The Canadian Pediatric Surgery Network
Le Réseau Canadien de Chirurgie Pédiatrique

Improving pediatric surgical care through national, collaborative research.

CAPSNet

2009 CAPSNET Annual Report

Version II

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Introduction to the Network

The **CA**nadian **P**ediatric **S**urgery **Net**work (CAPSNet) is a multi-disciplinary group of Canadian health researchers working together on research issues concerning pediatric surgical care. To date there are 28 network members, including 19 pediatric surgeons, 5 perinatologists/maternal fetal medicine specialists and 4 neonatologists.

The main objectives of the network are to:

1. Maintain a national pediatric surgical database, providing an infrastructure to facilitate and encourage collaborative national research.
2. Identify variations in clinical practices across Canadian centres and identify those practices which are associated with favourable and unfavourable outcomes.
3. Disseminate new knowledge through effective knowledge translation, and study impact of practice change.
4. Study the economic impact of clinical practice decisions to enable identification of treatment strategies that are efficacious and cost-effective.

Currently CAPSNET is in the 4th year of data collection and are pleased to report that since January 2008 we have had 6 new publications in the Journal of Pediatric Surgery. A further 6 manuscripts have been submitted and/or are in press in various other scientific journals. And to date a total of: 16 podium, plus one additional poster presentations have been made at International Scientific Conferences since 2007. For a complete list of all past and ongoing CAPSNET projects, please refer to appendix II.

Future Planning

In August, 2009 CAPSNet received a 10K CIHR Meetings, Planning and Dissemination (MPD) grant application for a planning meeting to discuss future planning and extension of CAPSNet (CAPSNet-X). Congratulations to Dr. P. Puligandla et al. for spear-heading this application. This meeting will have as major deliverables: refinement of the current DB to address gaps, deficiencies, and finalize fields for long term followup; development of new congenital malformations for study (e.g. bronchopulmonary malformations, sacrococcygeal teratoma), which would be the focus of future operating grant submissions; identification of 1-2 KT projects based on research findings from the original cohort; and development of a plan for international collaboration with international partners including CDH Study Group and the Australia-New Zealand Neonatal Network

A renewal operating grant has been submitted to CIHR. The focus of the renewal will be for ongoing perinatal data collection for new cases of CDH and gastroschisis, with the addition of standardized 36 month follow up for both conditions including developmental screening for GS, and hearing and formalized neurodevelopmental evaluation (Bayley Scales) for CDH. If funded, CAPSNet data abstraction for CDH and gastroschisis would continue uninterrupted through until the end of 2013, with 3y followup data available on an estimated 400 cases of GS and almost 300 cases of CDH.

CAPSNet Data Audit Project

During the summer of 2009 we launched a project to review prenatal data collection of the CAPSNet database. Currently there are significant deficiencies in the reporting of sonographic

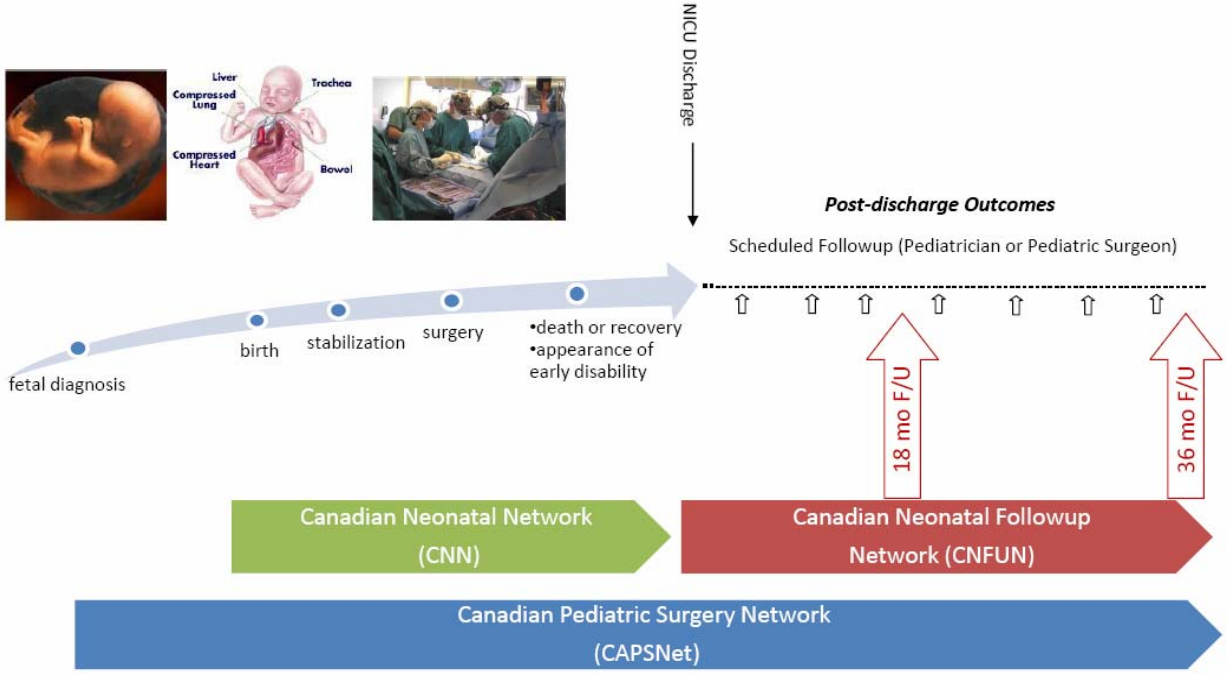
fetal risk variables for GS (bowel dilation, wall thickening, amniotic fluid volume/ echogenicity) and CDH (fetal liver position, lung head ratio). Before we can determine the value of these prenatal indicators in predicting postnatal outcome, we need to first understand why these gaps are occurring in our dataset. The objective of the data audit project is primarily to identify, understand and find solutions to the problem of data gaps that exist in the collection of prenatal data elements for GS and CDH cases in the CAPSNet Database. We hope to also be able to report on the quality of the data entered into the database as a whole. The data audit project is ongoing, but preliminary results indicate that gaps in prenatal data collection did not particularly improve with the reabstraction. One conclusion from this analysis is that the prenatal data, particularly ultrasound data is not readily abstractable from maternal charts across the country.

MICare Team: A New Collaborative Structure

CAPSNET has officially joined with the 3 perinatal networks to create MICare, the CIHR funded team in Maternal-Infant care. The goal of the MICare team is to enhance research productivity and knowledge translation across the discipline of perinatal medicine through collaboration between and across networks. Working together, this national effort will focus on improving and standardizing perinatal, neonatal and surgical care for mothers and infants across the country. The MICare team consists of the following national networks:

- Canadian Neonatal Network™ (CNN)
- Canadian Pediatric Surgery Network (CAPSNet)
- Canadian Perinatal Network (CPN)
- Canadian Neonatal Follow-up Network (CNFUN)
- Canadian Perinatal Surveillance Network (CPSN)

This figure illustrates how CNN, CNFUN and CAPSNet are linked to enable continuous data abstraction from fetal diagnosis to 3y followup. The network integration enabled by MICare ensures database linkage with common definitions and patient identifiers, and eliminates redundancy and cost of data collection.



Contributing Centres for the 2009 Annual Report

Victoria General Hospital, Victoria, BC
Children's and Women's Health Centre of British Columbia, Vancouver, BC
Alberta Children's Hospital, Calgary, AB
University of Alberta Hospital, Edmonton, AB
Royal University Hospital, Saskatoon, SK
Winnipeg Health Sciences Centre, Winnipeg, MB
in cooperation with: St. Boniface General Hospital, Winnipeg, MB
Hospital for Sick Children, Toronto, ON
in cooperation with: Mt. Sinai Hospital, Toronto, ON
McMaster Children's Hospital, Hamilton, ON
London Health Sciences Centre, London, ON
Kingston General Hospital, Kingston, ON
Children's Hospital of Eastern Ontario, Ottawa, ON
in cooperation with: The Ottawa Hospital, Ottawa, ON
Montréal Children's Hospital, Montréal, QC
in cooperation with: McGill University Health Centre, Montréal, QC
Hôpital Ste-Justine, Montréal, QC
Centre Hospitalier de L'Université Laval, Ste-Foy, QC
IWK Health Centre, Halifax, NS
Janeway Children's Health and Rehabilitation Centre, St. John's, NF

2009 CAPSNet Steering Committee Members

Dr. E. Skarsgard, Children's and Women's Health Centre of BC, Vancouver
Dr. S. Bouchard, Hôpital Ste-Justine, Montréal
Dr M. Brindle, University of Calgary, Calgary
Dr S. Himidan, Hospital for Sick Children, Toronto
Dr. J-M. Laberge, Montréal Children's Hospital, Montréal
Dr. S. K. Lee, MICare, University of Toronto, Toronto
Dr. Aideen Moore, Mount Sinai Hospital, Toronto-Neonatology
Dr. P. Puligandla, Montréal Children's Hospital, Montréal
Dr. G. Ryan, Mount Sinai Hospital, Toronto-Perinatology
Dr. N. Yanchar, IWK Health Centre, Halifax
Dr. D. Wilson, U of Calgary, Calgary-Perinatology

We wish to thank the following departing Steering Committee members for their contributions and leadership to the Network over the last 4 years:

Dr P. Kim, Hospital for Sick Children, Toronto
Dr. D. McMillan, IWK Health Centre, Halifax
Dr. P. von Dadelszen, University of British Columbia, Vancouver

Acknowledgements

Many thanks to Mr. Sonny Yeh, System Administrator, Samuel Lunenfeld Research Institute, Mt. Sinai Hospital for his work in compiling the national dataset which was used to produce this report; and to Ms. Alana Gaumont, Research Coordinator, Women's and Children's Hospital of BC for her work in analyzing and compiling the information in this, the 2009 CAPSNet Annual Report. Thanks also are due to Ms. Daisy Robson and Ms. Jennifer Claydon in their involvement in Coordinating the activities of the Network over the last year.

We also acknowledge each of our Data Abstractors, whose attention to detail and high quality work serves as the foundation for the database. Many thanks to: Brenda Andreychuk, Debbie Arsenault, Danielle Cardiff, Charlene Cars, Lola Cartier, Grace Chan, Natalie Condron, Valerie Cook, Nathalie Fredette, Tara Gundesen, Jolly de Guzman, Faye Hickey, Lizy Kodiattu, Robin Knighton, Anik Laverdiere, Rhodora Laylo, Mylène Leblanc, Nima Mirakhur, Kay Raghavan, Rashmi Raghavan, MaryJo Ricci, Daisy Robson, Margaret Ruddy, Andrea Secord, Wendy Seidlitz, Ellen Townson, Joceylne Vallee, Jeanne Vidakovich, and Susan Wadsworth.

We also acknowledge the many Trainees, their Site sponsors and the CAPSNet Steering Committee members who have and are currently utilizing the data for analyses (for a full list of ancillary projects to date see Appendix II).

Lastly, none of the work of the Network would be possible without the financial support of the Canadian Institutes of Health Research (CIHR), in kind contributions from CNN and MICare, and the additional abstractor funding support provided by the Executive Council of the Canadian Association of Pediatric Surgeons (CAPS).

Summary of Data by Diagnosis and Birth Outcome

Gastroschisis (GS)		Congenital Diaphragmatic Hernia (CDH)	
Complete live births (N)	395	Complete live births (N)	215
Incomplete live births†	23	Incomplete live births†	18
Died in Transport*	1	Died in Transport*	9
Elective Terminations	8	Elective Terminations	32
Still-Births & Spontaneous Abortions	5	Still-Births & Spontaneous Abortions	3
Total Case Incidence	432	Total Case Incidence	277

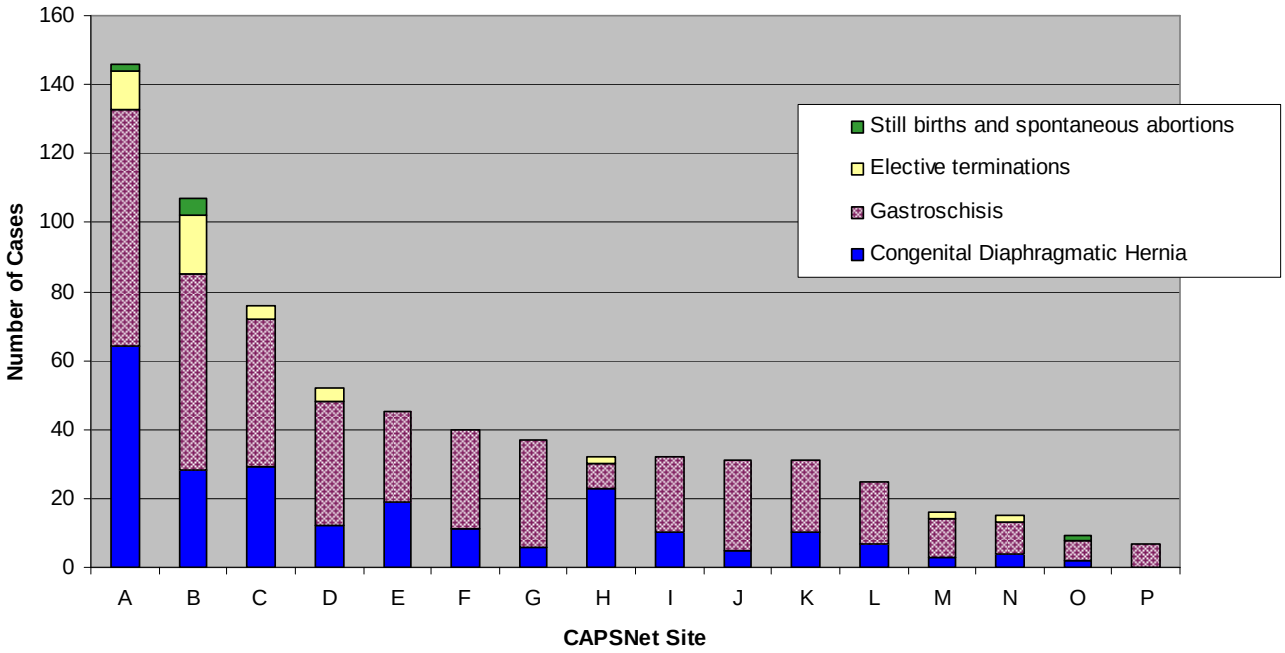
† Represents cases for which there are known live-births, but the infant was still in hospital as of May 31st, 2009. Only completed cases where patients have been fully discharged from hospital have been included in this report (N).

* Represents postnatally diagnosed live-births, where the infant was born at a community hospital and did not survive postnatal transfer to the CAPSNet tertiary pediatric centre.

Antenatal Misdiagnoses

- 5 cases of suspected CDH were confirmed at birth as either GS (n=3) or “other” (n=2).
- 1 case of suspected GS was confirmed at birth as “other”.
- 1 suspected case of Omphalocele was confirmed at birth as GS.

Figure A: Distribution of cases by centre



Site A had 1 GS and 5 CDH cases that died in transport. Sites B, F and H had 1, 2, and 1 CDH cases die in transport, respectively.

GS Descriptive Analyses

Table 1.0: Patient Population

Gastroschisis *n* = 395	
Overall survival rate	96.2%
Inborn rate	87.6%
Mean birth weight	2559 g
Proportion of males	53.7%
Proportion of males with undescended testis/testes	13.7%
Isolated defect	65.6%
Mea SNAP-II scores* Survivors Non-Survivors (*n*=15)	 9.3 21
Median SNAP-II scores Survivors Non-Survivors (*n*=15)	 5 12

*SNAP-II: Score for Neonatal Acute Physiology, version II

Table 1.1 Survival by centre volume

Table shows survival rate grouped by volume of GS cases. "Low volume" includes centres that see on average less than 3 cases of GS each year; whereas "high volume" includes centres that see on average 9 or more cases a year; "mid volume" therefore includes all those in between.

	Count (N)	Survival rate (%)	Median SNAP-II score	SNAP-II range
High volume (4 centres)	189	97%	5	0-64
Mid volume (7 centres)	160	96%	7	0-50
Low volume (4 centres)	29	88%	9	0-53
CAPSNet	378*	96%	5	

**If more than 65% of the SNAP score data elements were missing then a baby's SNAP-II score could not be computed and thus have been excluded from any mean/median calculations of SNAP-II scores.*

Figure 1.2: Gestational age at birth (in complete weeks)

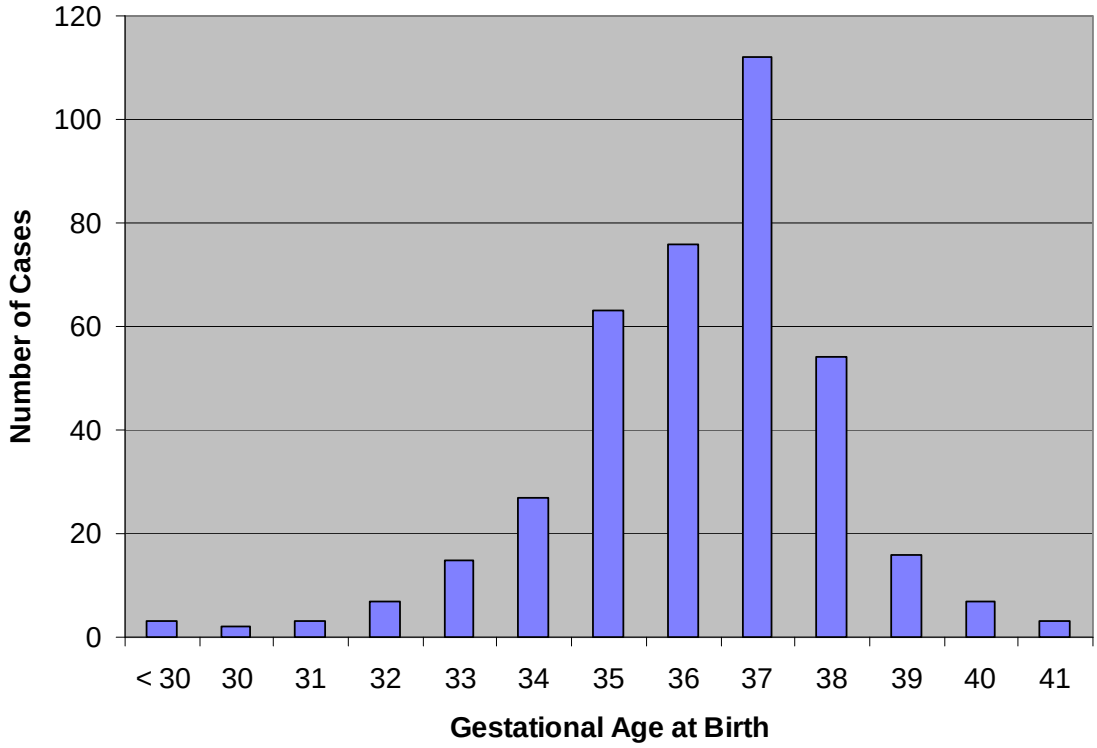
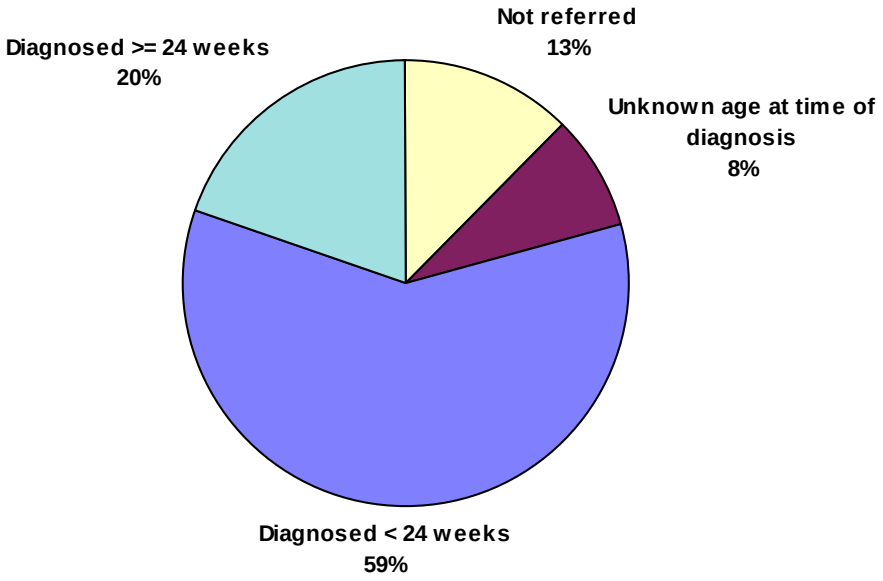


Figure 1.3: Early vs. late antenatal diagnosis

Figure shows the percentage of cases that were diagnosed: (i) antenatally before 24 weeks (59%); (ii) antenatally at 24 weeks or greater (20%); and cases (iii) not referred to a tertiary CAPSNet centre that were first diagnosed postnatally (13%).



Ultrasound Measurements (Figures 1.4 and 1.5)

Bowel dilation and bowel wall thickness measurements were recorded on up to four ultrasounds taken at varying time points:

(i) first ultrasound taken at the tertiary CAPSNet centre
(ii) last ultrasound taken between 23+0 and 31+6 weeks;
(iii) last ultrasound taken between 32+0 and 34+6 weeks, and
(iv) last ultrasound before delivery.

The data presented here reflects the worst (i.e. greatest) measurement reported on any one of the above measured ultrasounds. If there were no reported ultrasounds this has been indicated under “no ultrasound”. Where antenatal ultrasounds were taken, but data entry incomplete, this has been noted as “missing”. Finally, “not measured” indicates that ultrasounds have been done; however, the specific variable of interest was never measured on any antenatal ultrasound.

Figure 1.4: Maximum bowel dilation reported on antenatal ultrasound

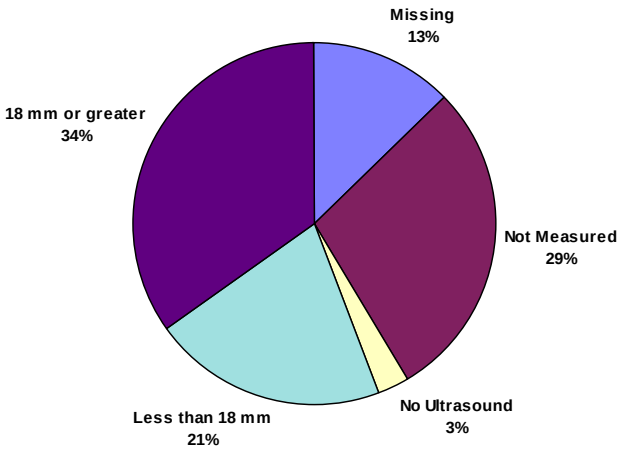


Figure 1.5: Bowel wall thickening reported on antenatal ultrasound

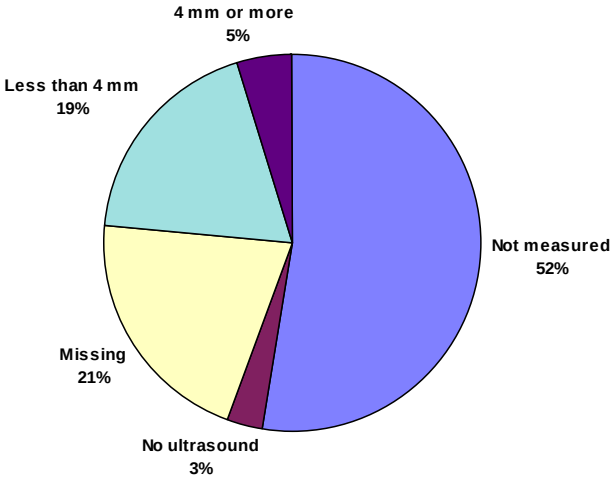


Table 1.6: Antenatal plan for delivery

Delivery plan as of 32 weeks	*n*	%
No pre-determined plan	85	22%
Spontaneous vaginal delivery	116	29%
Elective caesarean section	32	8%
Induction	130	33%
Other	4	1%
Unknown	28	7%

Figure 1.7: Actual mode of delivery by centre

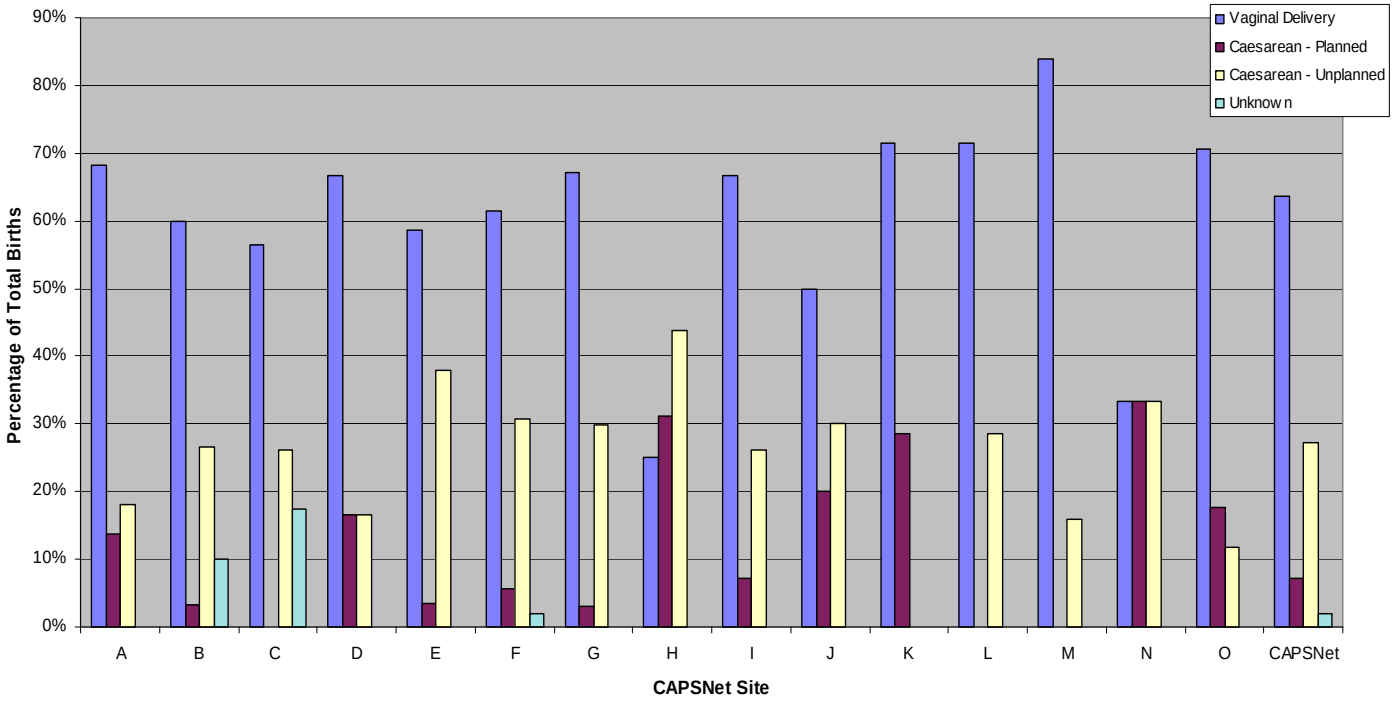


Figure 1.8a: Pre-operative bowel protection

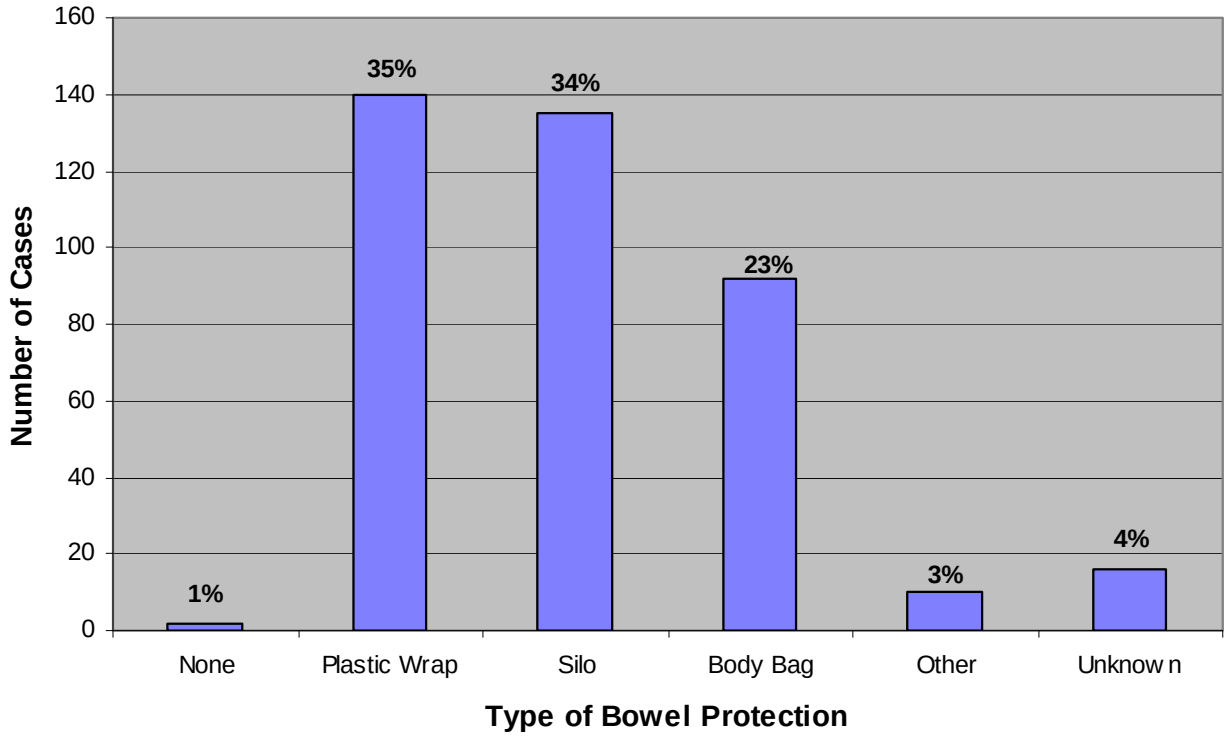


Table 1.8b: Time elapsed until pre-operative bowel protection established

Timing of pre-operative bowel protection	*n*	*%*
<= 1 hour	274	69%
1-4 hours	69	17%
> 4 hours	30	8%
Unknown	9	2%
No bowel protection	2	1%

Figure 1.9a: Timing of gastroschisis closure

Timing of gastroschisis closure	*n*	*%*
<6 hr	194	49%
6-12 hr	37	9%
12-24 hr	15	4%
>24 hr	133	34%
Unknown	13	3%
No surgery	3	1%

The denominator in the following 3 figures (1.10B – 1.11A) include only those cases in which surgery was performed (i.e., n=392).

Figure 1.9b: Surgeon's treatment intent by centre

The surgeon's treatment intent was to perform an urgent primary closure in 59% (n=230) of cases, and elective primary closure (enabled by a silo) in 38% (n=148). In the remaining 4% (n=14) cases, the surgeon's treatment intent is unknown.

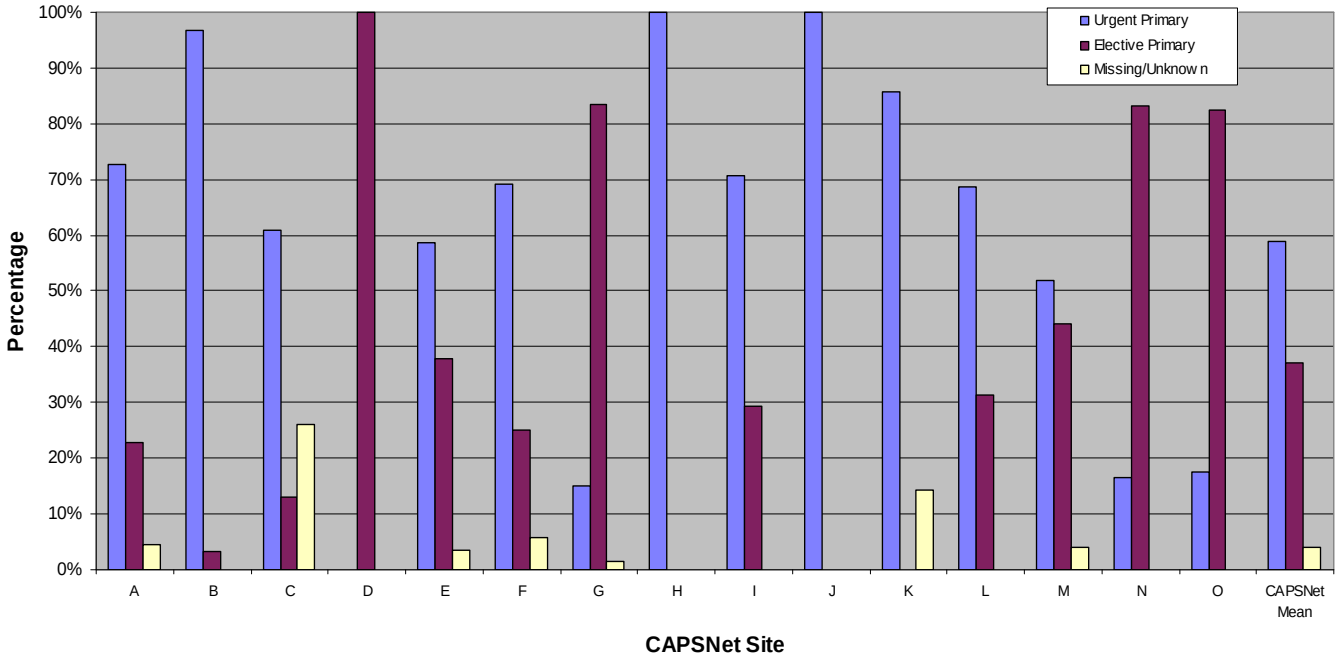


Figure 1.10a: Method of surgical closure

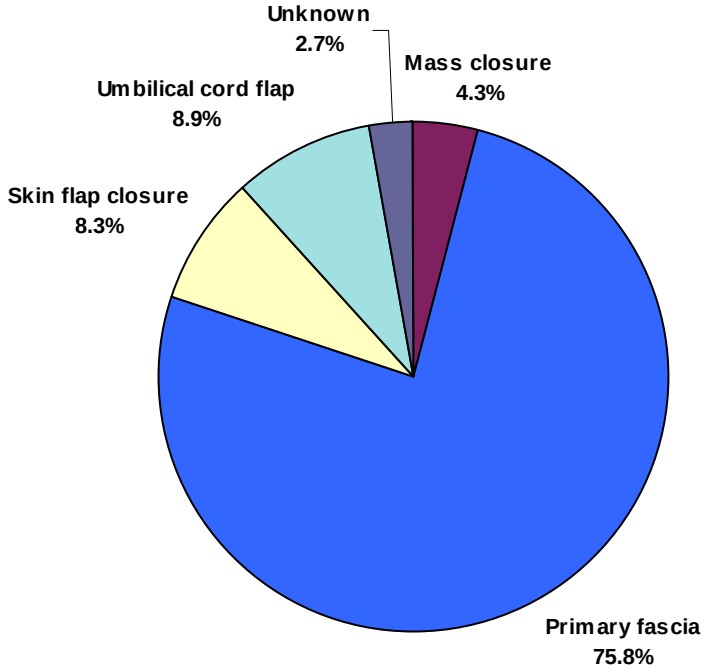


Figure 1.10b: Operative success

Of 392 primary operations, 83% were recorded as successful. 16% were reported as failed initial closures for the following reasons:*

Reasons for failed surgery	***n***	**%**
Bowel not reducible	38	60.3%
Bowel would reduce, but IPP or PIP too high to close abdomen (or seemed to tight to close)	20	31.7%
Unknown	5	7.9%

* The remaining one percent consists of two cases with missing data.

Figure 1.11: Proportion and severity of bowel injury

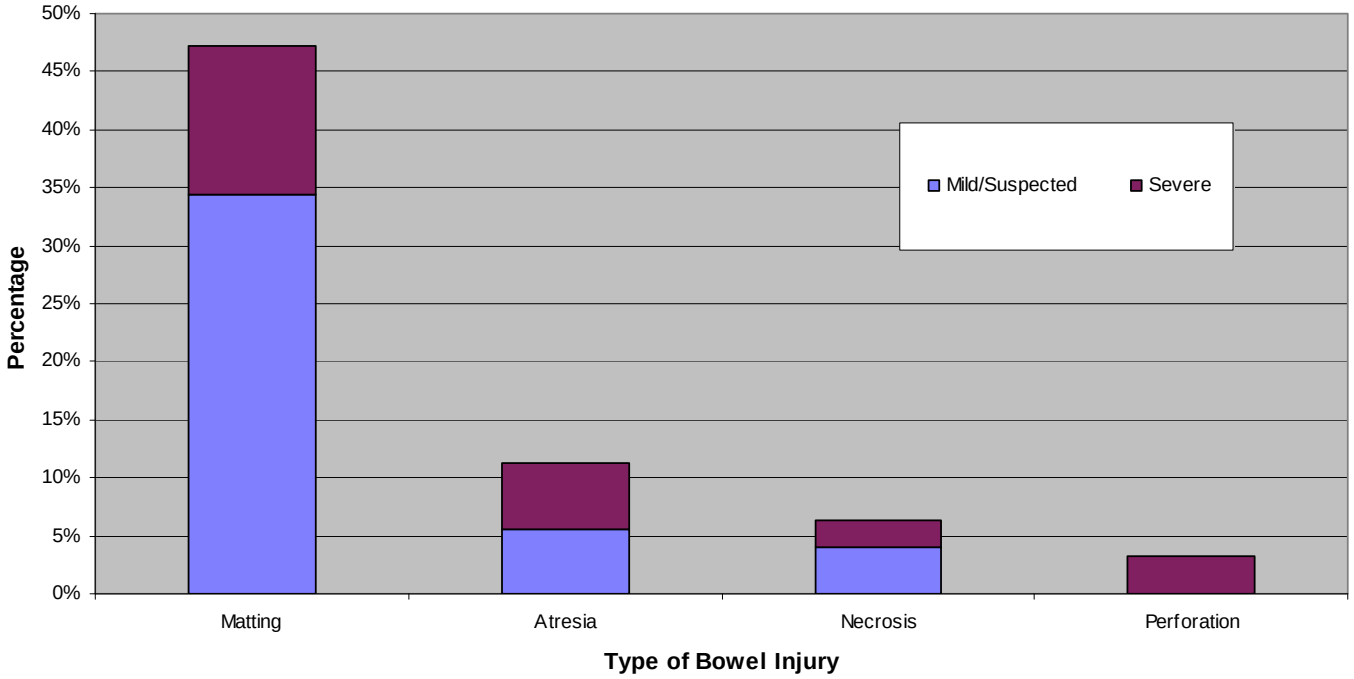


Figure 1.12: Selected neonatal complications

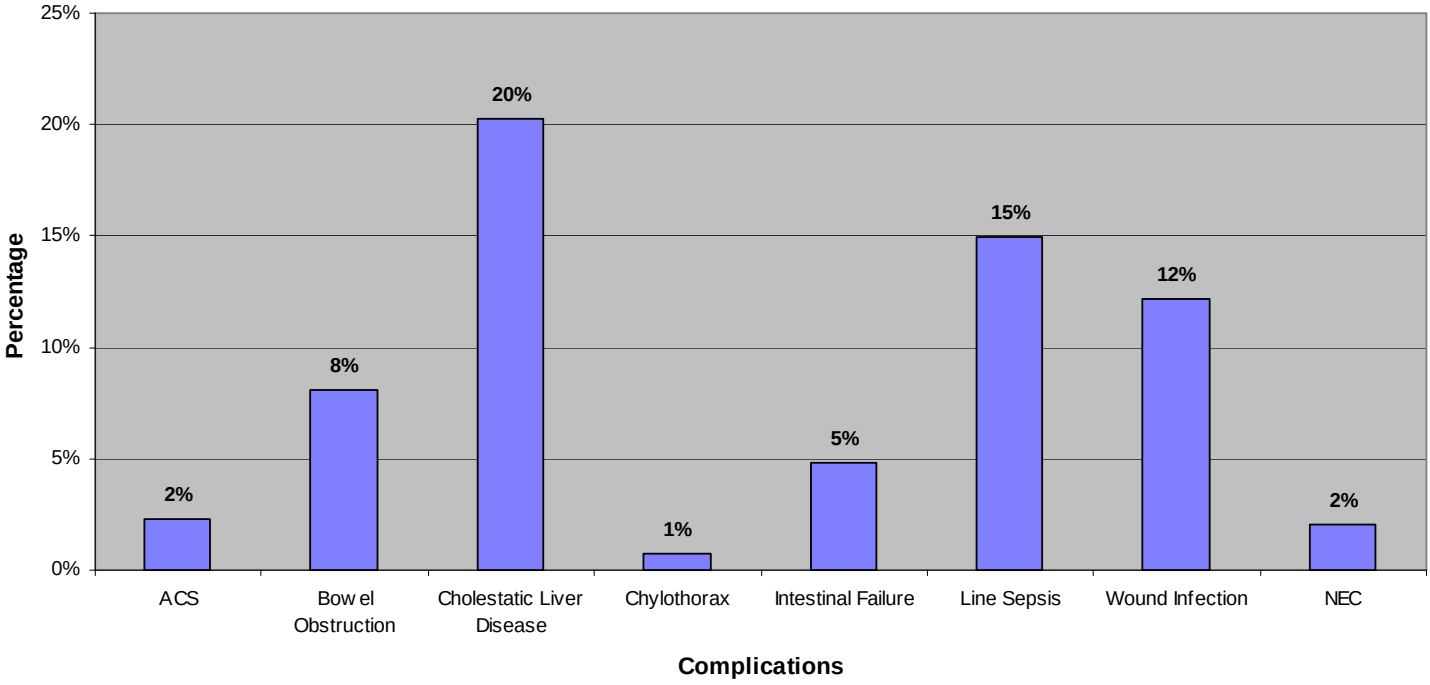


Figure 1.13a: Neonatal outcomes: Length of stay, TPN days and days to enteral feeds

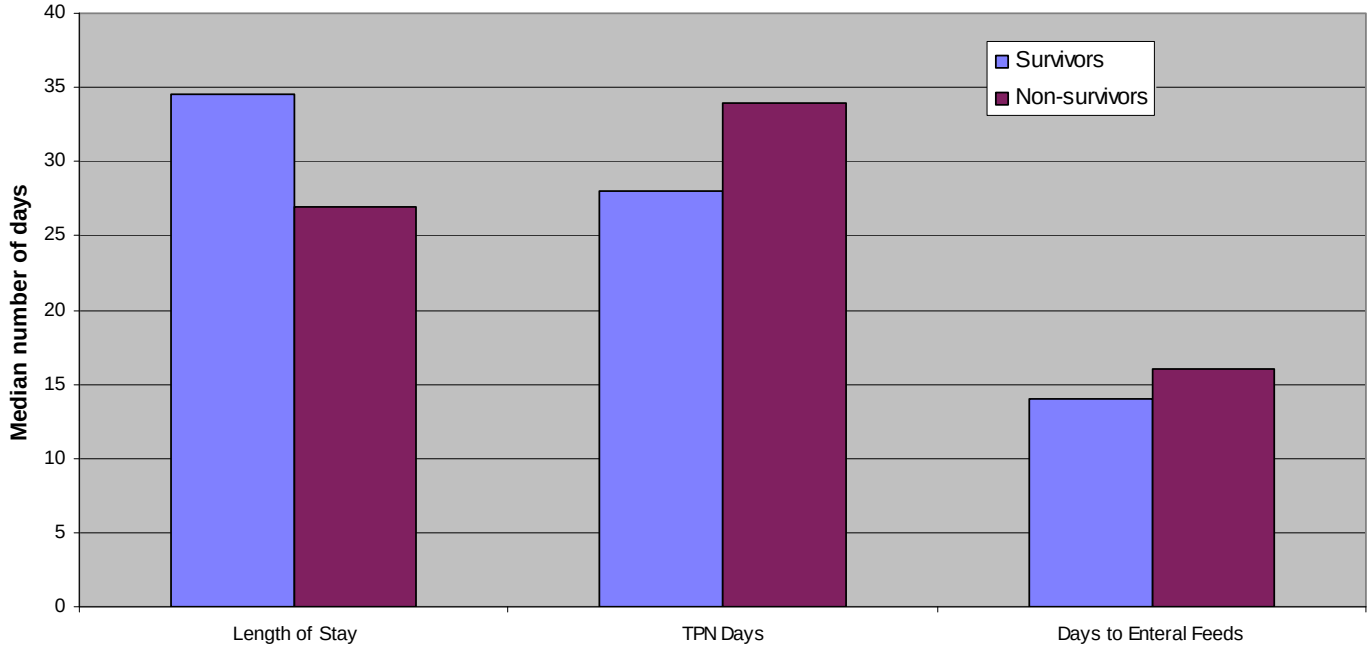


Table 1.13b: Neonatal outcomes: Length of stay, TPN days and days to enteral feeds

	Survivors (*n* = 380)			Non-survivors (*n* =15)		
	Median	**Mean**	**Range**	**Median**	**Mean**	**Range**
Length of stay (days)	35	48	1-349*	27	60	1-272
TPN days	28	39	5-221	34	55	8-182
Days to enteral feeds	14	17	1-96	16	21	1-62

* Three babies have a length of stay of 1 day because they were transferred to another hospital for treatment and no further data is available.

CDH Descriptive Analyses

Table 2.0: Patient Population

Congenital Diaphragmatic Hernia ***n* = 215**	
Overall survival rate	81.3%
Inborn rate	66.0%
Mean birth weight	3052 g
Proportion of males	59.5%
Isolated defect	60.9%
Proportion requiring ECMO	6.9%
Proportion with left sided defect	69.8%
Mean SNAP-II Scores Survivors Non-Survivors (n=28) *Median SNAP-II Scores* Survivors Non-Survivors (n=28)	 13.5 33.0 12.0 27.0

Table 2.1 Survival by centre volume

Table shows survival rate grouped by volume of CDH cases. "Low volume" includes centres that see on average 1 or fewer cases of CDH each year; whereas "high volume" includes centres that see on average 5 or more CDH cases a year; "mid-volume" therefore includes all those in between.

	Count (N)	**Survival rate (%)**	**Median SNAP-II score**	**SNAP-II range**
High volume (4 centres)	90	81%	13	0-77
Mid volume (6 centres)	53	86%	16	0-44
Low volume (3 centres)	10	50%	19.5	0-59
CAPSNet	153*	81%	16	

**If more than 65% of the SNAP score data elements were missing then a baby's SNAP-II score could not be computed and thus have been excluded from any mean/median calculations of SNAP-II scores.*

Figure 2.2: Gestational age at birth (complete weeks)

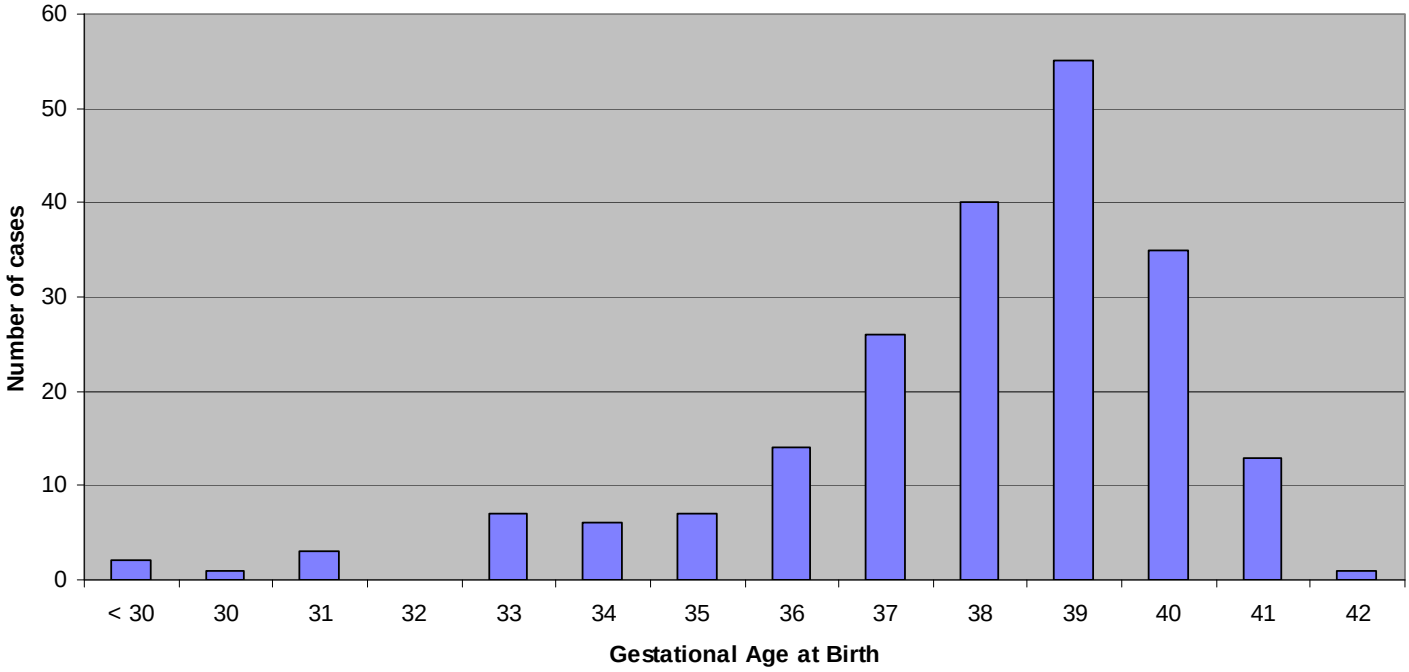
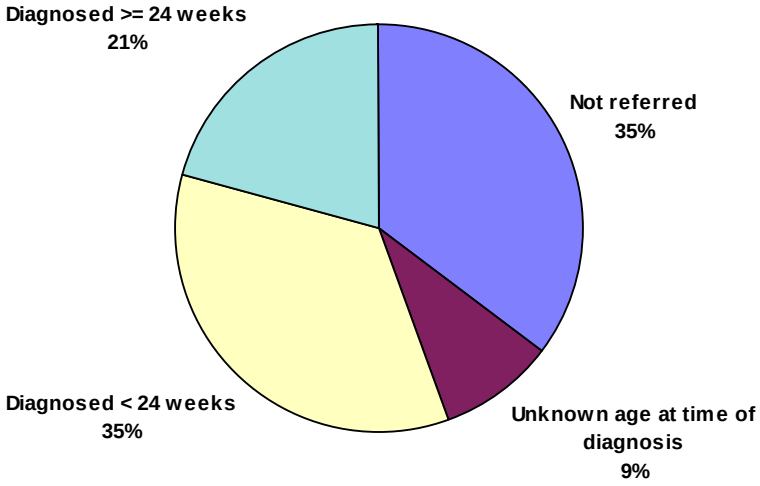


Figure 2.3: Early vs. late antenatal diagnosis

Figure shows the percentage of cases that were diagnosed: (i) antenatally before 24 weeks (35%); (ii) antenatally at 24 weeks or greater (21%); and cases (iii) not referred to a tertiary CAPSNet centre that were first diagnosed postnatally (35%).



Ultrasound Measurements (Figure 2.4)

Measurements are recorded on up to four ultrasounds taken at varying time points:

(i) first ultrasound taken at the tertiary CAPSNet centre
(ii) first ultrasound taken between 23+0 and 27+6 weeks;
(iii) first ultrasound taken between 28+0 and 32+6 weeks, and
(iv) last ultrasound before delivery.

The data presented here reflects the worst (i.e. greatest) measurement reported on any one of the above measured ultrasounds. If there were no reported ultrasounds this has been indicated under “no ultrasounds”. Where antenatal ultrasounds were taken, but data entry incomplete, this has been noted as “missing”. Finally, “not measured” indicates that ultrasounds have been done; however, the specific variable of interest was never measured on any antenatal ultrasound.

Figure 2.4: Maximum lung-head ratio reported on antenatal ultrasound

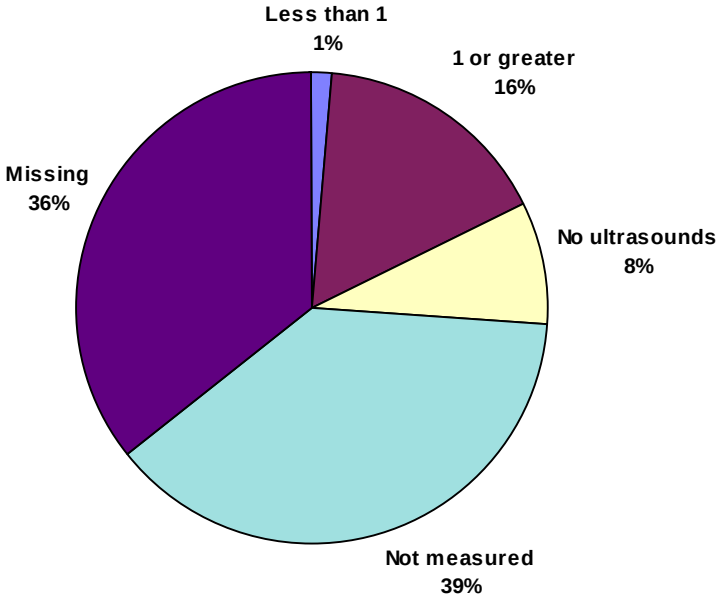
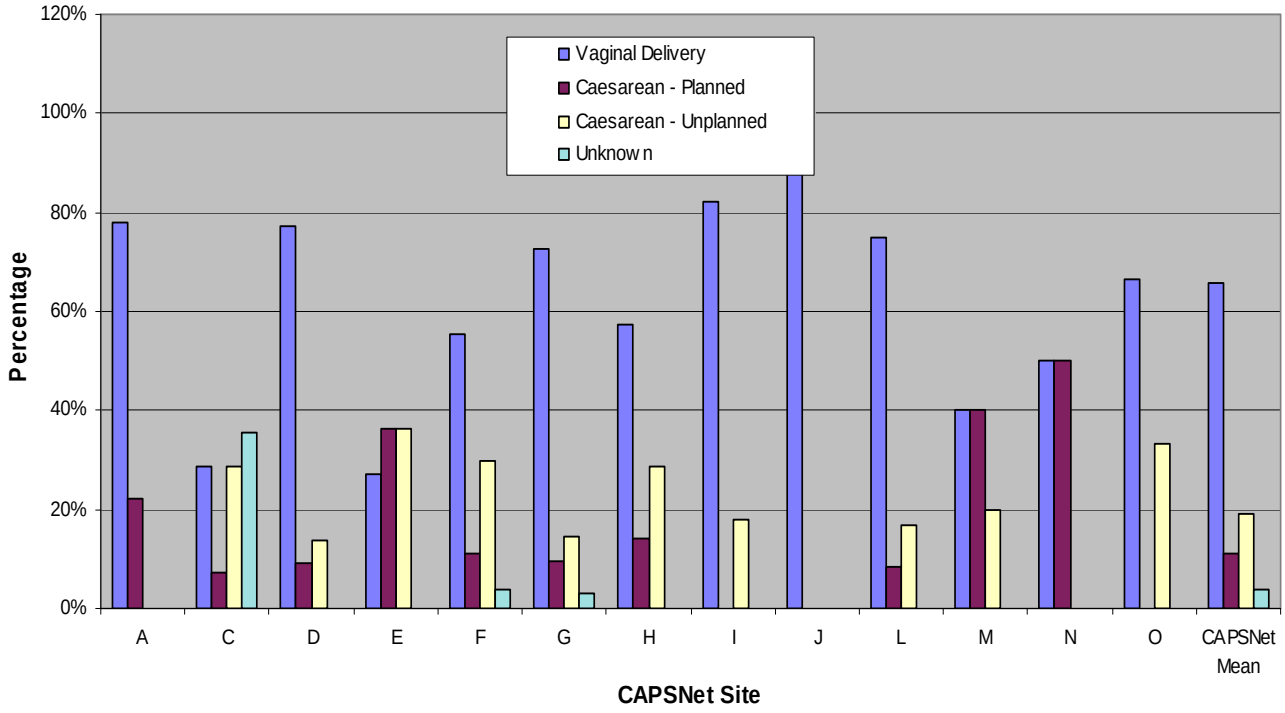


Figure 2.5: Mode of delivery by centre



The denominator in the following two figures include only those cases in which surgery was performed (i.e., n=186).

Figure 2.6: Mean days to surgical repair by centre

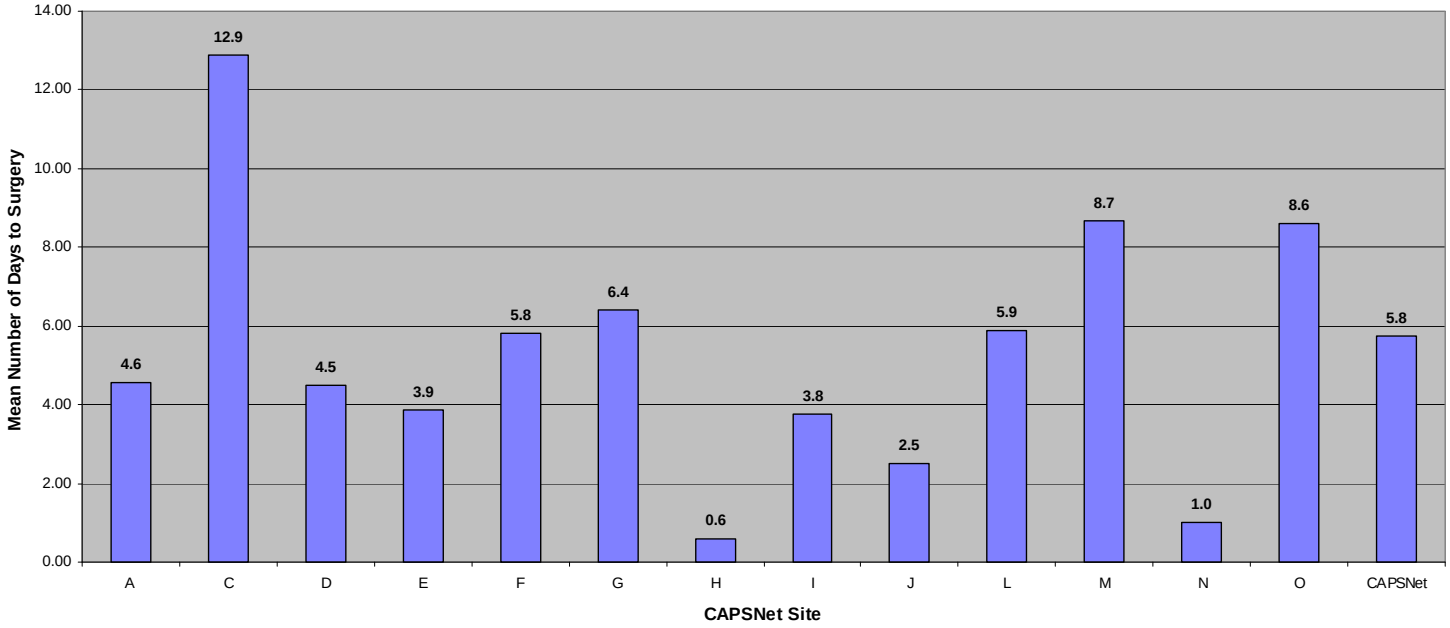


Figure 2.7: Method of surgical closure

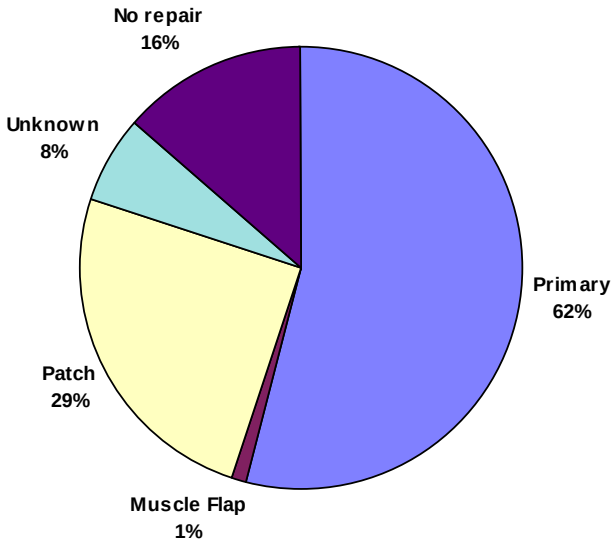


Figure 2.8: Selected neonatal complications

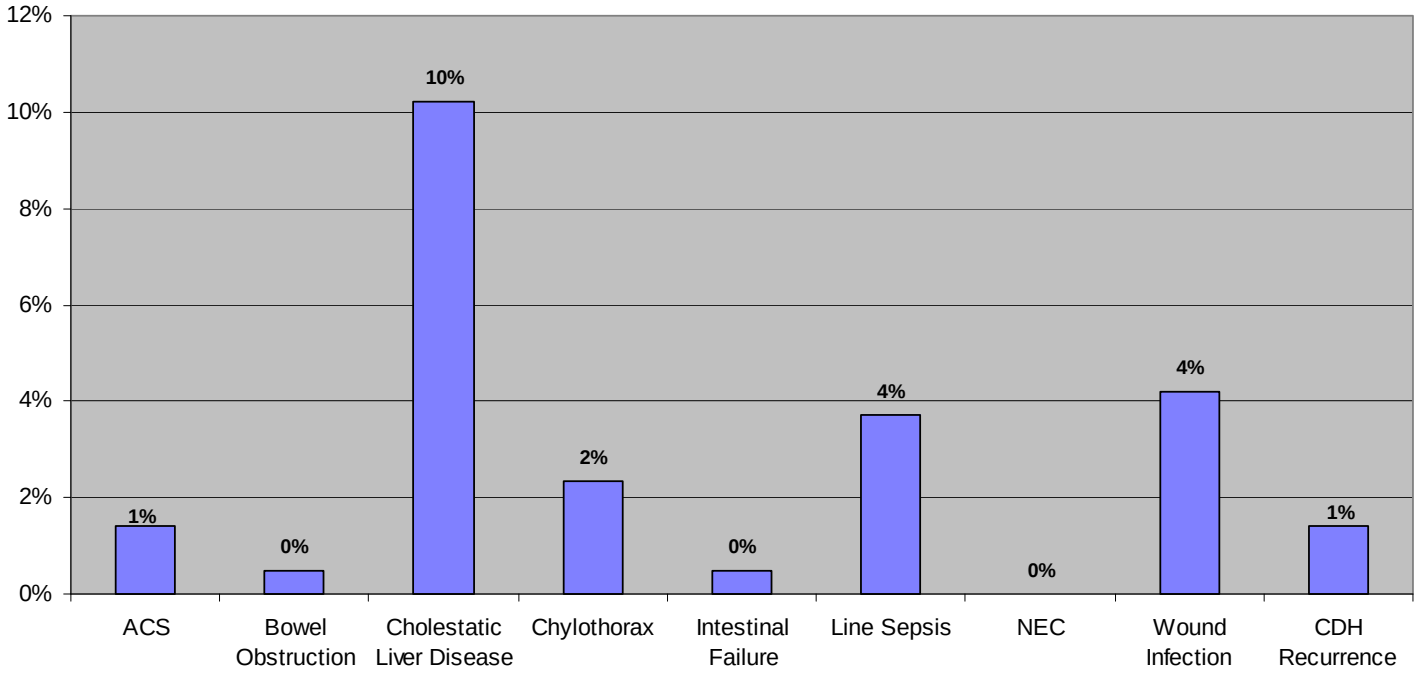


Figure 2.9a: Neonatal outcomes: Tube feeding, GER, CNS injury and oxygen support required at discharge

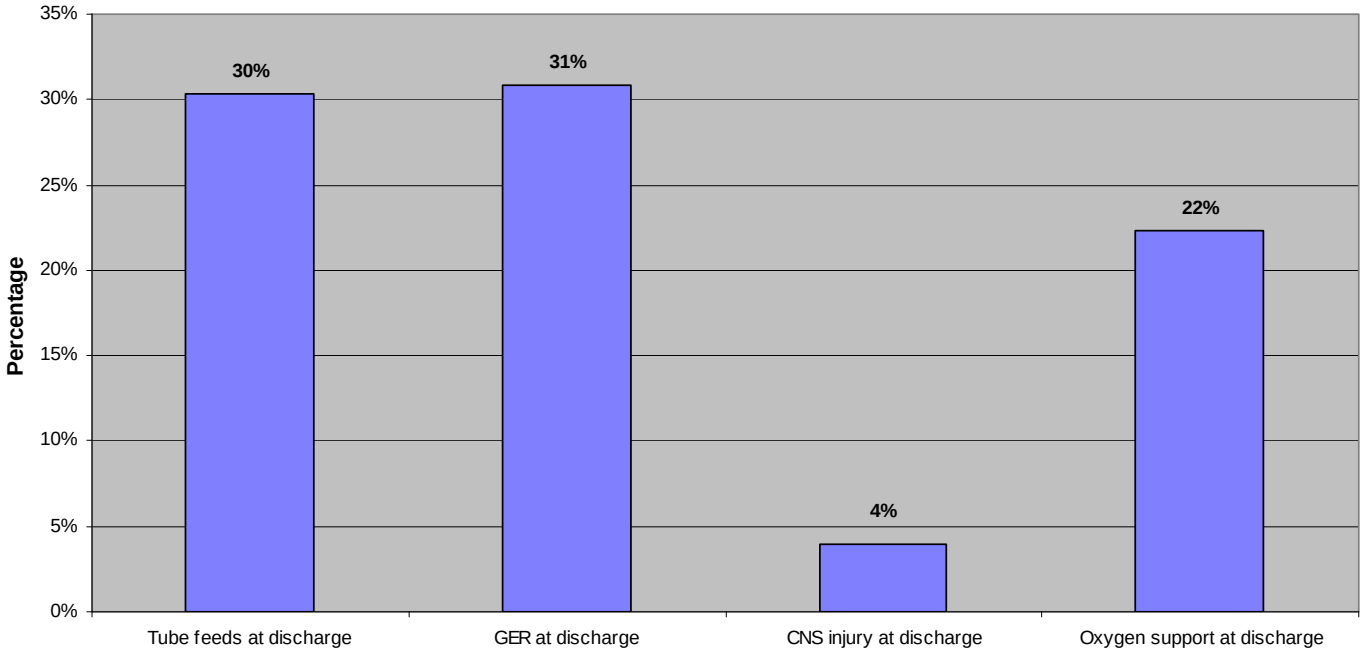


Table 2.9b: Neonatal outcomes

	Survivors (*n* = 174)*			Non-survivors (*n* = 40)		
	Median	**Mean**	**Range**	**Median**	**Mean**	**Range**
Length of stay (days)	27	38.2	4-340	10	19.5	1-125
TPN days	15	19.9	3-125	18	20.9	2-48
Days to enteral feeds	8	10.2	1-57	17	19.1	4-30
Ventilation days (if required)	9	12.1	0-83	7.5	17.4	1-86
ECMO days (if required)	10	14.2	2-31	14	13.2	1-29
Supplemental O_2 days (if required)	2	6.7	0-121	0	2.2	0-54

*1 baby has been removed from this analysis (length of stay of 362 days, was on TPN for 352 days and took 342 days to reach enteral feeds) due to concerns of the accuracy of the data. Data will be checked at the center to ensure it is correct and then will be included in future reports.

Appendix I: Definitions

Population Definition: The CAPSNet database captures:

A) All cases of confirmed or suspect Congenital Diaphragmatic Hernia (CDH) and Gastroschisis (GS) diagnosed antenatally and referred to one of the participating tertiary perinatal centres for ongoing prenatal care of the fetus, regardless of the final outcome of pregnancy,

AND

B) All cases of CDH and GS diagnosed postnatally up to 7 days of life who were either born at or transferred after birth to one of the participating centres.

***SNAP-II (Score for Neonatal Acute Physiology*)**: is an illness severity scoring system which stratifies patients according to cumulative severity of physiologic derangement in several organ systems within the first 12 hrs of admission to the intensive care unit. This scoring system has been shown to be highly predictive of neonatal mortality and to be correlated with other indicators of illness severity including therapeutic intensity, physician estimates of mortality risk, length of stay, and nursing workload. SNAP provides a numeric score that reflects how sick each infant is. The scoring system is modeled after similar adult and pediatric scores, which are already widely in use.

Gastroschisis Bowel Dilation: refers to the maximum internal (i.e. endoluminal) diameter measured from inner wall to inner wall along the short axis of the bowel loop at the most dilated segment of the extruded bowel in millimeters (mm).

Gastroschisis Bowel Wall Thickening: refers to the maximum bowel wall thickness measured from the inner wall to the outer wall of the thickest portion of the small bowel in millimeters (mm).

CDH Lung-Head Ratio: refers to the maximum recorded lung to head ratio measured from a transverse axial image through the chest demonstrating the four-chamber view of the heart with associated shift to the contralateral side. The contralateral lung is observed and the longest diameter measured (in millimeters). A line perpendicular to the first is then drawn and measured again in millimeters (mm).

Appendix II: CAPSNet Publication and Presentation List

Publications

Skarsgard E. Networks in Canadian Pediatric Surgery: Time to get Connected. Paediatr Child Health. 2006 Jan; 11(1):15-18.

Skarsgard ED, Claydon J, Bouchard S, Kim P, Lee SK, Laberge JM, McMillan D, von Dadelszen P, Yanchar N and the Canadian Pediatric Surgery Network. Canadian Pediatric Surgical Network: a population-based pediatric surgery network and database for analyzing surgical birth defects: The first 100 cases of gastroschisis. J Pediatr Surg. 2008 Jan;43(1):30-4.

Baird R, MacNab YC, Skarsgard ED, and the Canadian Pediatric Surgery Network. Mortality prediction in congenital diaphragmatic hernia. J Pediatr Surg. 2008 May;43(5):783-7.

Weinsheimer RL, Yanchar NL, Bouchard S, Kim P, Laberge JM, Skarsgard ED, Lee SK, McMillan D, von Dadelszen P, and the Canadian Pediatric Surgery Network. Gastroschisis Closure – Does Method Really Matter? J Pediatr Surg. 2008 May;43(5):874-8.

Weinsheimer RL, Yanchar NL and the Canadian Pediatric Surgical Network. Impact of Maternal Substance Abuse and Smoking on Children with Gastroschisis. J Pediatr Surg. 2008 May;43(5):879-83.

Boutros J, Regier M, Skarsgard ED and the Canadian Pediatric Surgery Network. Is Timing Everything? The Influence of Gestational Age and Intended and Actual Route of Delivery on Treatment & Outcome in Gastroschisis. J Pediatr Surg 44:912-7, 2009

Grushka JR, Laberge JM, Puligandla P, Skarsgard ED and the Canadian Pediatric Surgery Network. The effect of hospital case volume on outcome in Congenital Diaphragmatic Hernia. J Pediatr Surg 44:873-6, 2009

Publications (In Press)

Mills JA, Lin Y, MacNab YC, Skarsgard ED and the Canadian Pediatric Surgery Network. Does Overnight birth influence Treatment or Outcome in Congenital Diaphragmatic Hernia? Am J Perinatol (in press)

Cowan KN, Puligandla PS, Bütter A, Skarsgard ED, Laberge JM and the Canadian Pediatric Surgery Network. The Gastroschisis Bowel Score Predicts Outcome in Gastroschisis. Surgery (in press)

Baird R, Puligandla P, Skarsgard ED, Laberge JM, and the Canadian Pediatric Surgery Network. The Use of Antibiotics in the Management of Gastroschisis-Canadian Practice Patterns. J Pediatr Surg (in press)

Brindle M, Ma IW, Skarsgard ED and the Canadian Pediatric Surgery Network. Impact of Target Blood Gases on Outcome in Congenital Diaphragmatic Hernia (CDH). J Pediatr Surg (in press)

Brindle M, Oddone E, Skarsgard ED and the Canadian Pediatric Surgery Network. Need for Patch Repair Influences Outcome in Congenital Diaphragmatic Hernia (CDH). J Pediatr Surg (in press)

Mills J, Lin Y, MacNab Y, Skarsgard ED JM and the Canadian Pediatric Surgery Network. Perinatal Predictors of Outcome in Gastroschisis. J Pediatr Surg (in press)

Podium Presentations:

Skarsgard ED, Claydon J, Bouchard S, Kim P, Lee SK, Laberge JM, McMillan D, von Dadelszen P, Yanchar N and the Canadian Pediatric Surgery Network. Canadian Pediatric Surgical Network: a population-based pediatric surgery network and database for analyzing surgical birth defects: The first 100 cases of gastroschisis. Presented at the 38th Annual Meeting of the American Pediatric Surgical Association. May 2007. Also Presented at the 26th Annual Meeting of the International Fetal Medicine and Surgery Society. Apr 30, 2007. And at the 7th Annual Pan-African Pediatric Surgical Association. Aug 2008. [J Pediatr Surg. 2008 Jan; 43(1):30-4]

Pressey TP, Skarsgard ED, Claydon J, von Dadelszen P and the Canadian Pediatric Surgery Network. Ultrasound Predictors of Outcome in Antenatally Diagnosed Gastroschisis. Presented at the 26th Annual Meeting of the International Fetal Medicine and Surgery Society. Apr 30, 2007.

Baird R, MacNab YC, Skarsgard ED, and the Canadian Pediatric Surgery Network. Mortality prediction in congenital diaphragmatic hernia. Presented at the 2007 Annual Canadian Association of Pediatric Surgeons Meeting; St. John's, Newfoundland. Aug 25, 2007. [J Pediatr Surg. 2008 May;43(5):783-7]

Weinsheimer RL, Yanchar NL, Bouchard S, Kim P, Laberge JM, Skarsgard ED, Lee SK, McMillan D, von Dadelszen P, and the Canadian Pediatric Surgery Network. Gastroschisis Closure – Does Method Really Matter? Presented at the 2007 Annual Canadian Association of Pediatric Surgeons Meeting; St. John's, Newfoundland. Aug 25, 2007. [J Pediatr Surg. 2008 May;43(5):874-8]

Weinsheimer RL, Yanchar NL and the Canadian Pediatric Surgical Network. Impact of Maternal Substance Abuse and Smoking on Children with Gastroschisis. Presented at the 2007 Annual Canadian Association of Pediatric Surgeons Meeting; St. John's, Newfoundland. Aug 25, 2007. [J Pediatr Surg. 2008 May;43(5):879-83]

Mills J, MacNab Y, Skarsgard ED and the Canadian Pediatric Surgery Network. Does Overnight Birth Time Influence Surgical Management of Outcome in Neonates with Gastroschisis? Presented at the 79th Annual Meeting of the Pacific Coast Surgical Association; San Diego, California. Feb 16, 2008. Also presented at the 2008 Joint Meeting of the Pediatric Academic Societies and the Asian Society for Pediatric Research. May 2008.

Pressey TP, Skarsgard ED, Claydon J, von Dadelszen P and the Canadian Pediatric Surgery Network. Antenatal Ultrasound Detection of Abnormal Amniotic Fluid Volume Predicts Adverse Perinatal Outcomes. Presented at the 14th International Conference on Prenatal Diagnosis and Therapy. Jun 2008.

Boutros J, Regier M, Skarsgard ED and the Canadian Pediatric Surgery Network. Is Timing Everything? The Influence of Gestational Age and Intended and Actual Route of Delivery on Treatment & Outcome in Gastroschisis. Presented at the 2008 Annual Meeting of the Canadian Association of Pediatric Surgeons. Sep 2008. [J Pediatr Surg 44:912-7, 2009]

Grushka JR, Laberge JM, Puligandla P, Skarsgard ED and the Canadian Pediatric Surgery Network. The effect of hospital case volume on outcome in Congenital Diaphragmatic Hernia. Presented at the 2008 Annual Meeting of the Canadian Association of Pediatric Surgeons. Sep 2008. [J Pediatr Surg 44:873-6, 2009]

Cowan KN, Puligandla PS, Bütter A, Skarsgard ED, Laberge JM and the Canadian Pediatric Surgery Network. The Gastroschisis Bowel Score Predicts Outcome in Gastroschisis. Presented at the 4th Annual Academic Surgical Congress; Fort Myers, Florida. Feb 2009.

Baird R, Skarsgard ED, Laberge J-M, Puligandla PS, and the Canadian Pediatric Surgical Network. The Use of Antibiotics in the Management of Gastroschisis-Canadian Practice Patterns. Presented at the 40th Annual Meeting of the American Pediatric Surgical Association; Fajardo, Puerto Rico. May 28-30, 2009

Brindle M, Ma IW, Skarsgard ED and The Canadian Pediatric Surgery Network. Impact of Target Blood Gases on Outcome in Congenital Diaphragmatic Hernia (CDH). Presented at the 40th Annual Meeting of the American Pediatric Surgical Association; Fajardo, Puerto Rico. May 28-30, 2009

Brindle M, Oddone E, Skarsgard ED and The Canadian Pediatric Surgery Network. Need for Patch Repair Influences Outcome in Congenital Diaphragmatic Hernia (CDH). Presented at the 40th Annual Meeting of the American Pediatric Surgical Association; Fajardo, Puerto Rico. May 28-30, 2009

Mills J, Lin Y, MacNab Y, Skarsgard ED JM and the Canadian Pediatric Surgery Network. Perinatal Predictors of Outcome in Gastroschisis. Presented at the 40th Annual Meeting of the American Pediatric Surgical Association; Fajardo, Puerto Rico. May 28-30, 2009

Poster Presentations:

Grushka JR, Laberge JM, Puligandla P, Skarsgard ED and the Canadian Pediatric Surgery Network. The Effect of Prenatal Diagnosis on the Contemporary Outcome of CDH. Presented at the 40th Annual Meeting of the American Pediatric Surgical Association; Fajardo, Puerto Rico. May 28-30, 2009

Butterworth S, Skarsgard ED and the Canadian Pediatric Surgery Network. Is the need for fascial defect extension a predictor of adverse outcome in gastroschisis? To be presented at the 2009 Annual Meeting of the Canadian Association of Pediatric Surgeons. Oct 2009.

Additional Ongoing Projects:

Dr. Javed Akhtar, Dr. David Price - “Analysis of atypical perinatal events in Gastroschisis”

Dr. Sonia Butterworth, Dr. Erik Skarsgard – “Preoperative predictors of unfavorable outcome in CDH- comparing the ultility of delta SNAP-II, ventilation mode and persistent ductal saturation gradient”

Dr. Ayala Gover, Dr. Sonia Butterworth, Dr. Erik Skarsgard – “In gastroschisis: does early stratification into low and high risk patients, and a multidisciplinary feeding team improve outcome?”

Dr. Leigh Jansen, Dr. Erik Skarsgard - “Effect of preclosure resuscitation on outcome in Gastroschisis”

Dr. Arash Safavi, Dr. Erik Skarsgard – “Perinatal Management of Congenital Diaphragmatic Hernia (CDH): How should babies be delivered?”

Dr. Rebecca Sherlock, Dr. Philippe Chessex, Dr. Erik Skarsgard - “Does TPN photoprotection reduce TPN cholestasis in gastroschisis patients?”

Dr. Erik Skarsgard - “Interobserver Reliability of surgeon’s scoring of bowel injury in gastroschisis”

Appendix III: Changes to 2009 CAPSNET Annual Report version 1 to version 2

Description of Change	*Page*
1. Table 1.0 - proportion of isolated defect updated to include infants where "undescended testes" was entered as "unknown", to be reported as not having an additional defect.	7
2. Table 1.0 - addition of median SNAP-II scores in consideration that there are low numbers of infants in the "non-survivor" group.	7
3. Table 1.1 - mean SNAP-II scores replaced by median values. Addition of "count" column and "range of SNAP-II" column.	7
4. Figures 1.4 & 1.5 - addition of an explanation of what is meant by the labels "missing" and "not measured".	9
5. Figure 1.5 - updated, labels on pie chart incorrect.	9
6. Figure 1.9b – updated to include a CAPSNet Mean value	12
7. Figure 1.10a - updated to include percentage value for "primary fascia"	13
8. Table 1.13b - addition of footnote to explain how surviving babies could have a length of stay of 1 day, i.e. they were transferred to another hospital for treatment and no further data is available.	15
9. Table 2.0 - mean SNAP-II score for non-survivors was incorrect	16
10. Table 2.0 - addition of median SNAP-II scores in consideration that there are low numbers of infants in the "non-survivor" group.	16
11. Table 2.1 - mean SNAP-II scores replaced by median values. Addition of "count" column and "range of SNAP-II" column.	16
12. Figure 2.3 – updated, incorrect graph had been inserted here showing the GS numbers rather than CDH.	17
13. Figures 2.4 - addition of an explanation of what is meant by the labels "missing" and "not measured".	18
14. Figure 2.5 - updated to include a CAPSNet Mean value.	19
15. Table 2.9b - removed one outlier, footnote explanation added. - updated title - addition of median vent days for non-survivors, which was previously missing - updated supplemental O2 to include days on CPAP as well as days requiring supplemental O2 by nasal prongs (i.e. low/high flow).	21