birth Network Investigators. Intrapartum Magnesium Sulphate is Associated with Neuroprotection in Growth Restricted Fetuses. *Am J Obstet Gynecol*. 2018 Dec;219(6):606.e1-606.e8.
- 2) Toye JM, Yang J, Sankaran K. Narcotics and sedatives use in the mechanical ventilation in preterm infants: predictors and outcome. *J Neonatal Perinatal Med*. 2018 Dec 31.
- 3) Leibel SL, Ye XY, Shah P, Shah V, Canadian Neonatal Network. Chronic lung disease in preterm infants receiving various modes of noninvasive ventilation at  $\leq 30$  weeks' postmenstrual age. *J Matern Fetal Neonatal Med*. 2018 Sep 26;1-7.
- 4) Darlow BA, Vento M, Beltempo M, Lehtonen L, Håkansson S, Reichman B, Helenius K, Sjörs G, Sigali E, Lee S, Noguchi A, Morisaki N, Kusuda S, Bassler D, San Feliciano L, Adams M, Isayama T, Shah PS, Lui K, on behalf of the International Network for Evaluating Outcomes (iNeo) of Neonates. Variations in Oxygen Saturation Targeting, and Retinopathy of Prematurity Screening and Treatment Criteria in Neonatal Intensive Care Units: An International Survey. *Neonatology*. 2018;114(4):323-331.
- 5) Shah V, Hodgson K, Seshia M, Dunn M, Schmölzer GM. Golden hour management practices for infants  $< 32$  weeks gestational age in Canada. *Paediatr Child Health*. 2018 Jul;23(4):e70-e76.
- 6) Esmailizadeh R, Shah PS, Seshia M, Yee W, Yoon EW, Dow K, Canadian Neonatal Network Investigators. Antibiotic exposure and development of necrotizing enterocolitis in very preterm neonates. *Paediatr Child Health*. 2018 Jul;23(4):e56-e61.
- 7) Bairam A, Laflamme N, Drolet C, Piedboeuf B, Shah PS, Kinkead R, Canadian Neonatal Network Investigators. Sex-based differences in apnoea of prematurity: A retrospective cohort study. *Exp Physiol*. 2018 Oct;103(10):1403-1411.
- 8) Ting JY, Synnes AR, Lee SK, Shah PS, Canadian Neonatal Network and Canadian Neonatal Follow-Up Network. Association of admission temperature and death or adverse neurodevelopmental outcomes in extremely low-gestational age neonates. *J Perinatal*. 2018 Jul;38(7):844-849.
- 9) Ting JY, Roberts A, Synnes A, Canning R, Bodani J, Monterrosa L, Shah PS, Canadian Neonatal Network Investigators. Invasive Fungal Infections in Neonates in Canada: Epidemiology and Outcomes. *Pediatr Infect Dis J*. 2018 Nov;37(11):1154-1159.
- 10) Yusuf K, Alshaikh B, da Silva O, Lodha AK, Wilson RD, Alvaro RE, Lee SK, Shah PS; Canadian Neonatal Network Investigators. Neonatal outcomes of extremely preterm infants exposed to maternal hypertension and cigarette smoking. *J Perinatol*. 2018 Aug;38(8):1051-1059.
- 11) Haslam MD, Lisonkova S, Creighton D, Church P, Yang J, Shah PS, Joseph KS, Synnes A, Canadian Neonatal Network and Canadian Neonatal Follow-Up Network. Severe Neurodevelopmental Impairment in Neonates Born Preterm: Impact of Varying Definitions in a Canadian Cohort. *J Pediatr*. 2018 Jun;197:75-81.

- 12) Shah PS, McDonald SD, Barrett J, Synnes A, Robson K, Foster J, Pasquier JC, Joseph KS, Piedboeuf B, Lacaze-Masmonteil T, O'Brien K, Shivananda S, Chaillet N, Pechlivanoglou P; Canadian Preterm Birth Network Investigators. The Canadian Preterm Birth Network: a study protocol for improving outcomes for preterm infants and their families. *CMAJ Open*. 2018 Jan 18;6(1):E44-E49.
- 13) De Silva DA, Synnes AR, von Dadelszen P, Lee T, Bone JN; MAG-CP, CPN and CNN collaborative groups, Magee LA. MAGnesium sulphate for fetal neuroprotection to prevent Cerebral Palsy (MAG-CP)-implementation of a national guideline in Canada. *Implement Sci*. 2018 Jan 11;13(1):8.
- 14) Amer R, Moddemann D, Seshia M, Alvaro R, Synnes A, Lee KS, Lee SK, Shah PS; Canadian Neonatal Network and Canadian Neonatal Follow-up Network Investigators. Neurodevelopmental Outcomes of Infants Born at <29 Weeks of Gestation Admitted to Canadian Neonatal Intensive Care Units Based on Location of Birth. *J Pediatr*. 2018 May;196:31-37.
- 15) Sabri K, Woodward MA, Easterbrook B, Shivananda S; Canadian Neonatal Network. Retinopathy of prematurity practices: a national survey of Canadian Neonatal Intensive Care Units. *J Perinatol*. 2018 Apr;38(4):381-385.
- 16) Louis D, ElSayed YN, Ojah C, Alvaro R, Shah PS, Dunn M; Canadian Neonatal Network Investigators. Predictors of PDA Treatment in Preterm Neonates Who Had Received Prophylactic Indomethacin. *Am J Perinatol*. 2018 Apr;35(5):509-514.
- 17) Elborae MS, Toye J, Ye XY, Shah PS, Aziz K, Canadian Neonatal Network Investigators. Association between Umbilical Catheters and Neonatal Outcomes in Extremely Preterm Infants. *Am J Perinatol*. 2018 Feb;35(3):233-241.
- 18) Stritzke A, Mohammad K, Shah PS, Ye XY, Bhandari V, Akierman A, Harrison A, Bertelle V, Lodha A. Use and timing of surfactant administration: impact on neonatal outcomes in extremely low gestational age infants born in Canadian Neonatal Intensive Care Units. *J Matern Fetal Neonatal Med*. 2018 Nov;31(21):2862-2869.
- 19) Kelly EN, Shah VS, Levenbach J, Vincer M, DaSilva O, Shah PS; Canadian Neonatal Network and Canadian Neonatal Follow-Up Network Investigators. Inhaled and systemic steroid exposure and neurodevelopmental outcome of preterm neonates. *J Matern Fetal Neonatal Med*. 2018 Oct;31(20):2665-2672.
- 20) Persson M, Shah PS, Rusconi F, Reichman B, Modi N, Kusuda S, Lehtonen L, Hakansson S, Yang J, Isayama T, Beltempo M, Lee SK, Norman M; for the International Network for Evaluating Outcomes of Neonates. Association of Maternal Diabetes With Neonatal Outcomes of Very Preterm and Very Low-Birth-Weight Infants: An International Cohort Study. *JAMA Pediatrics*. 2018 Sep 1;172(9):867-875.
- 21) Beltempo M, Isayama T, Vento M, Lui K, Kusuda S, Lehtonen L, Sjörs G, Håkansson S, Adams M, Noguchi A, Reichman B, Darlow BA, Morisaki N, Bassler D, Pratesi S, Lee SK, Lodha A, Modi N, Helenius K, Shah PS; on behalf of the International Network for Evaluating Outcomes of Neonates. Respiratory Management of Extremely Preterm Infants: An International Survey. *Neonatology*. 2018 April; 114(1): 28-36.

### **Abstracts**

- 1) Shah V, Shah PS, Singhal N, Less is More Study Group. Variations in the Number of Blood Tests in the First 14 Days in Infants <29 weeks' GA: A Case for Blood Testing Stewardship? *E-PAS* 2018:1500.820.

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- 3) Beltempo M, Lee Sk, McMillan D, Seshia M, Singhal N, Dow K, Aziz K, Piedboeuf B, Shah PS, on behalf of the Canadian EPIQ study group. Outcomes and Care Practices of Preterm Infants in Canada: 12 Years of Quality Improvement. *E-PAS* 2018:1504.856.
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- 19) Abou Mehrem A, Singhal N, Shah PS, Shah V, Less is More study group. Diagnostic Imaging in the First 14 Days among Canadian Preterm Infants <29 Weeks' Gestation: Is Variation Justified? E-PAS 2018:4141.396.
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## J. Appendices

### Outcomes Definitions

**Mortality:** Death prior to discharge from the NICU.

**Severe neurological injury: Intraventricular hemorrhage (IVH), ventricular enlargement or parenchymal echogenicity or periventricular leukomalacia (PVL):** Defined as grade 3 IVH (intraventricular hemorrhage with ventricular enlargement) or grade 4 IVH (intraventricular hemorrhage and persistent parenchymal echogenicity) or persistent parenchymal echogenicity.

#### **Ventricular enlargement**

- **None:** Measurement of ventricles was <7 mm at any level section of lateral ventricle.
- **Mild:** Measurement was 7 to 10 mm at any level of the larger lateral ventricle. Classify as “mild” if there was no mention of “ventricular enlargement”, “ventriculomegaly” or “hydrocephalus”, or if the most severe report was of “mild ventriculomegaly” or “mild ventricular enlargement”, or if described as “suspected”
- **Moderate:** Measurement was 11 to 15 mm at any level of the larger lateral ventricle on sagittal scan. Classify as “moderate” if the terms “grade III IVH”, “ventricular enlargement”, “ventriculomegaly” or “hydrocephalus” were used with “moderate”, or without descriptors.
- **Severe:** Measurement was >15 mm at any level of the larger lateral ventricle on a sagittal scan, or ventricular drainage/shunting was required. If no measurement was made, classify as “severe” if the terms “severe” or “significant” were used to describe “grade III IVH”, “ventricular enlargement”, “ventriculomegaly” or “hydrocephalus”.
- **Not measured**
- **Unknown**

**Severe retinopathy of prematurity (ROP):** Stage 3, 4 or 5 ROP as defined by the International Classification of Retinopathy of Prematurity<sup>1</sup> and/or those infants requiring treatment (laser or intraocular injection). ROP was scored as the highest stage in either eye identified at any time.

**Necrotizing enterocolitis (NEC):** Stage 2 or 3 NEC according to Bell’s classification<sup>2</sup>, diagnosed by clinical and imaging findings.

**Sepsis:** Isolation of bacterial, fungal or viral organism from blood or cerebrospinal fluid in a symptomatic infant.

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<sup>1</sup> An International Committee for the Classification of Retinopathy of Prematurity. **The International Classification of Retinopathy of Prematurity Revisited.** Arch Ophthalmol 2005;123:991-999

<sup>2</sup> Bell MJ, Ternberg JL, Feigin RD, et al. **Neonatal necrotizing enterocolitis. Therapeutic decisions based upon clinical staging.** Ann Surg 1978;187:1-7

**Chronic lung disease (CLD):** Defined as respiratory support given at 36 weeks' post menstrual age or at discharge (if earlier than 36 weeks' PMA) to level 2 centers and was classified in different degrees of severity described as follows:

**Chronic lung disease (CLD) continued:**

Severity	Respiratory support at time of classification (at 36 weeks' PMA or at discharge if baby was discharged prior to 36 weeks' PMA)	Oxygen	Flow rate
No CLD	None	21%	None
Mild CLD	Headbox or incubator	>21%	Any amount
	Nasal cannula	100%	<0.1L/min
	Nasal cannula blended air/oxygen	21-99%	<1.5L/min
Moderate CLD	Nasal cannula	100%	≥100cc/min
	Nasal cannula blended air/oxygen	21-29%	≥1.5L/min
	CPAP, SIPAP, NIPPV, NIHFV	21-29%	
Severe CLD	Nasal cannula blended oxygen	≥30%	≥1.5L/min
	CPAP, SIPAP, NIPPV, NIHFV	≥30%	
	Mechanical ventilation (intubated)	21-100%	

**Survival without major morbidities:** Defined as survival at discharge from the NICU without having any of CLD, NEC stage 2 or 3, IVH grade 3 or 4 or PVL, sepsis, or ROP stage 3, 4, 5, or ROP treatment.

### **Variables Definitions**

Definitions of CNN variables can be found in the CNN abstractors' manual. The manual can be accessed on the CNN website ([www.canadianneonatalnetwork.org/portal](http://www.canadianneonatalnetwork.org/portal)) via the following link:  
<http://www.canadianneonatalnetwork.org/Portal/LinkClick.aspx?fileticket=krvGeUTtLck%3d&tabid=69>

### **Major Anomalies**

A list of major anomalies can be found in the 2013 annual report, pages 124-127.

It is available via the following link:

<http://www.canadianneonatalnetwork.org/Portal/LinkClick.aspx?fileticket=lreR0871sjA%3d&tabid=39>

## Abbreviations

<b>ANCS</b>	Antenatal Corticosteroids
<b>BW</b>	Birth Weight
<b>BPD</b>	Bronchopulmonary dysplasia
<b>CONS</b>	Coagulase-Negative Staphylococcus
<b>CPAP</b>	Continuous Positive Airway Pressure
<b>CLABSI</b>	Central Line-Associated Bloodstream Infection
<b>CLD</b>	Chronic Lung Disease
<b>CVL</b>	Central Venous Line
<b>DR</b>	Delivery Room
<b>EPIQ</b>	Evidence-based Practice for Improving Quality
<b>ETT</b>	Endotracheal Tube
<b>GA</b>	Gestational Age
<b>GBS</b>	Group B Streptococcus
<b>GM</b>	Germinal Matrix
<b>HFV</b>	High Frequency Ventilation
<b>HIE</b>	Hypoxic Ischemic Encephalopathy
<b>ICROP</b>	International Classification of Retinopathy of Prematurity
<b>IPPV</b>	Intermittent Positive Pressure Ventilation
<b>IVH</b>	Intra-Ventricular Hemorrhage
<b>NEC</b>	Necrotizing Enterocolitis
<b>NI</b>	Nosocomial Infection
<b>NICE</b>	Neonatal-Perinatal Interdisciplinary Capacity Enhancement
<b>NICU</b>	Neonatal Intensive Care Units
<b>NTISS</b>	Neonatal Therapeutic Intervention Scoring System
<b>PDA</b>	Patent Ductus Arteriosus
<b>PEC</b>	Parenchymal Echogenicity
<b>PICC</b>	Peripherally Inserted Central Catheters
<b>PIV</b>	Peripheral Intravenous
<b>PMA</b>	Postmenstrual Age
<b>PPV</b>	Positive Pressure Ventilation

<b>PVL</b>	Periventricular Leukomalacia
<b>RDS</b>	Respiratory Distress Syndrome
<b>ROP</b>	Retinopathy of Prematurity
<b>SD</b>	Standard Deviation
<b>SEM</b>	Standard Error of Mean
<b>SGA</b>	Small for Gestational Age
<b>SNAP</b>	Score for Acute Neonatal Physiology
<b>SNAP-IIPE</b>	Score for Acute Neonatal Physiology Version II, Perinatal Extension
<b>SR</b>	Standardized Ratio
<b>TPN</b>	Total Parenteral Nutrition
<b>TRIPS</b>	Transport Risk Index of Physiologic Stability
<b>UV</b>	Umbilical Vein
<b>VE</b>	Ventricular Enlargement
<b>VEGF</b>	Vascular Endothelial Growth Factor
<b>VLBW</b>	Very Low Birth Weight
<b>VP</b>	Ventriculoperitoneal

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