

# Canadian Neonatal Follow-Up Network Réseau Canadien de Suivi Néonatal



## CNFUN Annual Report 2019

## **Introduction**

The Canadian Neonatal Follow-Up Network (CNFUN) is collaboration between Neonatal and Perinatal Follow-Up Programs in Canada and their multidisciplinary team members. It was developed in liaison with the Canadian Neonatal Network (CNN) to facilitate collaboration in research, integrated data collection, knowledge translation and to improve the quality of care and long-term outcomes of children seen in their programs.

## **CNFUN's Mission**

CNFUN's mission is to be a network of health care professionals dedicated to improving the care of newborns and children at high risk of adverse outcome as a result of conditions requiring intensive medical care.

## **CNFUN's goals include:**

- Establish a network of Canadian health care professionals involved in neonatal / perinatal follow-up programs
- Develop a common standardized set of assessments to be done at standardized ages and common definitions to create the CNFUN data set.
- Develop a national electronic database of the CNFUN dataset and link it to neonatal and perinatal datasets including the Canadian Neonatal Network
- Use the CNFUN database to improve health care and its provision by providing accurate up to date information for decision making, identifying best practices and facilitating the acquisition of long term outcomes data in neonatal, perinatal and early intervention research.
- Be advocates for our population of children by ensuring that the best evidence is translated into practice.

## **Administrative Structure**

A Steering Committee oversees CNFUN activities and makes policy decisions. Site representatives from participating institutions provide representation, input and liaison for participating institutions.

The Steering Committee was appointed for the first 5 years and has been elected every 2 years since. It is to be composed of 9 members:

- The director of the network
- A co-director chosen by the CNFUN steering committee
- 5 members representing different geographic regions of Canada.
- 3 members representing allied health professionals in the fields of nursing, psychology, occupational or physiotherapy or speech and language. One of these professionals must be familiar with the Bayley-III.

The Network Coordinating Centre will provide administrative support to CNFUN, its committees and institutional and individual members.

## Membership

Membership is open to all health care professionals with an interest in neonatal/perinatal follow-up. There are two types of membership – institutional and individual.

Institutional Membership is open to all institutions, which have a neonatal or perinatal follow-up program.

- **Application:** to be submitted to the Chair of the Steering Committee
- **Membership fee:** none
- **Obligations:** membership requires commitment by the institution to collect and contribute the data to the CNFUN data set. Institutional members agree that their data may be used at the discretion of the network, within guidelines agreed upon between network members.
- **Benefits:** The database will be maintained and error checked by CNFUN and MiCare (Maternal Infant care Network). An institution's own data will be available for its own use. Research projects and resultant manuscripts using network data need to be approved by the Steering Committee.
- **Representation:** The institution will appoint a liaison representative who will represent the institution for policy decisions of the Network. The number of members who can vote for members of the Steering Committee shall be proportional to the number of participant data submitted to the CNFUN database.

- **Renewal and Termination:** Institutional membership is on-going until terminated by the institution, by written notice to the Chair of the Steering Committee. Membership may also be terminated by the Steering Committee if an institution fails to maintain data contribution to the CNFUN database.

Individual membership: is open to all health care professionals with an interest in neonatal / perinatal follow-up.

- **Application:** should be submitted to the chair of the Steering Committee and should be endorsed by an existing member.
- **Membership fee:** none
- **Obligations:** members agree to abide by the rules governing research conduct and use of the data.
- **Benefits:** Members may use network infrastructure for research collaboration. Research projects using network data must be approved by the Steering Committee.
- **Renewal and termination:** Individual membership will need to be renewed every three years.

### **CNFUN Funding**

CNFUN was initiated with support from the Canadian Institutes of Health Research through a grant to the CIHR Team in Maternal-Infant Care (CTP 87518). The study coordinating centre, the Maternal-Infant Care Research Centre, is supported by program funding from the Ontario Ministry of Health and Long-Term Care.

Current funding is from the CIHR SPOR grant “CHILD-BRIGHT” (Child Health Initiatives Limiting Disability- Brain Research Improving Growth and Health Trajectories) for the “Parent-EPIQ” project and the CIHR Pan-Canadian Network to Improve Outcomes of Preterm Birth.

Participating sites contribute additional funding for patient outcome assessments.

### **CNFUN steering committee**

Dr. Anne Synnes – Neonatologist / neonatal follow-up- founding director (British Columbia)

Dr. Thuy Mai Luu – Co-director Neonatal follow-up (Québec)

Dr. Diane Moddemann –Neonatal follow-up (Manitoba)

Dr. Jill Zwicker- Occupational therapist / researcher (British Columbia)

Dr. Kevin Coughlin-Neonatologist / neonatal follow-up (Ontario)

Dr. Jehier Afifi-Neonatologist / neonatal follow-up (Nova Scotia)

Dr. Ruth Grunau – Psychologist / researcher (British Columbia)

Lynn Whitty-Nurse / neonatal follow-up (Ontario)

Dr. Rudaina Banihani -Neonatologist / neonatal follow-up (Ontario)

### **Annual report review committee**

Dr. Anne Synnes – Neonatologist, neonatal follow-up- (British Columbia)

Dr. Thuy Mai Luu –Neonatal follow-up (Québec)

Dr. Jehier Afifi-Neonatologist, neonatal follow-up (Nova Scotia)

Dr. Matthew Hicks – Neonatologist, developmental & behavioral pediatrics (Alberta)

Carolina Segura- CNFUN National Coordinator (British Columbia)

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#### I. Summary of Publications

## A. Executive summary

We are pleased to provide the second annual CNFUN report. CNFUN aims to provide accurate up to date information on the outcomes of children born very preterm across Canada and to improve health and the provision of health care. This report provides unprecedented national and site specific data. Since the start of CNFUN data collection in April 2009, 6432 children have participated in CNFUN and 5863 of these have linked neonatal data from the Canadian Neonatal Network™.

Improving health and health care is our ultimate goal but the first step is identifying where we are now. Our CNFUN community is addressing this goal in many ways. The titles of our publications, listed at the end of this report, exemplify how we are identifying practices such as use of bevacizumab, oxygen concentration for resuscitation in the delivery room, admission temperature, antibiotic utilization in the NICU and early caffeine to identify potential best practices.

CNFUN's Parent-EPIQ (Evidence –based Practice to Improve Quality) is one of 13 studies in the CIHR SPOR (Strategy for Patient Oriented Research) CHILD-BRIGHT research collaborative. We are tremendously grateful to CHILD-BRIGHT for giving us the opportunity to implement interventions at participating sites to improve either language or cognitive outcomes, explore what aspects of health and neurodevelopment that parents of children born very preterm identify as being the most important and publish this annual report. Parent-EPIQ has brought us closer together with our parent partners.

In this second report we have strived to improve on our first one. Importantly we have reached out to all our participating sites to increase data accuracy and completeness. Thank you to all the sites for your diligent work and collaborative efforts. The results you find in this report required much more than collecting existing data and we recognize your faithful commitment since much of the effort is unfunded. Our goal is to demonstrate the importance of our work so that it can be incorporated into clinical care and quality improvement.



Thank you to the CNFUN annual report working group and the support of the CNFUN Steering Committee. Thank you to the MiCare Coordinating site: Sonny Yeh for developing and supporting the database, Junmin Yang for the analyses and Dr. Prakesh Shah for his leadership. The CIHR Team in MiCare grant provided partial funding to sites to participate for the “MiCare” cohort born April 1, 2009 to September 30, 2011. Thank you to the sites who were able to continue to contribute data despite receiving no funding for births October 1, 2011 until April 1, 2016. The cost of data abstraction, but not collection, is now covered by the Parent-EPIQ study.

Most importantly we want to show our appreciation for the willingness of the families of children born preterm to attend the follow-up visits. Families travel on average 100 kilometers to their Neonatal Follow-Up Program and some travelled over 1000 kms! Many of these families come, not just to get excellent clinical care but also to give back to their NICU and to contribute to improving neonatal care. This report recognizes their contribution.

I am thrilled to introduce Dr. Thuy Mai Luu as the CNFUN co-director. CNFUN is growing and striving to do more. Mai brings both clinical and research expertise in neonatal follow-up and we look forward to working together.

Anne Synnes MDCM, MHSc

Director, CNFUN

Thuy Mai Luu MD, MSc

Co-Director, CNFUN

## B. Participating sites

### Presentation No 1: CNFUN site description

| Active members |  |   |                                   |                         |
|----------------|--|---|-----------------------------------|-------------------------|
| Abbreviation   | NFUP Program Name / City                             | Hospital Site   | Site Investigator                 | Number of CNFUN members |
| BCWH           | Neonatal Follow-Up Program, vancouver                | BC Women's Hospital & Health Centre                                     | Anne Synnes                       | 7                       |
| VGH/GVS        | Neonatal Follow-Up Team, Victoria                    | Victoria General Hospital   | Thevanisha Pillay                 | 3                       |
| ACH/FMC        | Perinatal Follow-up Clinic, Calgary                  | Alberta Children's Hospital & Foothills Hospital, University of Calgary | Leonora Hendson                   | 5                       |
| EDM            | Neonatal and Infant Follow-Up Clinic, Edmonton       | Glenrose Rehabilitation Hospital  | Amber Reichert, Matt Hicks        | 3                       |
| SBGH           | High Risk Newborn Follow-Up Program, Winnipeg        | St. Boniface General Hospital   | Diane Moddemann, Cecilia del Cabo | 4                       |
| HSCC           | High Risk Newborn Follow-Up Program, Winnipeg        | University of Manitoba Health Sciences Centre / Children's Hospital     | Diane Moddemann, Cecilia de Cabo  | 6                       |
| HHSC           | Neonatal Follow-Up Clinic, Hamilton                  | Hamilton Health Sciences Centre, McMaster Children's Hospital           | Karen Thomas                      | 2                       |
| KGH            | Special Infant Clinic, Kingston                      | Kingston General Hospital   | Sarah McKnight                    | 2                       |
| SJHC (LHSC)    | Developmental Follow-Up Clinic, London               | St. Joseph's Health Care London   | Kevin Coughlin                    | 2                       |
| SUNY           | Neonatal Follow-Up Program, Toronto                  | Sunnybrook Health Sciences Center                                       | Paige Church                      | 2                       |
| MSH            | Neonatal Follow-Up Pogram, Toronto                   | Mount Sinai Hospital  | Edmond Kelly                      | 2                       |
| WRH            | Neonatal Neurodevelopment Follow-Up Program, Windsor | Windsor Regional Hospital   | Chukwuma Nwaesei                  | 2                       |
| CHUS           | Clinique de suivi neonatal, Sherbrooke               | Centre Hopitalier Universitaire de Sherbrooke                           | Alyssa Morin, Charlotte Demers    | 2                       |

| <b>Active members</b> |  |   |                                   |                                |
|-----------------------|--|---|-----------------------------------|--------------------------------|
| <b>Abbreviation</b>   | <b>NFUP Program Name / City</b>                                | <b>Hospital Site</b>  | <b>Site Investigator</b>          | <b>Number of CNFUN members</b> |
| CHUQ                  | Centre Hospitalier Universitaire de Quebec (Laval Site)        | Centre Mere Enfant, Centre Hospitalier de L'Université Laval                                      | Sylvie Bélanger                   | 2                              |
| HSJ                   | Clinique de suivi neonatal, Montréal                           | Universite de Montreal, Hôpital Sainte-Justine  | Thuy Mai Luu, Veronique Dorval    | 3                              |
| JGH                   | Neonatal Follow-Up Clinic, Montréal                            | Jewish General Hospital   | Ermelinda Pelausa, Kim-Anh Nguyen | 3                              |
| MUHC                  | Neonatal Follow-Up Program, Clinic de Suivi Neonatal, Montréal | McGill University Health Centre/ Montreal Children's Hospital/ L'Hôpital de Montréal pour enfants | May Khairy, Marc Beltempo         | 2                              |
| IWK                   | Perinatal Follow-Up Program, Halifax                           | IWK Health Centre and Cape Breton Regional Hospital   | Jehier Afifi                      | 4                              |
| HMR                   | Montréal   | Hôpital Maisonneuve-Rosemont  | Marie St-Hilaire                  | 1                              |
| <b>New members</b>    |  |   |                                   |                                |
| <b>Abbreviation</b>   | <b>NFUP Program Name / City</b>                                | <b>Hospital Site</b>  | <b>Site Investigator</b>          | <b>Number of CNFUN members</b> |
| RCH                   | Neonatal Follow-Up Program, New Westminster                    | Royal Columbian Hospital  | Miroslav Stavel, Anitha Moodley   | 2                              |
| SMH                   | Neonatal Follow-Up Program, Surrey                             | Surrey Memorial Hospital  | Rebecca Sherlock                  | 1                              |

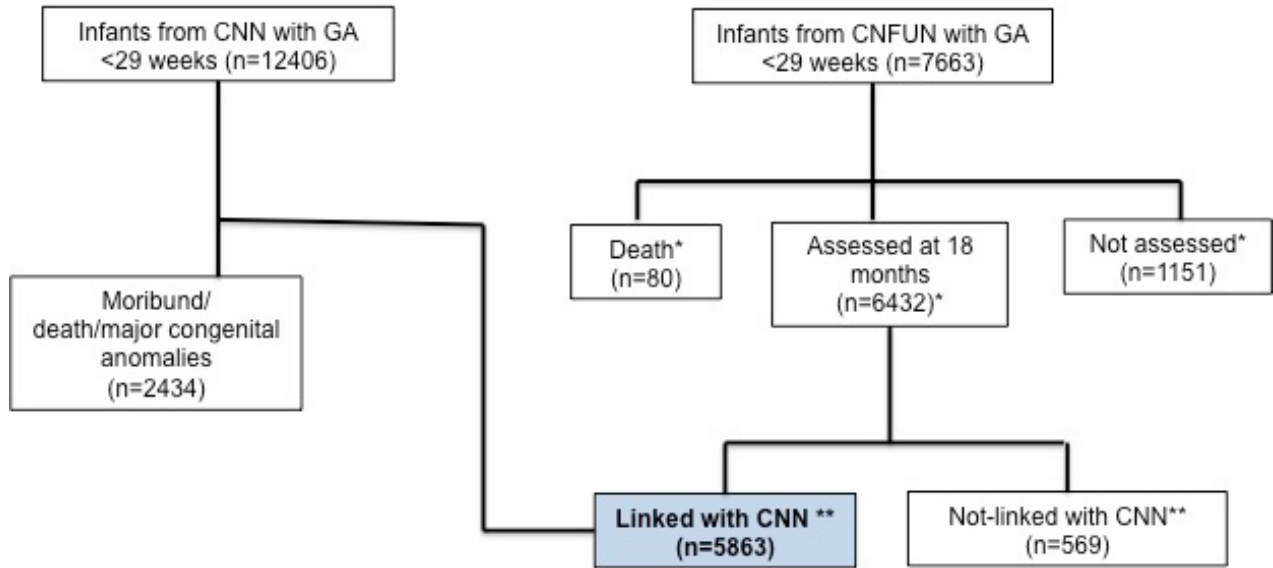
| <b>Past members</b> |   |   |                             |                                |
|---------------------|---|---|-----------------------------|--------------------------------|
| <b>Abbreviation</b> | <b>NFUP Program Name / City</b>         | <b>Hospital Site</b>                              | <b>Site Investigator</b>    | <b>Number of CNFUN members</b> |
| ECH                 | Fredericton                             | Dr. Everett Chalmers Hospital                     | Ramaiyer Krishnaswamy       | 1                              |
| SEHC                | Neonatal Follow-Up Clinic, Moncton      | Moncton Hospital                                  | Roderick Canning            | 3                              |
| SEHC                | Neonatal Follow-Up Program, Saint John  | Saint John Regional Hospital                      | Luis Monterrosa             | 2                              |
| JCHC                | High-Risk Follow-Up Clinic, St. John's  | Janeway Children's Health & Rehabilitation Centre | Phil Murphy                 | 2                              |
| HSC                 | Neonatal Follow-Up Program, Toronto     | Hospital for Sick Children                        | Linh Ly                     | 1                              |
| CHEO/OTTA           | Neonatal Follow-Up Clinic, Ottawa       | Children's Hospital of Eastern Ontario            | Thierry Daboval             | 1                              |
| RQHR                | Developmental Assessment Clinic, Regina | Regina General Hospital                           | Zarin Kalapesi, J.P. Bodani | 3                              |
| RUH                 | Saskatoon                               | Royal University Hospital                         | Sibasis Daspal              | 2                              |

Presentation No 2: CNFUN site participation and follow-up rates

| CNFUN Site | MiCare data, Yes / No | MiCare Follow-Up Rate n (%) | Post-MiCare Follow-Up rate- n (%) preliminary | Parent-EPIQ Intervention site Yes/No |
|------------|-----------------------|-----------------------------|---|--------------------------------------|
| 1          | Yes                   | 170/222 (76.6)              | 322/428 (75.2)                                | Yes                                  |
| 2          | Yes                   | 115/131 (87.8)              | 239/297 (80.5)                                | No                                   |
| 3          | Yes                   | 11/13 (84.6)                | 61/118 (51.7)                                 | No                                   |
| 4          | Yes                   | 13/17 (76.5)                | 6/31 (19.4)                                   | No                                   |
| 5          | Yes                   | 205/256 (80.1)              | 7/611 (1.1)                                   | Yes                                  |
| 6          | Yes                   | 213/249 (85.5)              | 440/617 (71.3)                                | Yes                                  |
| 7          | Yes                   | 30/53 (56.6)                | 17/115 (14.8)                                 | No                                   |
| 8          | Yes                   | 145/203 (71.4)              | 3/413 (0.7)                                   | No                                   |
| 9          | Yes                   | 53/110 (48.2)               | 27/147 (18.4)                                 | No                                   |
| 10         | Yes                   | 56/69 (81.2)                | 99/166 (59.6)                                 | Yes                                  |
| 11         | Yes                   | 178/223 (79.8)              | 353/397 (88.9)                                | Yes                                  |
| 12         | Yes                   | 84/102 (82.4)               | 198/225 (88)                                  | Yes                                  |
| 13         | Yes                   | 21/37 (56.8)                | 0/84 (0)                                      | No                                   |
| 14         | Yes                   | 103/135 (76.3)              | 218/297 (73.4)                                | Yes                                  |
| 15         | Yes                   | 31/51 (60.8)                | 7/80 (8.8)                                    | No                                   |
| 16         | Yes                   | 250/301 (83.1)              | 419/705 (59.4)                                | Yes                                  |
| 17         | Yes                   | 64/163 (39.3)               | 5/319 (1.6)                                   | No                                   |
| 18         | Yes                   | 43/47 (91.5)                | 9/89 (10.1)                                   | No                                   |
| 19         | Yes                   | 17/66 (25.8)                | 5/123 (4.1)                                   | No                                   |
| 20         | Yes                   | 79/101 (78.2)               | 161/214 (75.2)                                | Yes                                  |
| 21         | Yes                   | 55/59 (93.2)                | 102/134 (76.1)                                | Yes                                  |
| 22         | Yes                   | 13/20 (65)                  | 9/55 (16.4)                                   | No                                   |
| 23         | Yes                   | 132/166 (79.5)              | 89/270 (33)                                   | Yes                                  |
| 24         | Yes                   | 7/13 (53.8)                 | 0/24 (0)                                      | Yes                                  |
| 25         | Yes                   | 241/308 (78.2)              | 681/822 (82.8)                                | No                                   |
| 26         | Yes                   | 18/22 (81.8)                | 40/54 (74.1)                                  | No                                   |
| 27         | No                    | -                           | -   | No                                   |

Presentation No 3

CNN and CNFUN flow diagram for births April 1, 2009- Dec 31, 2016



\*CNFUN children are recruited locally by a CNFUN site and recorded in the CNFUN database as assessed, not assessed or deceased.

\*\*Data linkage with CNN occurs by the CNFUN site contacting the CNN data abstractor to obtain the unique identifier. When a matching unique identifier is not available in CNN and CNFUN, probabilistical matching is attempted to link.

## C. Outcomes Definitions

| Impairments      | Significant neurodevelopmental disability = sNDI (Any one or more of the following)* | Neurodevelopmental impairment =NDI (Any one or more of the following)** |
|------------------|--|---|
| <b>Motor</b>     | CP with GMFCS 3,4 or 5   | CP with GMFCS 1 or higher   |
|                  | Bayley III Motor Composite <70   | Bayley III Motor Composite <85  |
| <b>Cognitive</b> | Bayley III Cognitive Composite <70   | Bayley III Cognitive Composite <85                                      |
| <b>Language</b>  | Bayley III Language Composite <70  | Bayley III Language Composite <85                                       |
| <b>Hearing</b>   | Hearing aid or cochlear implant  | Sensorineural/mixed hearing loss  |
| <b>Vision</b>    | Bilateral visual impairment  | Uni- or bilateral visual impairment                                     |

CP-cerebral palsy defined as per Rosenbaum et al. Dev Med Child Neurol suppl 2007;109:8-14 : “group of disorders of the development of movement and posture, causing activity limitation, that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain.”

Bayley-III- Bayley Scales of Infant and Toddler Development-3rd edition

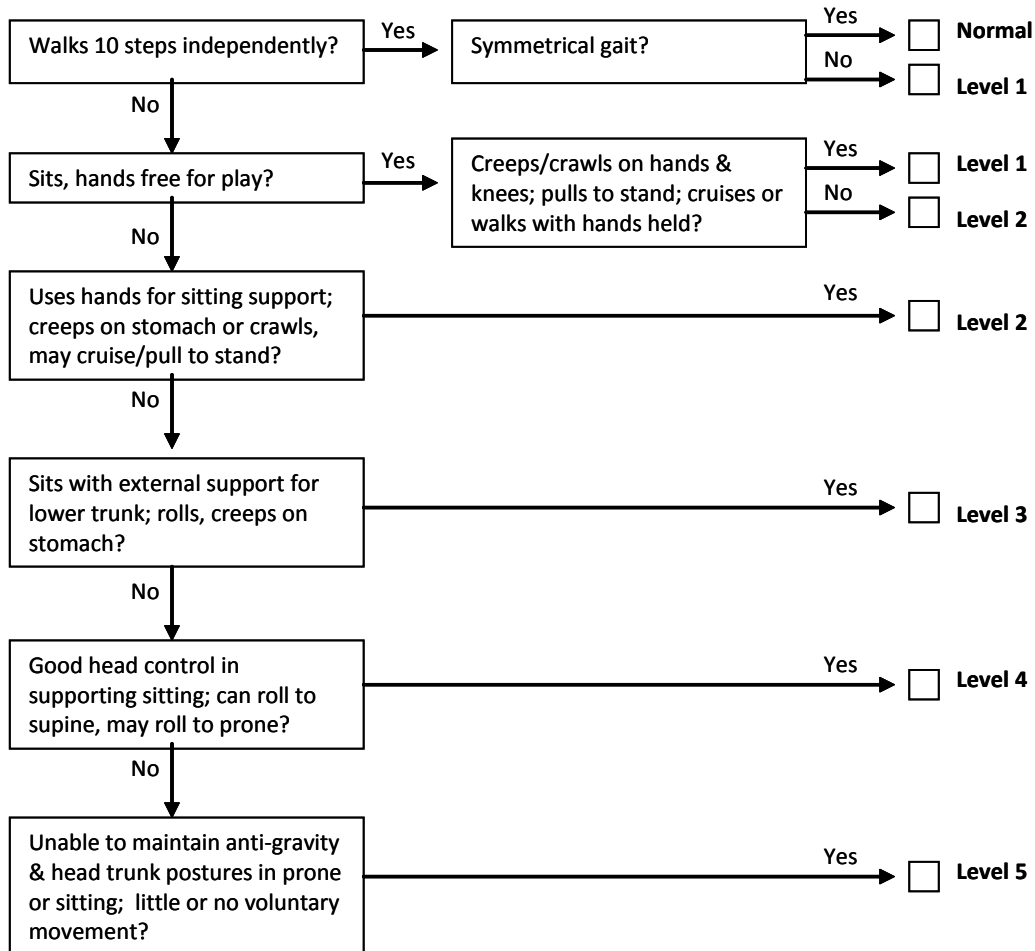
Hearing impairment- determined from audiology reports

Visual impairment is determined from ophthalmology consult if available. If no report is available, impairment is defined as a small scarred eye, sustained sensory nystagmus or lack of response to a 1cm object (cheerio) on a white background at 30 cms.

\*Children who could not be tested using the Bayley-III with a Bayley-III Adaptive Behavior score < 70 or if no Bayley-III score assessed to have a significant developmental delay

\*\*Children with a NDI or those who could not be tested using the Bayley-III with a Bayley-III Adaptive Behavior score < 85

## Gross Motor Function Classification System (GMFCS)



### COMMENTS:

The algorithm is based on Palisano<sup>1</sup>

Further information is available at

<http://motorgrowth.canchild.ca/en/GMFCS/originalversion.asp>

- 1) Palisano R, Rosenbaum P, Walter S et al. Development and reliability of a system to classify gross motor function in children with cerebral palsy. Dev Med Child Neurol 1997; 39:214-223



## D. Descriptive Analyses

### Presentation No 4: Survival and participant assessments among all CNN sites

| Year of birth | NICU admission (n) | NICU death n (%) | NICU survivors# n (%) | Death After NICU (%) | Linked CNN-CNFUN data for NICU survivors n (%) | Known outcome** for NICU deaths & survivors n (%) |
|---------------|--------------------|------------------|-----------------------|----------------------|--|---|
| 2009*         | 1201               | 212 (17.7)       | 881 (73.4)            | (0.4)                | 659 (75%)                                      | 876 (80%)   |
| 2010          | 1613               | 244 (15.1)       | 1335 (82.8)           | (0.9)                | 1013 (76 %)                                    | 1271 (80%)  |
| 2011          | 1527               | 258 (16.9)       | 1218 (79.8)           | (0.3)                | 852 (70 %)                                     | 1115 (76%)  |
| 2012          | 1590               | 251 (15.8)       | 1288 (81.0)           | 0 (0)                | 676 (52%)                                      | 927 (60%)   |
| 2013          | 1622               | 256 (15.8)       | 1307 (80.6)           | (0.2)                | 615 (47%)                                      | 874 (56%)   |
| 2014          | 1621               | 232 (14.3)       | 1319 (81.4)           | (0.1)                | 649 (49%)                                      | 882 (57%)   |
| 2015          | 1544               | 201 (13.0)       | 1256 (81.4)           | (0.1)                | 686 (55%)                                      | 888 (61%)   |
| 2016          | 1678               | 221 (13.2)       | 1358 (80.9)           | (0.3)                | 713 (53%)                                      | 939 (59%)   |
| '09-'16       | 12406              | 1875 (15.1)      | 9972 (80.3)           | 34 (0.3)             | 5863 (59%)                                     | 7772 (65%)  |

n= number

\* April 1 to Dec 31

\*\* Death or CNFUN outcomes

#Newborns admitted moribund or with major congenital anomalies are excluded

### Comments:

These results include participating and non-participating sites. Partial funding by the CIHR team in MiCare for data collection and abstraction was provided for the April 1, 2009 – September 30, 2011 birth cohort. Data collection and participation dropped significantly with no funding and limited funding has been available to the Parent-EPIQ study from the CHILD-BRIGHT CIHR SPOR grant since 2016.

## Presentation No 5: Follow-up rates among CNFUN sites

| Year of birth | All NICU survivors n (%) | NICU survivors at participating sites# n | CNFUN data** (n) | Linked CNN-CNFUN data for NICU survivors n (%) | Follow-up rate for participating CNFUN sites n (%) |
|---------------|--------------------------|--|------------------|--|--|
| 2009*         | 881 (73.4)               | 881                                      | 774              | 659 (75%)                                      | 659 (75%)  |
| 2010          | 1335 (82.8)              | 1335                                     | 1123             | 1013 (76 %)                                    | 1013 (76%)   |
| 2011          | 1218 (79.8)              | 1218                                     | 935              | 852 (70 %)                                     | 852 (70%)  |
| 2012          | 1288 (81.0)              | 938                                      | 722              | 676 (52%)                                      | 651 (69%)  |
| 2013          | 1307 (80.6)              | 973                                      | 664              | 615 (47%)                                      | 611 (63%)  |
| 2014          | 1319 (81.4)              | 954                                      | 708              | 649 (49%)                                      | 643 (67%)  |
| 2015          | 1256 (81.4)              | 929                                      | 757              | 686 (55%)                                      | 679 (73%)  |
| 2016          | 1358 (80.9)              | 999                                      | 749              | 713 (53%)                                      | 710 (71%)  |
| '09-'16       | 9972 (80.3)              | 8227                                     | 6432             | 5863 (59%)                                     | 5818 (71%)   |

n= number

\* April 1 to December 31

\*\* Not all CNFUN patients can be linked to CNN

# For 2012-2015, Participating sites: Victoria General Hospital, BC Women's Hospital & Health Centre , Alberta Children's Hospital & Foothills Hospital, University of Calgary , University of Manitoba Health Sciences Centre / Children's Hospital , St. Boniface General Hospital , Windsor Regional Hospital , St. Joseph's Health Care London, Mount Sinai Hospital, Sunnybrook Health Sciences Center , Université de Montréal, Hôpital Sainte-Justine, Jewish General Hospital, McGill University Health Centre/ Montreal Children's Hospital/ L'Hôpital de Montréal pour enfants, Centre Hospitalier Universitaire de Sherbrooke, Centre Mere Enfant, Centre Hospitalier de L'Université Laval, IWK Health Centre and Cape Breton Regional Hospital, Winnipeg Health Sciences Centre Children's Hospital.

**2016:** Edmonton, Hamilton Health Sciences Centre, Kingston General Hospital and Hôpital Maisonneuve Rosemont were also participating sites

### COMMENTS:

Analyses using the MiCare cohort are more reliable than the post-MiCare cohort due to larger attrition bias in the later period.

Presentation 6:

Survival and participant assessments among all CNN sites by gestational age

| Gestational Age (Weeks) | NICU admission (n) | NICU death n (%) | NICU survivors# n (%) | Death After NICU (%) | Linked CNN-CNFUN data for NICU survivors n (%) | Known outcome* for NICU deaths and survivors n (%) |
|-------------------------|--------------------|------------------|-----------------------|----------------------|--|--|
| 22                      | 127                | 48 (37.8)        | 20 (15.8)             | 0 (0)                | 10 (50.0)                                      | 58 (85%)   |
| 23                      | 672                | 305 (45.4)       | 279 (41.5)            | 2 (0.3)              | 165 (59.1)                                     | 472 (81%)  |
| 24                      | 1485               | 476 (32.1)       | 931 (62.7)            | 6 (0.4)              | 565 (60.7)                                     | 1047 (74%)   |
| 25                      | 2045               | 412 (20.2)       | 1564 (76.5)           | 8 (0.4)              | 963 (61.6)                                     | 1383 (70%)   |
| 26                      | 2280               | 290 (12.7)       | 1913 (83.9)           | 5 (0.2)              | 1171 (61.2)                                    | 1466 (67%)   |
| 27                      | 2692               | 193 (7.2)        | 2411 (89.6)           | 9 (0.3)              | 1415 (58.7)                                    | 1617 (62%)   |
| 28                      | 3105               | 151 (4.9)        | 2854 (91.9)           | 4 (0.1)              | 1574 (55.2)                                    | 1729 (58%)   |
| 22-28                   | 12406              | 1875 (15.1)      | 9972 (80.3)           | 34 (0.3)             | 5863 (59%)                                     | 7772 (65%)   |

n= number

\* Death or CNFUN outcomes

#Newborns admitted moribund or with major congenital anomalies are excluded

Presentation 7:

Follow-up rates among CNFUN sites by gestational age

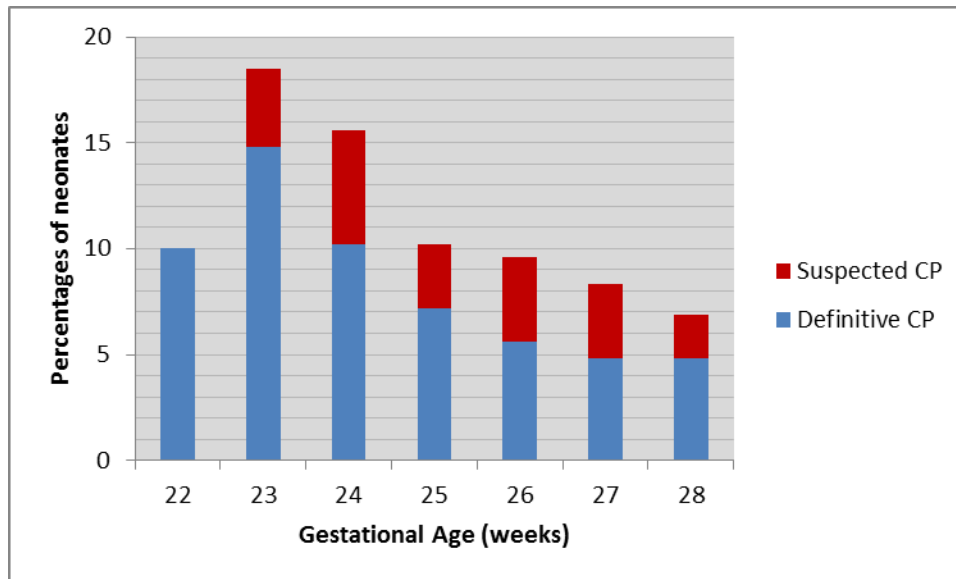
| Gestational Age (weeks) | All NICU survivors n (%) | NICU survivors at participating sites# n | CNFUN data** (n)  | Linked CNN-CNFUN data for NICU survivors n (%) | Follow-up rate for participating CNFUN sites n (%) |
|-------------------------|--------------------------|--|-------------------|--|--|
| 22                      | 20 (15.8)                | 15                                       | 10                | 10 (50.0)                                      | 10 (67%)   |
| 23                      | 279 (41.5)               | 216                                      | 163               | 165 (59.1)                                     | 164 (76%)  |
| 24                      | 931 (62.7)               | 753                                      | 650               | 565 (60.7)                                     | 561 (75%)  |
| 25                      | 1564 (76.5)              | 1288                                     | 1032              | 963 (61.6)                                     | 953 (74%)  |
| 26                      | 1913 (83.9)              | 1584                                     | 1257              | 1171 (61.2)                                    | 1153 (73%)   |
| 27                      | 2411 (89.6)              | 2012                                     | 1551              | 1415 (58.7)                                    | 1407 (70%)   |
| 28                      | 2854 (91.9)              | 2359                                     | 1759              | 1574 (55.2)                                    | 1570 (67%)   |
| 22-28                   | 9972 (80.3)              | 8227                                     | 6422 <sup>†</sup> | 5863 (59%)                                     | 5818 (71%)   |

<sup>†</sup> 10 patients missing GA for CNFUN data

## E. Gestational Age based Outcomes from CNFUN participating sites

Presentation No 8: Cerebral palsy rates by gestational age

| GA     | CNN-<br>CNFUN<br>linked<br>cases or<br>deaths<br>n | Death or<br>definitive<br>CP n (%) | CNN-<br>CNFUN<br>linked<br>cases<br>with CP<br>data for<br>n | Definitive<br>CP n (%) | Missing<br>CP<br>GMFCS | GMFCS<br>≤2<br>N (%) | GMFCS<br>3-5 N (%) | Suspected<br>CP n (%) |
|--------|--|------------------------------------|--|------------------------|------------------------|----------------------|--------------------|-----------------------|
| 22 wks | 58   | 49 (84%)                           | 10   | (10.0)                 | 0                      | (100)                | 0 (0)              | 0 (0)                 |
| 23 wks | 472  | 331 (70%)                          | 162  | 24 (14.8)              | 2                      | 13 (59.1)            | 9 (40.9)           | 6 (3.7)               |
| 24 wks | 1047   | 539 (51%)                          | 577  | 57 (10.2)              | 7                      | 32 (64.0)            | 18 (36.0)          | 30 (5.4)              |
| 25 wks | 1383   | 488 (35%)                          | 948  | 68 (7.2)               | 7                      | 36 (59.0)            | 25 (41.0)          | 28 (3.0)              |
| 26 wks | 1446   | 359 (24%)                          | 1149   | 64 (5.6)               | 7                      | 37 (64.9)            | 20 (35.1)          | 46 (4.0)              |
| 27 wks | 1617   | 269 (17%)                          | 1393   | 67 (4.8)               | 7                      | 41 (68.3)            | 19 (31.7)          | 48 (3.5)              |
| 28 wks | 1729   | 230 (13%)                          | 1554   | 75 (4.8)               | 9                      | 41 (62.1)            | 25 (37.9)          | 32 (2.1)              |
| Total  | 7772   | 2265<br>(29%)                      | 5773   | 356 (6.2)              | 39                     | 201 (63.4)           | 116 (36.6)         | 190 (3.3)             |



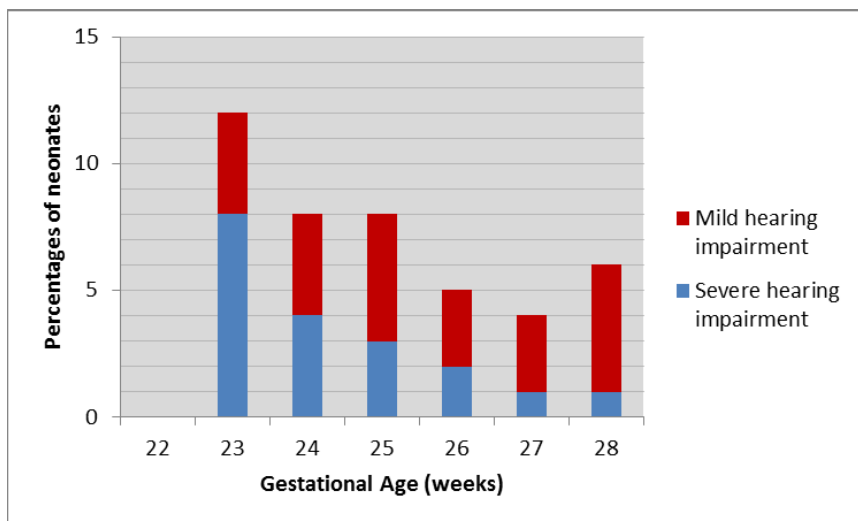
### COMMENTS:

Cerebral palsy rates decrease with increasing gestational age. Due to small numbers at 22 weeks gestation, results should be interpreted with caution.

Presentation No 9:

Hearing impairments rates by gestational age

| GA     | CNN-<br>CNFUN<br>linked cases<br>or deaths<br>n | Death or any<br>hearing<br>impairment<br>n (%) | CNN-<br>CNFUN<br>linked cases<br>with data for<br>hearing | Normal<br>hearing<br>n (%) | Mild<br>hearing<br>impairment<br>n (%) | Severe hearing<br>impairment<br>n (%) |
|--------|---|--|---|----------------------------|--|---------------------------------------|
| 22 wks | 58  | 48 (83%)                                       | 10  | 10 (100)                   | 0 (0)                                  | 0 (0)                                 |
| 23 wks | 472   | 327 (69%)                                      | 160   | 140 (87%)                  | 7 (4%)                                 | 13 (8%)                               |
| 24 wks | 1047  | 526 (50%)                                      | 556   | 512 (92%)                  | 23 (4%)                                | 21 (4%)                               |
| 25 wks | 1383  | 496 (36%)                                      | 940   | 864 (92 %)                 | 50 (5%)                                | 26 (3%)                               |
| 26 wks | 1446  | 355 (24%)                                      | 1143  | 1083 (95 %)                | 37 (3%)                                | 23 (2%)                               |
| 27 wks | 1617  | 264 (16%)                                      | 1388  | 1326<br>(96 %)             | 44 (3%)                                | 18 (1%)                               |
| 28 wks | 1729  | 246 (14%)                                      | 1544  | 1453<br>(94 %)             | 74 (5%)                                | 17 (1%)                               |
| Total  | 7772  | 2262 (29%)                                     | 5741  | 5388<br>(94 %)             | 235 (4 %)                              | 118 (2%)                              |



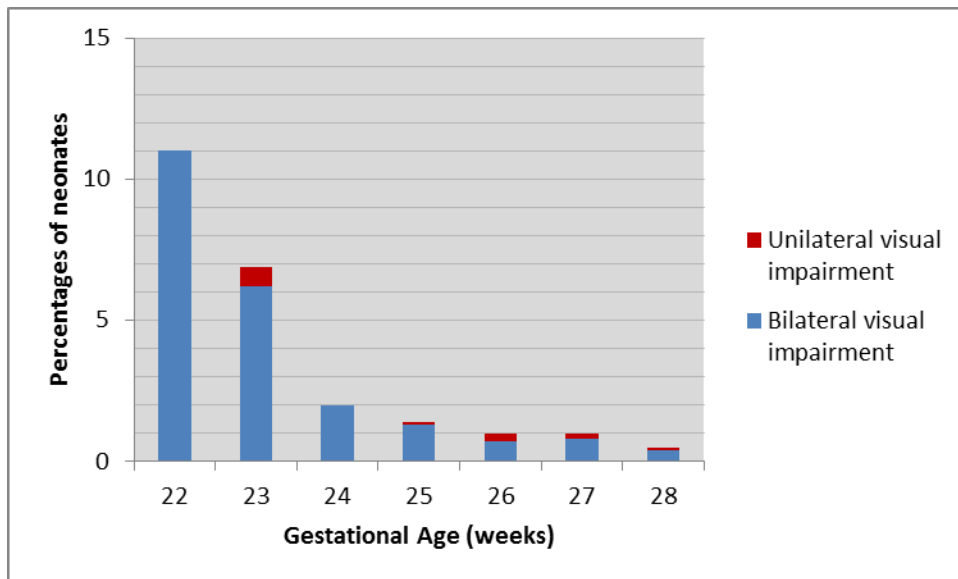
**COMMENTS:**

Hearing impairment was determined at CNFUN sites based on audiology reports. Hearing impairment is infrequent but approximately 10 times as frequent in the very preterm infant than in the normal population. Severe hearing impairment incidence decreases with gestational age. Mild impairment is often transient.

Presentation No 10:

Visual impairment rates by gestational Age (GA)

| GA     | CNN-<br>CNFU<br>N<br>linked<br>cases or<br>deaths<br>n | Death or<br>any visual<br>impairment<br>n (%) | CNN-<br>CNFUN<br>linked cases<br>with data for<br>vision<br>n | Normal<br>Vision<br>n (%) | Unilateral<br>visual<br>impairment<br>n (%) | Bilateral<br>visual<br>impairment<br>n (%) |
|--------|--|---|---|---------------------------|---|--|
| 22 wks | 58   | 49 (85%)                                      | 9   | 8 (89%)                   | 0 (0)                                       | (11%)                                      |
| 23 wks | 472  | 317 (67%)                                     | 146   | 136 (93%)                 | (0.7%)                                      | 9 (6.2%)                                   |
| 24 wks | 1047   | 492 (47%)                                     | 513   | 503 (98%)                 | 0 (0)                                       | 10 (2.0%)                                  |
| 25 wks | 1383   | 432 (31%)                                     | 882   | 870 (99%)                 | (0.1%)                                      | 11 (1.3%)                                  |
| 26 wks | 1446   | 305 (21%)                                     | 1078  | 1068 (99%)                | (0.3%)                                      | 7 (0.7%)                                   |
| 27 wks | 1617   | 215 (13%)                                     | 1309  | 1296 (99%)                | (0.2%)                                      | 10 (0.8%)                                  |
| 28 wks | 1729   | 163 (9%)                                      | 1460  | 1452 (99%)                | (0.1%)                                      | 6 (0.4%)                                   |
| Total  | 7772   | 1973 (25%)                                    | 5397  | 5333 (99%)                | 10 (0.2%)                                   | 54 (1.0%)                                  |

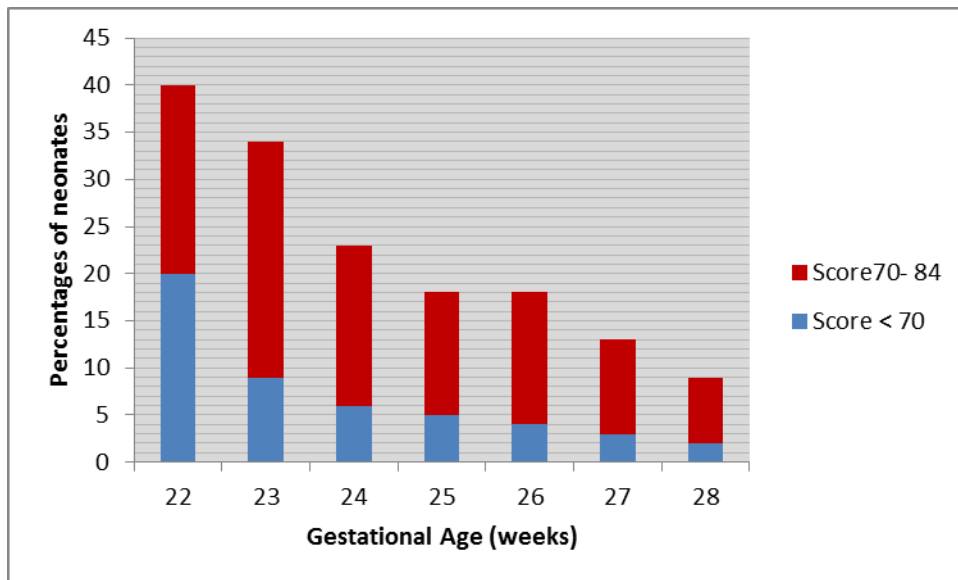


**COMMENTS:**

Visual impairment was determined from ophthalmology reports. If no report was available, impairment was defined as a small scarred eye, sustained sensory nystagmus or lack of response to a 1cm object (cheerio) on a white background at 30 cms. Visual impairment is an infrequent outcome.

Presentation No 11:  
Bayley- III cognitive composite scores rates by gestational age

| GA     | CNN-<br>CNFUN<br>linked<br>cases or<br>deaths<br>n | Death or<br>cognitive<br>score < 85<br>n (%) | CNN-<br>CNFUN<br>linked cases<br>with<br>cognitive<br>data<br>n | Median<br>score (IQR) | Bayley-III ≥<br>85<br>n (%) | Score70-<br>84<br>n (%) | Score < 70<br>n (%) |
|--------|--|--|---|-----------------------|-----------------------------|-------------------------|---------------------|
| 22 wks | 58   | 52 (90%)                                     | 10  | 88 (80, 95)           | 6(60%)                      | (20%)                   | (20%)               |
| 23 wks | 472  | 355 (75%)                                    | 141   | 90 (80, 100)          | 93 (66%)                    | 35 (25%)                | 13 (9%)             |
| 24 wks | 1047   | 601 (57%)                                    | 516   | 90 (85, 100)          | 397 (77%)                   | 89 (17%)                | 30 (6%)             |
| 25 wks | 1383   | 583 (42%)                                    | 900   | 95 (85, 105)          | 737 (82%)                   | 118 (13%)               | 45 (5%)             |
| 26 wks | 1446   | 484 (33%)                                    | 1090  | 95 (85, 105)          | 901 (83%)                   | 149 (14%)               | 40 (4%)             |
| 27 wks | 1617   | 376 (23%)                                    | 1314  | 95 (90, 105)          | 1140 (87%)                  | 137 (10%)               | 37 (3%)             |
| 28 wks | 1729   | 288 (17%)                                    | 1462  | 100 (90, 105)         | 1329 (91%)                  | 106 (7%)                | 27 (2%)             |
| Total  | 7772   | 2739 (35%)                                   | 5433  | 95 (90, 105)          | 4603 (85%)                  | 636 (12%)               | 194 (4%)            |



**COMMENTS:**

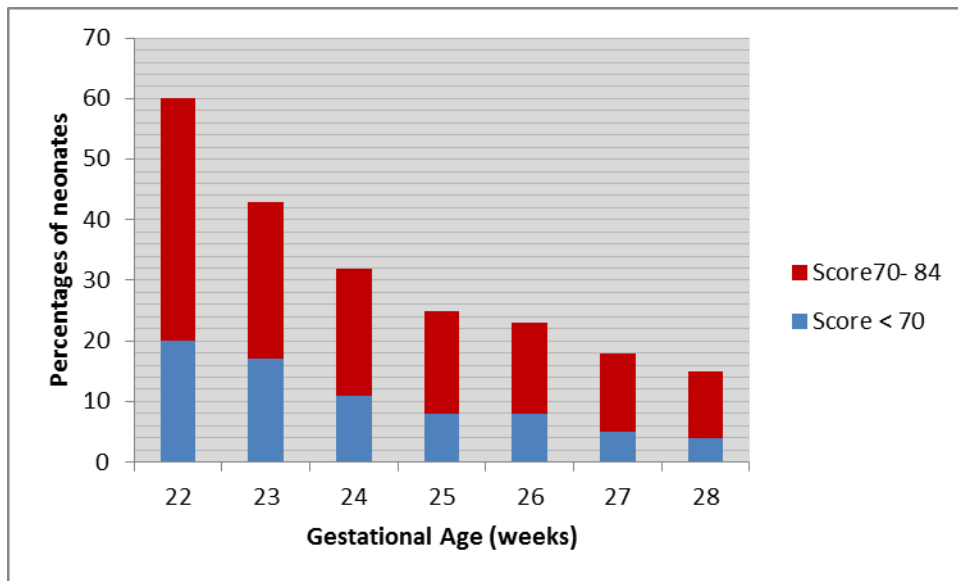
Cognitive scores on the Bayley Scales of Infant and Toddler Development- 3<sup>rd</sup> edition (Bayley-III) improve with increasing gestational age. The Bayley-III has a mean score of 100 and standard deviation of 15 (Less than 70 is therefore < - 2 standard deviations). Bayley-III scores tend to underestimate developmental delay and have limited predictive ability.



Presentation No 12:

Bayley- III motor composite scores rates by gestational age

| GA     | CNN-<br>CNFUN<br>linked<br>cases or<br>deaths<br>n | Death or<br>motor score <<br>85 n (%) | CNN-<br>CNFUN<br>linked cases<br>with motor<br>data<br>n | Median<br>score | Bayley-III ≥<br>85<br>n (%) | Score 70-<br>84<br>n (%) | Score < 70<br>n (%) |
|--------|--|---------------------------------------|--|-----------------|-----------------------------|--------------------------|---------------------|
| 22 wks | 58   | 54 (93%)                              | 10   | 82 (70, 88)     | (40%)                       | (40%)                    | (20%)               |
| 23 wks | 472  | 364 (77%)                             | 133  | 88 (73, 97)     | 76 (57%)                    | 34 (26%)                 | 23 (17%)            |
| 24 wks | 1047   | 637 (61%)                             | 494  | 91 (79, 97)     | 339 (69%)                   | 103 (21%)                | 52 (11%)            |
| 25 wks | 1383   | 633 (46%)                             | 863  | 94 (85, 100)    | 650 (75%)                   | 147 (17%)                | 66 (8%)             |
| 26 wks | 1446   | 525 (36%)                             | 1038   | 94 (85, 100)    | 808 (78%)                   | 151 (15%)                | 79 (8%)             |
| 27 wks | 1617   | 422 (26%)                             | 1241   | 94 (88, 103)    | 1021 (82%)                  | 158 (13%)                | 62 (5%)             |
| 28 wks | 1729   | 364 (21%)                             | 1410   | 97 (88, 103)    | 1201 (85%)                  | 154 (11%)                | 55 (4%)             |
| Total  | 7772   | 2999 (39%)                            | 5189   | 94 (85, 100)    | 4099 (79%)                  | 751 (14%)                | 339 (7%)            |



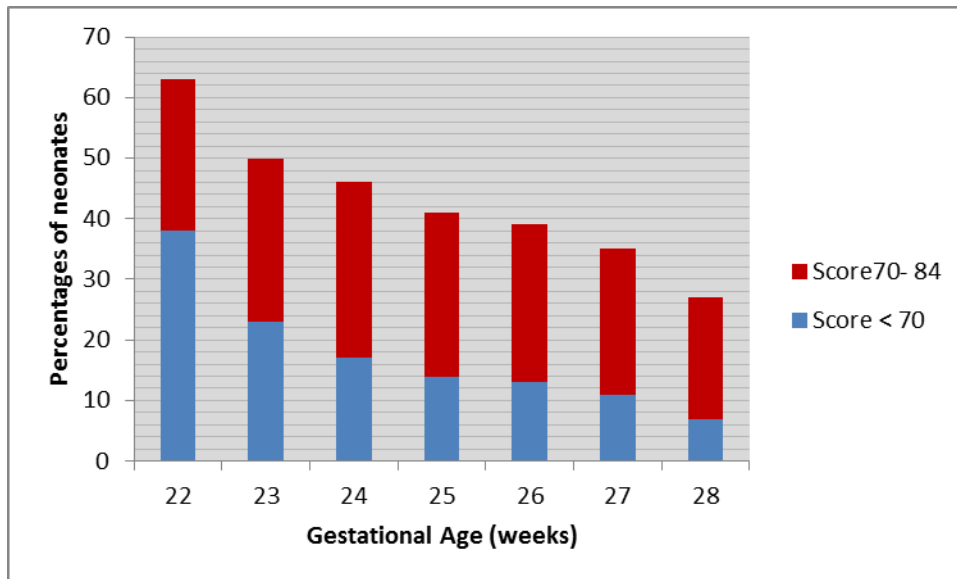
**COMMENTS:**

Motor scores on the Bayley Scales of Infant and Toddler Development- 3<sup>rd</sup> edition (Bayley-III) improve with increasing gestational age. The Bayley-III has a mean score of 100 and standard deviation of 15 (Less than 70 is therefore < - 2 standard deviations). Bayley-III scores tend to underestimate developmental delay and have limited predictive ability.

Presentation No 13

Bayley- III language composite scores rates by gestational age

| GA     | CNN-<br>CNFUN<br>linked<br>cases or<br>deaths<br>n | Death or<br>language<br>score < 85<br>n (%) | CNN-<br>CNFUN<br>linked<br>cases with<br>language<br>data<br>n | Median<br>score (IQR) | Bayley-III ≥<br>85<br>n (%) | Score 70-84<br>n (%) | Score < 70<br>n (%) |
|--------|--|---|--|-----------------------|-----------------------------|----------------------|---------------------|
| 22 wks | 58   | 53 (91%)                                    | 8  | 77 (65, 94)           | (38%)                       | (25%)                | (38%)               |
| 23 wks | 472  | 374(79%)                                    | 135  | 86 (71, 97)           | 68 (50%)                    | 36 (27%)             | 31 (23%)            |
| 24 wks | 1047   | 710(68%)                                    | 499  | 86 (74, 97)           | 271 (54%)                   | 143 (29%)            | 85 (17%)            |
| 25 wks | 1383   | 772(56%)                                    | 862  | 89 (77, 97)           | 510 (59%)                   | 232 (27%)            | 120 (14%)           |
| 26 wks | 1446   | 710(48%)                                    | 1058   | 89 (77, 100)          | 643 (61%)                   | 278 (26%)            | 137 (13%)           |
| 27 wks | 1617   | 648(40%)                                    | 1255   | 91 (79, 100)          | 809 (64%)                   | 307 (24%)            | 139 (11%)           |
| 28 wks | 1729   | 536(31%)                                    | 1392   | 94 (83, 103)          | 1011 (73%)                  | 285 (20%)            | 96 (7%)             |
| Total  | 7772   | 3803(49%)                                   | 5209   | 89 (79, 100)          | 3315 (64%)                  | 1283 (25%)           | 611 (12%)           |



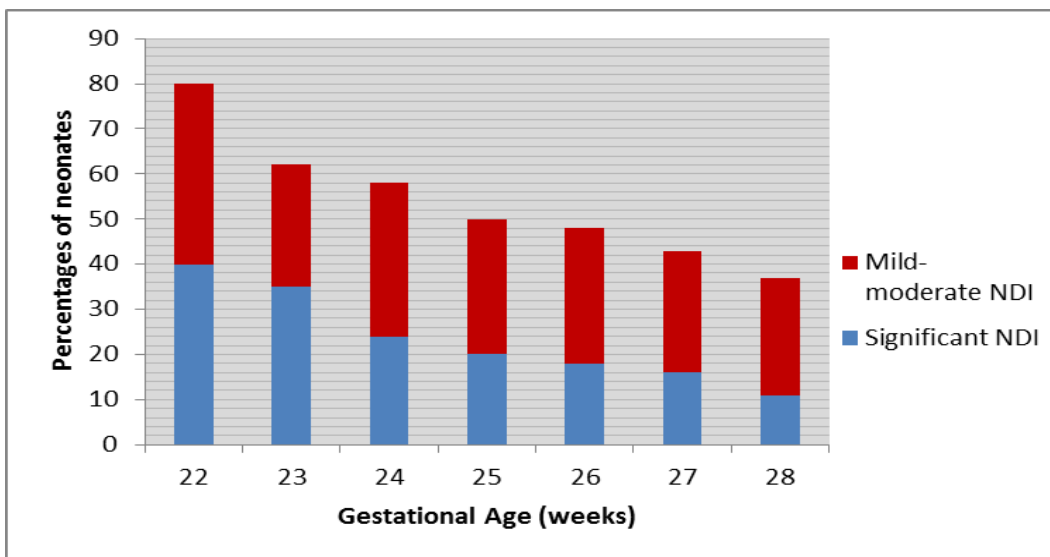
**COMMENTS:**

Language scores on the Bayley Scales of Infant and Toddler Development- 3<sup>rd</sup> edition (Bayley-III) improve with increasing gestational age. Language is the domain on the Bayley-III with the highest frequency of low scores. The Bayley-III has a mean score of 100 and < 70 is worse than - 2 standard deviations. Bayley-III scores tend to underestimate language delay and have limited predictive ability.

Presentation No 14

Neurodevelopmental impairment (NDI) rates by gestational age (GA)

| GA     | CNN-CNFUN linked cases or deaths n | Death or any NDI n (%) | CNN-CNFUN linked cases with complete data n | No NDI n (%) | Mild-moderate NDI n (%) | Significant NDI n (%) |
|--------|------------------------------------|------------------------|---|--------------|-------------------------|-----------------------|
| 22 wks | 58                                 | 56 (97%)               | 10  | (20%)        | (40%)                   | (40%)                 |
| 23 wks | 472                                | 408 (86%)              | 164   | 63 (38%)     | 44 (27%)                | 57 (35%)              |
| 24 wks | 1047                               | 812 (78%)              | 565   | 235 (42%)    | 192 (34%)               | 138 (24%)             |
| 25 wks | 1383                               | 900 (65%)              | 956   | 476 (50%)    | 291 (30%)               | 189 (20%)             |
| 26 wks | 1446                               | 854 (58%)              | 1169  | 610 (52%)    | 347 (30%)               | 212 (18%)             |
| 27 wks | 1617                               | 801 (50%)              | 1408  | 809 (57%)    | 379 (27%)               | 220 (16%)             |
| 28 wks | 1729                               | 725 (42%)              | 1570  | 1000 (64%)   | 403 (26%)               | 167 (11%)             |
| Total  | 7772                               | 4556 (59%)             | 5842  | 3195 (55%)   | 1660 (28%)              | 987 (17%)             |



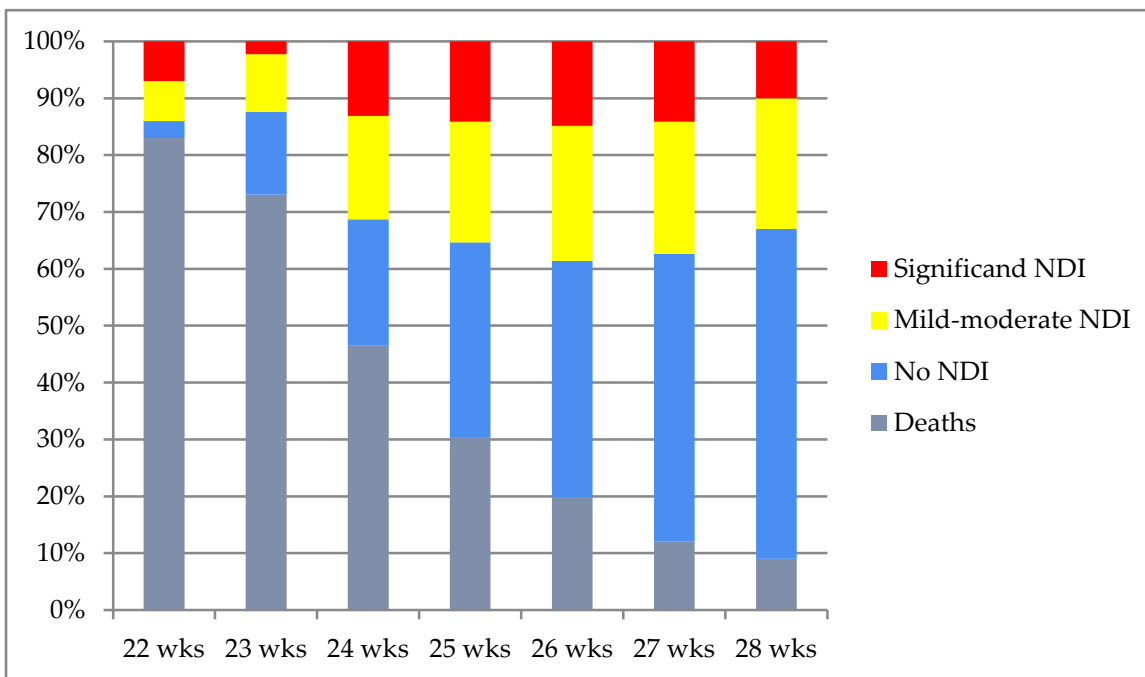
**COMMENTS:**

Neurodevelopmental impairment rates decrease with increasing gestational age. \* Due to small numbers at 22 weeks gestation, results should be interpreted with caution

Presentation No 15:

Death or Neurodevelopmental impairment (NDI) rates by gestational age (GA)

| GA     | CNN-CNFUN<br>Linked cases or<br>deaths<br>n | Deaths<br>n (%) | No NDI<br>n (%) | Mild-moderate<br>NDI<br>n (%) | Significant NDI<br>n (%) |
|--------|---|-----------------|-----------------|-------------------------------|--------------------------|
| 22 wks | 58  | 48 (83)         | 2 (3)           | 4 (7)                         | 4 (7)                    |
| 23 wks | 472   | 307 (65)        | 63 (13)         | 44 (9)                        | 57 (2)                   |
| 24 wks | 1047  | 482 (46)        | 235 (22)        | 192 (18)                      | 138 (13)                 |
| 25 wks | 1383  | 420 (30)        | 476 (34)        | 291 (21)                      | 189 (14)                 |
| 26 wks | 1446  | 295 (20)        | 610 (42)        | 347 (24)                      | 212 (15)                 |
| 27 wks | 1617  | 202 (12)        | 809 (50)        | 379 (23)                      | 220 (14)                 |
| 28 wks | 1729  | 155 (9)         | 1000 (58)       | 403 (23)                      | 167 (10)                 |

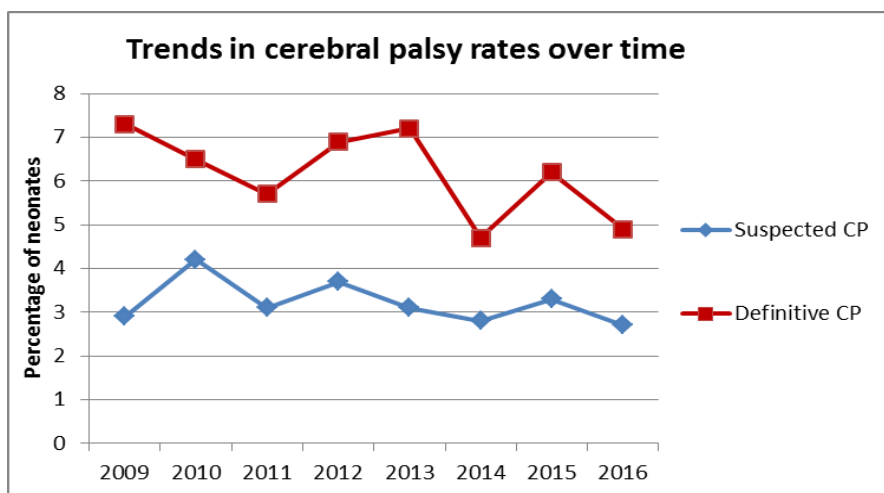


## F. Outcomes Over Time

The data presented in this section have not been adjusted for confounding variables

Presentation 16: Trends in cerebral palsy rates over time

| Yr of birth | CNFUN with complete CP data (n) | Missing CP data (n) | No CP n (%) | Suspected CP n (%) | Definitive CP n (%) | Missing CP GMFCS n | CP GMFCS $\leq 2$ n (%) | CP GMFCS 3-5 n (%) |
|-------------|---------------------------------|---------------------|-------------|--------------------|---------------------|--------------------|-------------------------|--------------------|
| 2009        | 647                             | 12                  | 581 (90%)   | 19 (2.9%)          | 47 (7.3%)           | 7                  | 26 (65%)                | 14 (35%)           |
| 2010        | 997                             | 16                  | 890 (89%)   | 42 (4.2%)          | 65 (6.5%)           | 11                 | 33 (61%)                | 21 (39%)           |
| 2011        | 827                             | 25                  | 754 (91%)   | 26 (3.1%)          | 47 (5.7%)           | 4                  | 22 (51%)                | 21 (49%)           |
| 2012        | 669                             | 7                   | 598 (89%)   | 25 (3.7%)          | 46 (6.9%)           | 3                  | 25 (58%)                | 18 (42%)           |
| 2013        | 607                             | 8                   | 544 (90%)   | 19 (3.1%)          | 44 (7.2%)           | 2                  | 28 (67%)                | 14 (33%)           |
| 2014        | 641                             | 8                   | 593 (93%)   | 18 (2.8%)          | 30 (4.7%)           | 1                  | 20 (69%)                | 9 (31%)            |
| 2015        | 674                             | 12                  | 610 (91%)   | 22 (3.3%)          | 42 (6.2%)           | 2                  | 26 (65%)                | 14 (35%)           |
| 2016        | 711                             | 2                   | 657 (92%)   | 19 (2.7%)          | 35 (4.9%)           | 9                  | 21 (81%)                | 5 (19%)            |
| '09-'16     | 5773                            | 90                  | 5227 (91%)  | 190 (3.3%)         | 356 (6.2%)          | 39                 | 201 (63%)               | 116 (37%)          |



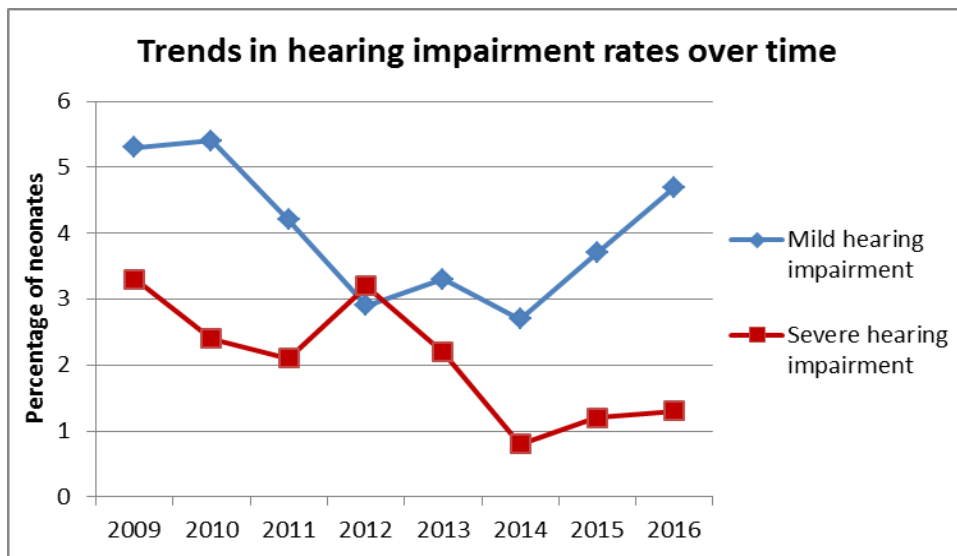
### COMMENTS:

Higher attrition rates in the later years may impact the results. The majority of cerebral palsy cases are mild with GMFCS  $\leq 2$ .

Presentation No 17:

Trends in hearing impairment rates over time

| Yr of birth | CNFUN complete data (n) | Missing hearing data (n) | Normal hearing n (%) | Mild hearing impairment n (%) | Severe hearing impairment* n (%) |
|-------------|-------------------------|--------------------------|----------------------|-------------------------------|----------------------------------|
| 2009        | 643                     | 16                       | 588 (91%)            | 34 (5.3%)                     | 21 (3.3%)                        |
| 2010        | 988                     | 25                       | 911 (92%)            | 53 (5.4%)                     | 24 (2.4%)                        |
| 2011        | 819                     | 33                       | 768 (94%)            | 34 (4.2%)                     | 17 (2.1%)                        |
| 2012        | 663                     | 13                       | 623 (94%)            | 19 (2.9%)                     | 21 (3.2%)                        |
| 2013        | 602                     | 13                       | 569 (95%)            | 20 (3.3%)                     | 13 (2.2%)                        |
| 2014        | 641                     | 8                        | 619 (97%)            | 17 (2.7%)                     | 5 (0.8%)                         |
| 2015        | 675                     | 11                       | 642 (95%)            | 25 (3.7%)                     | 8 (1.2%)                         |
| 2016        | 710                     | 3                        | 668 (94%)            | 33 (4.7%)                     | 9 (1.3%)                         |
| '09-'16     | 5741                    | 122                      | 5388 (94%)           | 235 (4.1%)                    | 118 (2.1%)                       |



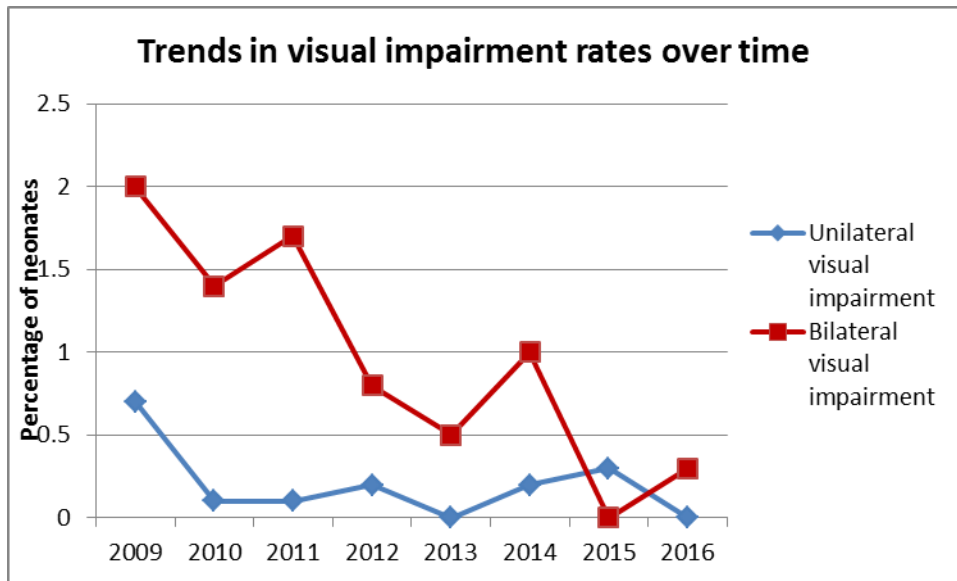
**COMMENTS:**

Severe hearing impairment was defined as prescribed hearing aid(s) or cochlear implant(s). A mild hearing impairment is any hearing impairment identified by an audiologist as not requiring hearing aid(s) or cochlear implant(s).

Presentation No 18:

Trends in visual impairment rates over time

| Yr of birth | CNFUN complete data<br>(n) | Missing vision data<br>(n) | Normal Vision<br>n (%) | Unilateral visual impairment<br>n (%) | Bilateral visual impairment<br>n (%) |
|-------------|----------------------------|----------------------------|------------------------|---------------------------------------|--------------------------------------|
| 2009        | 613                        | 46                         | 597 (97%)              | (0.7%)                                | 12 (2.0%)                            |
| 2010        | 931                        | 82                         | 917 (98%)              | (0.1%)                                | 13 (1.4%)                            |
| 2011        | 755                        | 97                         | 741 (98%)              | (0.1%)                                | 13 (1.7%)                            |
| 2012        | 622                        | 54                         | 616 (99%)              | (0.2%)                                | 5 (0.8%)                             |
| 2013        | 565                        | 50                         | 562 (99%)              | 0 (0)                                 | (0.5%)                               |
| 2014        | 599                        | 50                         | 592 (99%)              | (0.2%)                                | 6 (1.0%)                             |
| 2015        | 637                        | 49                         | 635 (99.7%)            | 0 (0.3)                               | 0 (0)                                |
| 2016        | 675                        | 38                         | 673 (99.7%)            | 0 (0)                                 | (0.3%)                               |
| '09-'16     | 5397                       | 466                        | 5333 (99%)             | 10 (0.2%)                             | 54 (1.0%)                            |



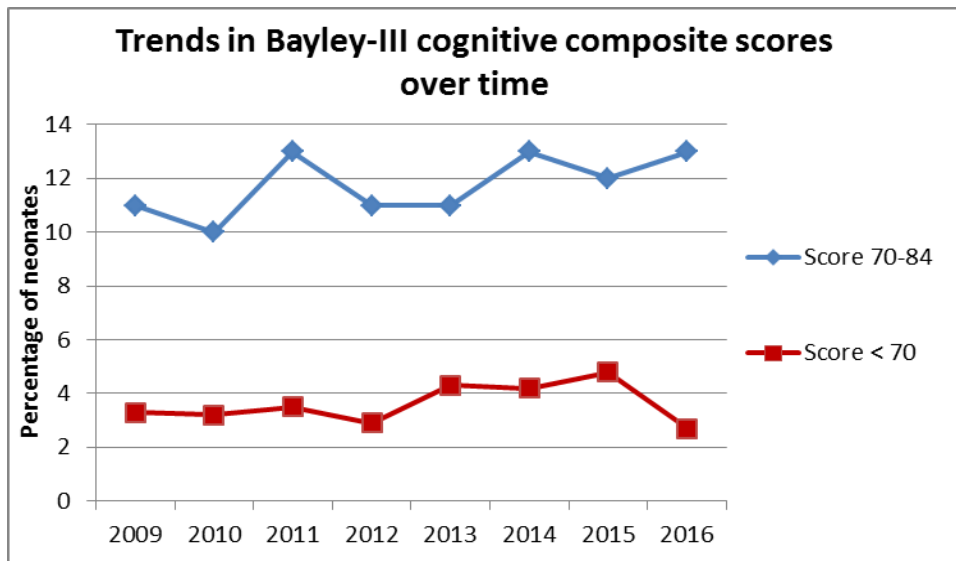
**COMMENTS:**

Visual impairment at 18 months corrected age is now a rare complication of prematurity.

Presentation No 19:

Table 4: Trends in Bayley- III cognitive composite scores over time

| Yr of birth | CNFUN with complete data (n) | Missing Bayley cognitive (n) | Median score (IQR) | Bayley-III $\geq$ 85 n (%) | Score 70-84 n (%) | Score < 70 n (%) |
|-------------|------------------------------|------------------------------|--------------------|----------------------------|-------------------|------------------|
| 2009        | 608                          | 51                           | 95 (90, 105)       | 523 (86%)                  | 65 (11%)          | 20 (3.3%)        |
| 2010        | 943                          | 71                           | 95 (90, 105)       | 813 (86%)                  | 99 (10%)          | 30 (3.2%)        |
| 2011        | 794                          | 58                           | 95 (90, 105)       | 664 (84%)                  | 102 (13%)         | 28 (3.5%)        |
| 2012        | 627                          | 49                           | 95 (90, 105)       | 542 (86%)                  | 67 (11%)          | 18 (2.9%)        |
| 2013        | 561                          | 54                           | 95 (90, 105)       | 473 (84%)                  | 64 (11%)          | 24 (4.3%)        |
| 2014        | 601                          | 48                           | 95 (85, 105)       | 498 (83%)                  | 78 (13%)          | 25 (4.2%)        |
| 2015        | 641                          | 45                           | 95 (90, 105)       | 536 (84%)                  | 74 (12%)          | 31 (4.8%)        |
| 2016        | 659                          | 54                           | 95 (90, 105)       | 554 (84%)                  | 87 (13%)          | 18 (2.7%)        |
| '09-'16     | 5433                         | 430                          | 95 (90, 105)       | 4603 (85%)                 | 636 (12%)         | 194 (3.6%)       |



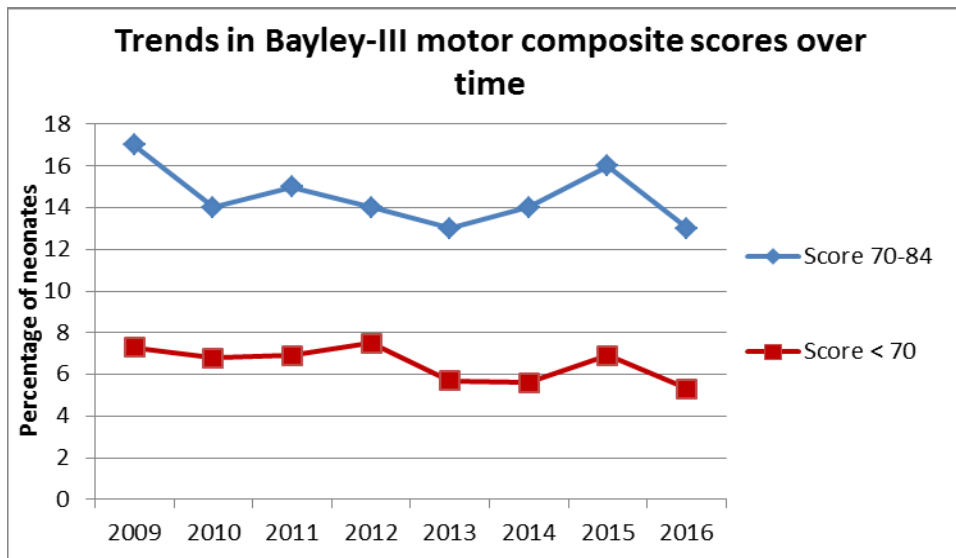
**COMMENTS:**

Higher attrition rates in the later years may impact the results. The Bayley-III has a poor predictive value.



Presentation No 20:  
Trends in Bayley- III motor composite scores over time

| Yr of birth | CNFUN complete data (n) | Missing Bayley motor scores (n) | Median score (IQR) | Bayley-III $\geq$ 85 | Bayley-III 70-84 | Bayley-III < 70 |
|-------------|-------------------------|---------------------------------|--------------------|----------------------|------------------|-----------------|
|             |                         |                                 |                    | n (%)                | n (%)            | n (%)           |
| 2009        | 579                     | 80                              | 94 (85, 100)       | 437 (75%)            | 100 (17%)        | 42 (7.3%)       |
| 2010        | 900                     | 113                             | 94 (85, 100)       | 713 (79%)            | 127 (14%)        | 61 (6.8%)       |
| 2011        | 769                     | 83                              | 94 (85, 100)       | 603 (78%)            | 113 (15%)        | 53 (6.9%)       |
| 2012        | 613                     | 63                              | 94 (85, 100)       | 484 (79%)            | 83 (14%)         | 46 (7.5%)       |
| 2013        | 530                     | 85                              | 94 (85, 100)       | 429 (81%)            | 71 (13%)         | 30 (5.7%)       |
| 2014        | 570                     | 79                              | 94 (88, 100)       | 459 (81%)            | 79 (14%)         | 32 (5.6%)       |
| 2015        | 605                     | 81                              | 94 (85, 100)       | 469 (78%)            | 94 (16%)         | 42 (6.9%)       |
| 2016        | 623                     | 90                              | 94 (88, 103)       | 506 (81%)            | 84 (13%)         | 33 (5.3%)       |
| '09-'16     | 5189                    | 674                             | 94 (85, 100)       | 4099 (79%)           | 751 (15%)        | 339 (6.5%)      |



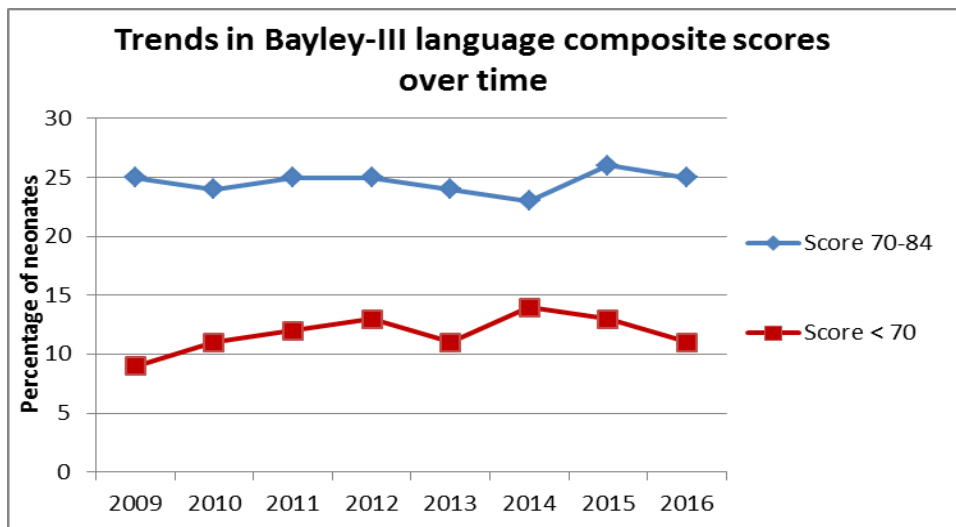
**COMMENTS:**

Higher attrition rates in the later years may impact the results. The Bayley-III has a poor predictive value.

Presentation No 21:

Trends in Bayley- III language composite scores over time

| Yr of birth | CNFUN with complete data (n) | Missing Bayley language scores n (%) | Median score (IQR) | Bayley-III $\geq$ 85 n (%) | Bayley-III 70-84 n (%) | Bayley-III < 70 n (%) |
|-------------|------------------------------|--------------------------------------|--------------------|----------------------------|------------------------|-----------------------|
| 2009        | 581                          | 78                                   | 91 (79, 100)       | 383 (66%)                  | 143 (25%)              | 55 (9%)               |
| 2010        | 915                          | 98                                   | 89 (79, 100)       | 594 (65%)                  | 218 (24%)              | 103 (11%)             |
| 2011        | 774                          | 78                                   | 91 (77, 100)       | 482 (62%)                  | 196 (25%)              | 96 (12%)              |
| 2012        | 616                          | 60                                   | 90 (79, 100)       | 386 (63%)                  | 152 (25%)              | 78 (13%)              |
| 2013        | 519                          | 96                                   | 91 (79, 100)       | 338 (65%)                  | 124 (24%)              | 57 (11%)              |
| 2014        | 568                          | 81                                   | 89 (77, 100)       | 359 (63%)                  | 132 (23%)              | 77 (14%)              |
| 2015        | 613                          | 73                                   | 89 (77, 100)       | 374 (61%)                  | 162 (26%)              | 77 (13%)              |
| 2016        | 623                          | 90                                   | 89 (79, 100)       | 399 (64%)                  | 156 (25%)              | 68 (11%)              |
| '09-'16     | 5209                         | 654                                  | 91 (79, 100)       | 3315 (64%)                 | 1283 (25%)             | 611 (12%)             |

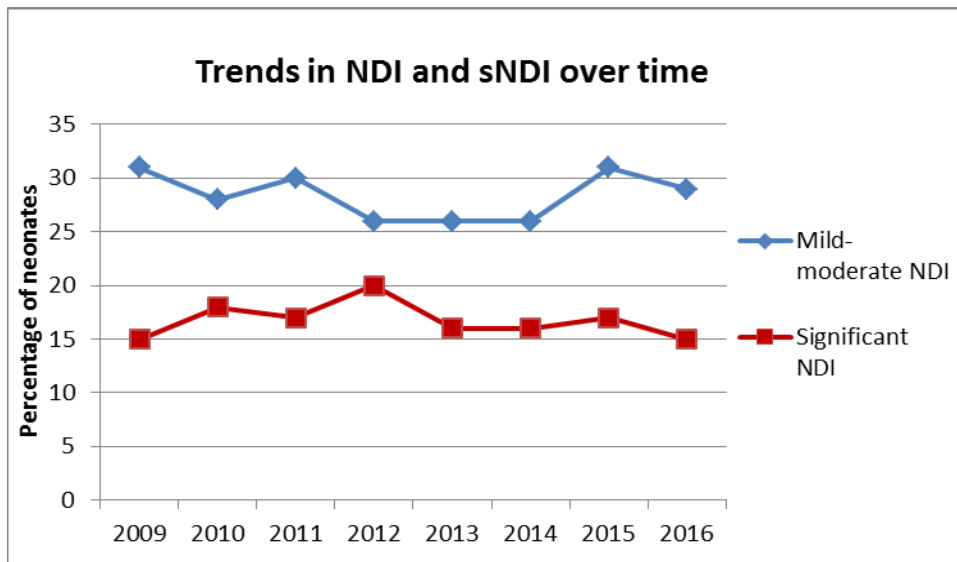


**COMMENTS:**

Higher attrition rates in the later years may impact the results. The Bayley-III has a poor predictive value.

Presentation No 22:  
Trends in NDI and sNDI over time

| Yr of birth | CNFUN with complete data (n) | Missing data n (%) | No NDI n (%) | Mild-moderate NDI n (%) | Significant NDI n (%) |
|-------------|------------------------------|--------------------|--------------|-------------------------|-----------------------|
| 2009        | 653                          | 6                  | 347 (53%)    | 205 (31%)               | 101 (15%)             |
| 2010        | 1012                         | 1                  | 550 (54%)    | 285 (28%)               | 178 (18%)             |
| 2011        | 848                          | 4                  | 450 (53%)    | 251 (30%)               | 147 (17%)             |
| 2012        | 674                          | 2                  | 367 (54%)    | 174 (26%)               | 133 (20%)             |
| 2013        | 612                          | 3                  | 356 (58%)    | 160 (26%)               | 96 (16%)              |
| 2014        | 647                          | 2                  | 370 (57%)    | 171 (26%)               | 106 (16%)             |
| 2015        | 684                          | 2                  | 358 (52%)    | 209 (31%)               | 117 (17%)             |
| 2016        | 712                          | 1                  | 398 (56%)    | 205 (29%)               | 109 (15%)             |
| '09-'16     | 5842                         | 21                 | 3195 (55%)   | 1660 (28%)              | 987 (17%)             |



**COMMENTS:**

See page 15 for definitions. Higher attrition rates in the later years may impact the results. There has not been a clinically significant change in neurodevelopmental impairment rates.

## G. Site Comparisons-Crude

Presentation No 23:

Neurodevelopmental impairment for MiCare cohort (Births April 1, 2009-Sept 30, 2011)\*

| Site  | CNFUN (n) | No NDI n (%) | Any NDI n (%) | CP with GMFCS 1-5 n (%) | Any hearing Impairment n(%) | Any visual Impairment n(%) | Bayley score <85m Motor n(%) | Bayley score <85 Language n(%) | Bayley score <85 Cognitive n(%) |
|-------|-----------|--------------|---------------|-------------------------|-----------------------------|----------------------------|------------------------------|--------------------------------|---------------------------------|
| 1     | 168       | 110 (65.5)   | 58 (34.5)     | < 5%                    | 9 (5.4)                     | 0 (0)                      | 23 (13.7)                    | 40 (23.8)                      | 8 (4.8)                         |
| 2     | 115       | 70 (60.9)    | 45 (39.1)     | < 5%                    | 12 (10.4)                   | 0 (0)                      | 17 (14.8)                    | 29 (25.2)                      | 10 (8.7)                        |
| 5     | 205       | 118 (57.6)   | 87 (42.4)     | 7 (3.4)                 | 29 (14.1)                   | < 5%                       | 24 (11.7)                    | 57 (27.8)                      | 21 (10.2)                       |
| 6     | 212       | 95 (44.8)    | 117 (55.2)    | 11 (5.2)                | 25 (11.8)                   | 11 (5.2)                   | 58 (27.4)                    | 76 (35.8)                      | 30 (14.2)                       |
| 7     | 27        | 19 (70.4)    | 8 (29.6)      | < 5%                    | 0 (0)                       | < 5%                       | 5 (18.5)                     | 7 (25.9)                       | < 10%                           |
| 8     | 145       | 67 (46.2)    | 78 (53.8)     | 14 (9.7)                | < 5%                        | < 5%                       | 41 (28.3)                    | 53 (36.6)                      | 31 (21.4)                       |
| 9     | 53        | 30 (56.6)    | 23 (43.4)     | 5 (9.4)                 | < 5%                        | 0 (0)                      | < 10%                        | 10 (18.9)                      | 9 (17)                          |
| 10    | 56        | 15 (26.8)    | 41 (73.2)     | < 10%                   | 9 (16.1)                    | < 5%                       | 19 (33.9)                    | 34 (60.7)                      | 18 (32.1)                       |
| 11    | 178       | 92 (51.7)    | 86 (48.3)     | 9 (5.1)                 | 13 (7.3)                    | < 5%                       | 45 (25.3)                    | 55 (30.9)                      | 20 (11.2)                       |
| 12    | 84        | 43 (51.2)    | 41 (48.8)     | 12 (14.3)               | < 5%                        | < 5%                       | 25 (29.8)                    | 26 (31)                        | 14 (16.7)                       |
| 13    | 21        | 16 (76.2)    | 5 (23.8)      | < 15%                   | < 15%                       | 0 (0)                      | 0 (0)                        | < 5%                           | 0 (0)                           |
| 14    | 103       | 56 (54.4)    | 47 (45.6)     | 6 (5.8)                 | < 5%                        | 0 (0)                      | 17 (16.5)                    | 42 (40.8)                      | 12 (11.7)                       |
| 15    | 30        | 17 (56.7)    | 13 (43.3)     | < 5%                    | 6 (20)                      | 0 (0)                      | < 15%                        | 9 (30)                         | 5 (16.7)                        |
| 16    | 250       | 128 (51.2)   | 122 (48.8)    | 18 (7.2)                | 16 (6.4)                    | < 5%                       | 48 (19.2)                    | 75 (30)                        | 44 (17.6)                       |
| 17    | 64        | 33 (51.6)    | 31 (48.4)     | 0 (0)                   | < 5%                        | < 5%                       | 18 (28.1)                    | 22 (34.4)                      | 12 (18.8)                       |
| 18    | 43        | 23 (53.5)    | 20 (46.5)     | < 10%                   | < 5%                        | < 5%                       | 9 (20.9)                     | 14 (32.6)                      | 9 (20.9)                        |
| 20    | 79        | 40 (51.3)    | 39 (48.7)     | 5 (6.3)                 | < 5%                        | < 5%                       | 14 (17.7)                    | 34 (43)                        | 9 (11.4)                        |
| 21    | 55        | 19 (34.5)    | 36 (65.5)     | 5 (9.1)                 | 10 (18.2)                   | < 5%                       | 19 (34.5)                    | 29 (52.7)                      | 15 (27.3)                       |
| 23    | 132       | 85 (64.4)    | 47 (35.6)     | 10 (7.6)                | 11 (8.4)                    | < 5%                       | 17 (12.9)                    | 27 (20.5)                      | 10 (7.6)                        |
| 25    | 238       | 125 (52.5)   | 113 (47.5)    | 0 (0)                   | 13 (5.5)                    | < 5%                       | 40 (16.8)                    | 95 (39.9)                      | 33 (13.9)                       |
| Total | 2258      | 1198(53.1)   | 1055(46.8)    | 123 (5.4)               | 174 (7.7)                   | 38 (1.7)                   | 446 (19.8)                   | 735 (32.6)                     | 312 (13.8)                      |

\*Cells with less than 5 show only % , rounded up to a multiple of 5%

Presentation No 24:

Significant neurodevelopmental impairment for MiCare cohort (Births April 1, 2009-Sept 30, 2011)\*

| Site  | CNFUN (n) | No NDI n (%) | Significant NDI n (%) | CP GMFCS 3-5 n (%) | Severe hearing Impairment n (%) | Bilateral visual Impairment n (%) | Bayley score <70 Motor n (%) | Bayley score <70 Language n (%) | Bayley score <70 Cognitive n (%) |
|-------|-----------|--------------|-----------------------|--------------------|---------------------------------|-----------------------------------|------------------------------|---------------------------------|----------------------------------|
| 1     | 168       | 110 (65.5)   | 10 (6)                | <5%                | 0 (0)                           | 0 (0)                             | 6 (3.6)                      | 7 (4.2)                         | <5%                              |
| 2     | 115       | 70 (60.9)    | 10 (8.7)              | 0 (0)              | <5%                             | 0 (0)                             | <5 %                         | <5 %                            | < 5%                             |
| 5     | 205       | 118 (57.6)   | 18 (8.8)              | < 5%               | < 5%                            | <5 %                              | 5 (2.4)                      | 9 (4.4)                         | < 5%                             |
| 6     | 212       | 95 (44.8)    | 45 (21.2)             | < 5%               | < 5%                            | 9 (4.2)                           | 15 (7.1)                     | 32 (15.1)                       | 5 (2.4)                          |
| 7     | 27        | 19 (70.4)    | < 15%                 | < 5%               | 0 (0)                           | < 5%                              | < 15%                        | < 15%                           | < 5%                             |
| 8     | 145       | 67 (46.2)    | 29 (20)               | 6 (4.1)            | < 5%                            | < 5%                              | 13 (9)                       | 14 (9.7)                        | 7 (4.8)                          |
| 9     | 53        | 30 (56.6)    | 8 (15.1)              | 0 (0)              | < 5%                            | 0 (0)                             | < 5%                         | < 10%                           | < 5%                             |
| 10    | 56        | 15 (26.8)    | 23 (41.1)             | 0 (0)              | 0 (0)                           | < 5%                              | 8 (14.3)                     | 22 (39.3)                       | < 10%                            |
| 11    | 178       | 92 (51.7)    | 27 (15.2)             | 5 (2.8)            | 5 (2.8)                         | < 5%                              | 13 (7.3)                     | 16 (9)                          | 7 (3.9)                          |
| 12    | 84        | 43 (51.2)    | 16 (19)               | < 5%               | < 5%                            | < 5%                              | 9 (10.7)                     | 6 (7.1)                         | < 5%                             |
| 13    | 21        | 16 (76.2)    | 5 (23.8)              | < 15%              | < 15%                           | 0 (0)                             | 0 (0)                        | < 5%                            | 0 (0)                            |
| 14    | 103       | 56 (54.4)    | 13 (12.6)             | < 5%               | < 5%                            | 0 (0)                             | 6 (5.8)                      | 8 (7.8)                         | 0 (0)                            |
| 15    | 30        | 17 (56.7)    | 8 (26.7)              | < 5%               | < 15%                           | 0 (0)                             | < 10%                        | < 15%                           | 0 (0)                            |
| 16    | 250       | 128 (51.2)   | 47 (18.8)             | 8 (3.2)            | 10 (4)                          | < 5%                              | 10 (4)                       | 24 (9.6)                        | 9 (3.6)                          |
| 17    | 64        | 33 (51.6)    | 14 (21.9)             | 0 (0)              | 0 (0)                           | 0 (0)                             | 6 (9.4)                      | 10 (15.6)                       | < 5%                             |
| 18    | 43        | 23 (53.5)    | 12 (27.9)             | < 10%              | 0 (0)                           | < 5%                              | 6 (14)                       | 7 (16.3)                        | < 10%                            |
| 20    | 79        | 39 (48.7)    | 17 (21.5)             | < 5%               | < 5%                            | < 5%                              | < 10%                        | 12 (15.2)                       | < 5%                             |
| 21    | 55        | 19 (34.5)    | 18 (32.7)             | < 5%               | < 5%                            | < 5%                              | 9 (16.4)                     | 15 (27.3)                       | 6 (10.9)                         |
| 23    | 132       | 85 (64.4)    | 19 (14.4)             | 5 (3.8)            | 9 (6.8)                         | < 5%                              | 5 (3.8)                      | 5 (3.8)                         | < 5%                             |
| 25    | 238       | 125 (52.5)   | 39 (16.4)             | 0 (0)              | 10 (4.2)                        | < 5%                              | 9 (3.8)                      | 26 (10.9)                       | < 5%                             |
| Total | 2258      | 1198 (53.1)  | 380 (16.8)            | 49 (2.2)           | 58 (2.6)                        | 34 (1.5)                          | 133 (5.9)                    | 228 (10.1)                      | 67 (3)                           |

\*Cells with less than 5 only show %, rounded up to a multiple of 5%

Presentation No 25:

Neurodevelopmental impairment for post MiCare cohort (Births Oct 1, 2011- Dec 31, 2016)\*

| Site  | CNFUN (n) | No NDI n (%) | Any NDI n (%) | GMFCS 1-5 n (%) | Any hearing Impairment n(%) | Any visual Impairment n(%) | Bayley score <85m motor n(%) | Bayley score <85 Language n(%) | Bayley score <85 Cognitive n(%) |
|-------|-----------|--------------|---------------|-----------------|-----------------------------|----------------------------|------------------------------|--------------------------------|---------------------------------|
| 1     | 320       | 183 (57.2)   | 137 (42.8)    | 23 (7.2)        | 15 (4.7)                    | < 5%                       | 55 (17.2)                    | 90 (28.1)                      | 30 (9.4)                        |
| 2     | 238       | 145 (60.9)   | 93 (39.1)     | 11 (4.6)        | 23 (9.7)                    | 0 (0)                      | 21 (8.8)                     | 62 (26.1)                      | 20 (8.4)                        |
| 3     | 61        | 27 (44.3)    | 34 (55.7)     | < 5%            | < 5%                        | 0 (0)                      | 16 (26.2)                    | 26 (42.6)                      | 8 (13.1)                        |
| 6     | 440       | 257 (58.4)   | 183 (41.6)    | 16 (3.6)        | 16 (3.6)                    | 7 (1.6)                    | 91 (20.7)                    | 120 (27.3)                     | 65 (14.8)                       |
| 9     | 27        | 14 (51.9)    | 13 (48.1)     | 1 (3.7)         | 0 (0)                       | 0 (0)                      | 6 (22.2)                     | 6 (22.2)                       | 5 (18.5)                        |
| 10    | 99        | 34 (34.3)    | 65 (65.7)     | 7 (7.1)         | 11 (11.1)                   | < 5%                       | 29 (29.3)                    | 58 (58.6)                      | 20 (20.2)                       |
| 11    | 353       | 189 (53.5)   | 164 (46.5)    | 27 (7.6)        | 25 (7.1)                    | < 5%                       | 85 (24.1)                    | 112 (31.7)                     | 56 (15.9)                       |
| 12    | 197       | 112 (56.9)   | 85 (43.1)     | 19 (9.6)        | < 5%                        | < 5%                       | 45 (22.8)                    | 58 (29.4)                      | 28 (14.2)                       |
| 14    | 218       | 115 (52.8)   | 103 (47.2)    | 10 (4.6)        | 13 (6)                      | < 5%                       | 40 (18.3)                    | 72 (33)                        | 21 (9.6)                        |
| 16    | 419       | 248 (59.2)   | 171 (40.8)    | 22 (5.3)        | 17 (4.1)                    | 0 (0)                      | 51 (12.2)                    | 131 (31.3)                     | 65 (15.5)                       |
| 20    | 160       | 82 (51.3)    | 78 (48.8)     | 8 (5)           | 16 (10)                     | < 5%                       | 35 (21.9)                    | 57 (35.6)                      | 32 (20)                         |
| 21    | 99        | 48 (48.5)    | 51 (51.5)     | 9 (9.1)         | < 5%                        | 0 (0)                      | 24 (24.2)                    | 42 (42.4)                      | 20 (20.2)                       |
| 23    | 89        | 55 (61.8)    | 34 (38.2)     | 9 (10.1)        | 5 (5.6)                     | < 5%                       | 12 (13.5)                    | 23 (25.8)                      | 13 (14.6)                       |
| 25    | 680       | 367 (54)     | 313 (46)      | 21 (3.1)        | 20 (2.9)                    | < 5%                       | 107 (15.7)                   | 256 (37.6)                     | 112 (16.5)                      |
| 26    | 40        | 29 (72.5)    | 11 (27.5)     | < 5%            | < 5%                        | 0 (0)                      | 6 (15)                       | 8 (20)                         | <10%                            |
| Total | 3440      | 1905 (55.4)  | 1535 (44.6)   | 188 (5.5)       | 173 (5.0)                   | 23 (0.7)                   | 623 (18.1)                   | 1121 (32.6)                    | 498 (14.5)                      |

\*Cells with less than 5 only show % , rounded up to a multiple of 5%

Presentation No 26:

Significant neurodevelopment for post MiCare cohort (Births Oct 1, 2011- Dec 31, 2016)\*

| Site  | CNFUN (n) | No NDI n (%) | Significant NDI n (%) | CP 3-5 n (%) | Severe hearing Impairment n(%) | Bilateral visual Impairment n(%) | Bayley score <70 Motor n(%) | Bayley score <70 Language n(%) | Bayley score <70 Cognitive n(%) |
|-------|-----------|--------------|-----------------------|--------------|--------------------------------|----------------------------------|-----------------------------|--------------------------------|---------------------------------|
| 1     | 320       | 183 (57.2)   | 62 (19.4)             | 13 (4.1)     | 11 (3.4)                       | < 5%                             | 21 (6.6)                    | 25 (7.8)                       | 8 (2.5)                         |
| 2     | 238       | 145 (60.9)   | 32 (13.4)             | 5 (2.1)      | < 5%                           | 0 (0)                            | < 5%                        | 20 (8.4)                       | 7 (2.9)                         |
| 3     | 61        | 27 (44.3)    | 16 (26.2)             | < 5%         | < 5%                           | 0 (0)                            | 5 (8.2)                     | 11 (18)                        | 0 (0)                           |
| 6     | 440       | 257 (58.4)   | 59 (13.4)             | 5 (1.1)      | < 5%                           | < 5%                             | 22 (5)                      | 46 (10.5)                      | 18 (4.1)                        |
| 9     | 27        | 14 (51.9)    | 6 (22.2)              | 0 (0)        | 0 (0)                          | 0 (0)                            | < 10%                       | < 5%                           | < 10%                           |
| 10    | 99        | 34 (34.3)    | 28 (28.3)             | < 5%         | < 5%                           | < 5%                             | 8 (8.1)                     | 25 (25.3)                      | 5 (5.1)                         |
| 11    | 353       | 189 (53.5)   | 51 (14.4)             | 5 (1.4)      | < 5%                           | < 5%                             | 28 (7.9)                    | 27 (7.6)                       | 9 (2.5)                         |
| 12    | 197       | 112 (56.9)   | 26 (13.2)             | < 5%         | < 5%                           | < 5%                             | 13 (6.6)                    | 20 (10.2)                      | 8 (4.1)                         |
| 14    | 218       | 115 (52.8)   | 39 (17.9)             | 5 (2.3)      | < 5%                           | < 5%                             | 16 (7.3)                    | 17 (7.8)                       | 7 (3.2)                         |
| 16    | 419       | 248 (59.2)   | 56 (13.4)             | 5 (1.2)      | 9 (2.1)                        | 0 (0)                            | 15 (3.6)                    | 34 (8.1)                       | 17 (4.1)                        |
| 20    | 160       | 82 (51.3)    | 43 (26.9)             | < 5%         | < 5%                           | < 5%                             | 14 (8.8)                    | 32 (20)                        | 9 (5.6)                         |
| 21    | 99        | 48 (48.5)    | 26 (26.3)             | < 5%         | < 5%                           | 0 (0)                            | 10 (10.1)                   | 20 (20.2)                      | 8 (8.1)                         |
| 23    | 89        | 55 (61.8)    | 16 (18)               | 5 (5.6)      | < 5%                           | < 5%                             | 6 (6.7)                     | 8 (9)                          | < 5%                            |
| 25    | 680       | 367 (54)     | 119 (17.5)            | 11 (1.6)     | 13 (1.9)                       | < 5%                             | 27 (4)                      | 81 (11.9)                      | 19 (2.8)                        |
| 26    | 40        | 29 (72.5)    | 10%                   | 0 (0)        | < 5%                           | 0 (0)                            | < 5%                        | < 5%                           | 0 (0)                           |
| Total | 3440      | 1905 (55.4)  | 583 (16.9)            | 64 (1.9)     | 59 (1.7)                       | 19 (0.6)                         | 192 (5.6)                   | 369 (10.7)                     | 119 (3.5)                       |

\*Cells with less than 5 only show %, rounded up to a multiple of 5%

## H.Site Comparisons- Adjusted Standardized Ratios

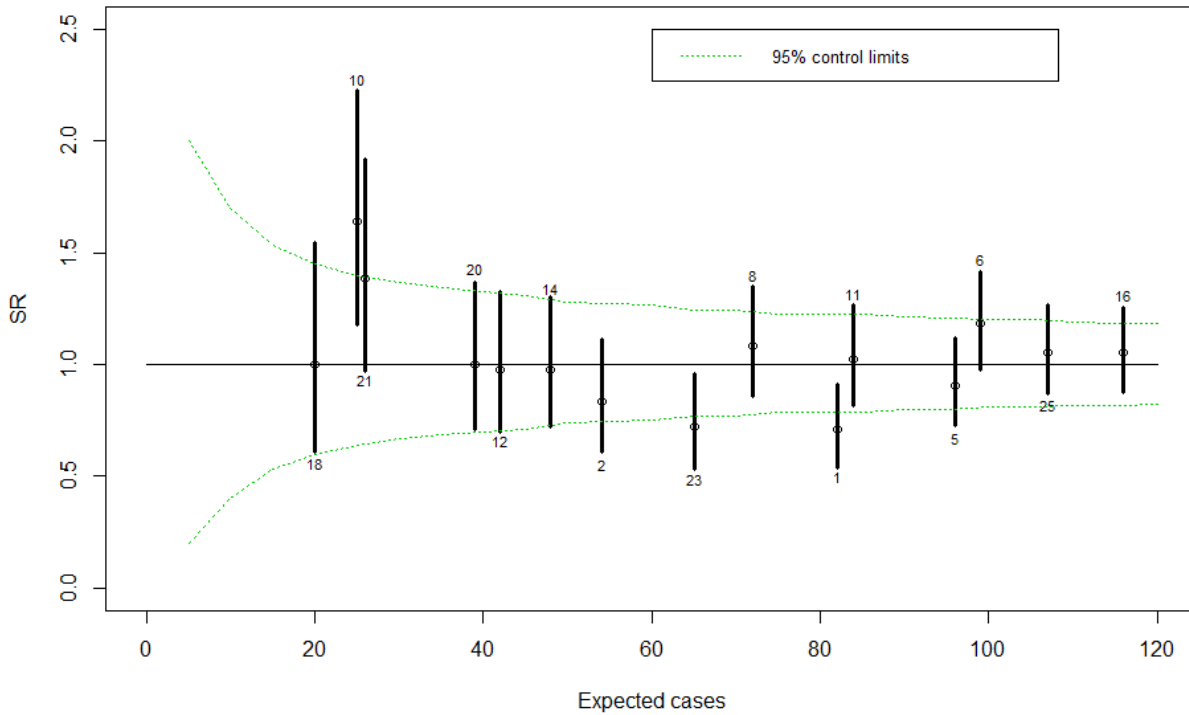
Presentation No 27:

Adjusted Standardized ratios by site – Neurodevelopmental Impairment (NDI)- MiCare cohort

| Site | No. of children | Follow-up Rate (%) | Included Yes/ No | NDI n | Adjusted Expected NDI | Adjusted standardized ratio (95%CI) |
|------|-----------------|--------------------|------------------|-------|-----------------------|-------------------------------------|
| 1    | 168             | 76.6               | Y                | 58    | 82                    | 0.71 (0.54, 0.91)                   |
| 2    | 115             | 87.8               | Y                | 45    | 54                    | 0.83 (0.61, 1.12)                   |
| 3    | 10              | 84.6               | N                | 7     |                       |                                     |
| 4    | 13              | 76.5               | N                | 3     |                       |                                     |
| 5    | 205             | 80.1               | Y                | 87    | 96                    | 0.91 (0.73, 1.12)                   |
| 6    | 212             | 85.5               | Y                | 117   | 99                    | 1.18 (0.98, 1.42)                   |
| 7    | 27              | 56.6               | N                | 8     |                       |                                     |
| 8    | 145             | 71.4               | Y                | 78    | 72                    | 1.08 (0.86, 1.35)                   |
| 9    | 53              | 48.2               | N                | 23    |                       |                                     |
| 10   | 56              | 81.2               | Y                | 41    | 25                    | 1.64 (1.18, 2.22)                   |
| 11   | 178             | 79.8               | Y                | 86    | 84                    | 1.02 (0.82, 1.26)                   |
| 12   | 84              | 82.4               | Y                | 41    | 42                    | 0.98 (0.70, 1.32)                   |
| 13   | 21              | 56.8               | N                | 5     |                       |                                     |
| 14   | 103             | 76.3               | Y                | 47    | 48                    | 0.98 (0.72, 1.30)                   |
| 15   | 30              | 60.8               | N                | 13    |                       |                                     |
| 16   | 250             | 83.1               | Y                | 122   | 116                   | 1.05 (0.87, 1.26)                   |
| 17   | 64              | 39.3               | N                | 31    |                       |                                     |
| 18   | 43              | 91.5               | Y                | 20    | 20                    | 1.00 (0.61, 1.54)                   |
| 19   | 17              | 25.8               | N                | 5     |                       |                                     |
| 20   | 79              | 78.2               | Y                | 39    | 39                    | 1.00 (0.71, 1.37)                   |
| 21   | 55              | 93.2               | Y                | 36    | 26                    | 1.38 (0.97, 1.92)                   |
| 22   | 13              | 65                 | N                | 2     |                       |                                     |
| 23   | 132             | 79.5               | Y                | 47    | 65                    | 0.72 (0.53, 0.96)                   |
| 24   | 7               | 53.8               | N                | 4     |                       |                                     |
| 25   | 238             | 78.2               | Y                | 113   | 107                   | 1.06 (0.87, 1.27)                   |
| 26   | 18              | 81.8               | N                | 9     |                       |                                     |

1. Sites with < 20 participants for the 2.5year MiCare cohort period and / or < 70% follow-up rates are excluded.
2. Model is adjusted for gestational age, sex, outborn, severity of illness (SNAP> 20), bronchopulmonary dysplasia, necrotizing enterocolitis Bell's stage 2 or greater and severe brain injury, defined as any grade 3 or 4 intraventricular hemorrhage , ventricular dilatation  $\geq 10$  mm, intraparenchymal hemorrhage or periventricular leukomalacia.





**COMMENTS:**

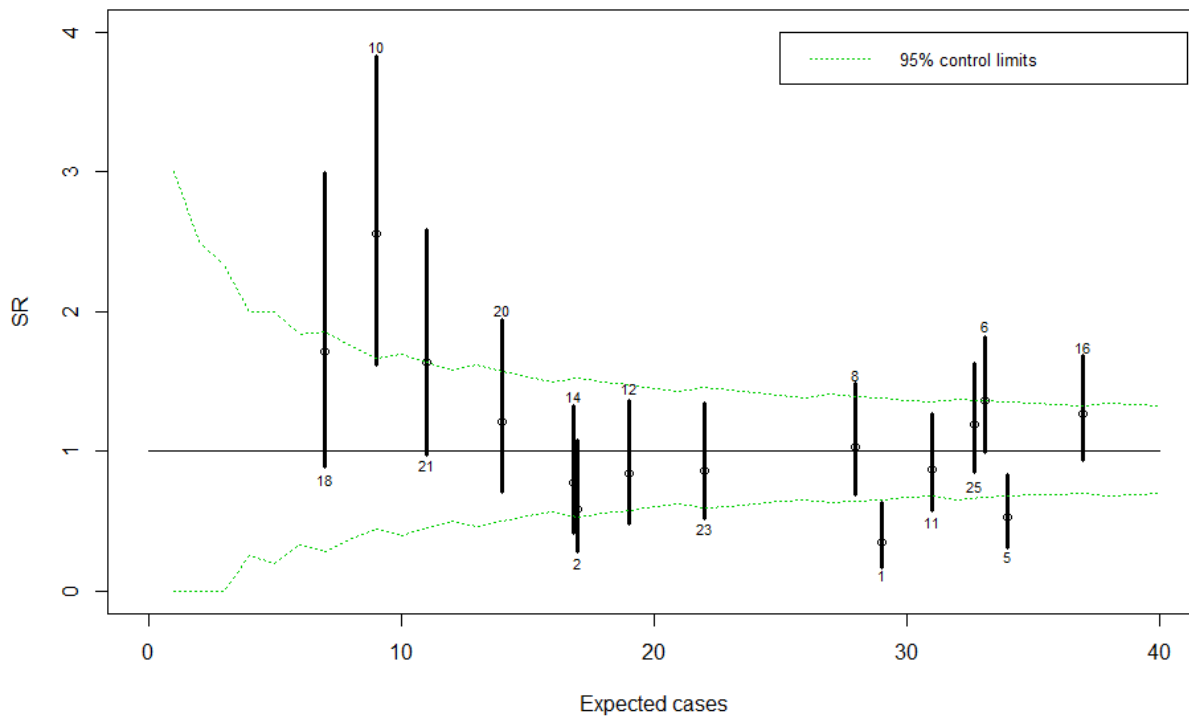
Sites with points outside the green “funnel” represent higher or lower adjusted NDI rates than expected. When the 95% confidence interval doesn’t cross 1, the results are statistically significant. Therefore 3 sites have statistically higher or lower NDI rates.

Presentation No 28:

Adjusted standardized ratios by site – Significant NDI- MiCare cohort

| Site | Children (n) | Follow-up Rate (%) | Included Yes/ No | sNDI (n) | Adjusted Expected sNDI n | Adjusted standardized ratio (95%CI) |
|------|--------------|--------------------|------------------|----------|--------------------------|-------------------------------------|
| 1    | 168          | 76.6               | Y                | 10       | 29                       | 0.34 (0.17, 0.63)                   |
| 2    | 115          | 87.8               | Y                | 10       | 17                       | 0.59 (0.28, 1.08)                   |
| 3    | 10           | 84.6               | N                | 3        |                          |                                     |
| 4    | 13           | 76.5               | N                | 0        |                          |                                     |
| 5    | 205          | 80.1               | Y                | 18       | 34                       | 0.53 (0.31, 0.84)                   |
| 6    | 212          | 85.5               | Y                | 45       | 33                       | 1.36 (0.99, 1.82)                   |
| 7    | 27           | 56.6               | N                | 4        |                          |                                     |
| 8    | 145          | 71.4               | Y                | 29       | 28                       | 1.04 (0.69, 1.49)                   |
| 9    | 53           | 48.2               | N                | 8        |                          |                                     |
| 10   | 56           | 81.2               | Y                | 23       | 9                        | 2.56 (1.62, 3.83)                   |
| 11   | 178          | 79.8               | Y                | 27       | 31                       | 0.87 (0.57, 1.27)                   |
| 12   | 84           | 82.4               | Y                | 16       | 19                       | 0.84 (0.48, 1.37)                   |
| 13   | 21           | 56.8               | N                | 5        |                          |                                     |
| 14   | 103          | 76.3               | Y                | 13       | 17                       | 0.76 (0.41, 1.31)                   |
| 15   | 30           | 60.8               | N                | 8        |                          |                                     |
| 16   | 250          | 83.1               | Y                | 47       | 37                       | 1.27 (0.93, 1.69)                   |
| 17   | 64           | 39.3               | N                | 14       |                          |                                     |
| 18   | 43           | 91.5               | Y                | 12       | 7                        | 1.71 (0.88, 2.99)                   |
| 19   | 17           | 25.8               | N                | 0        |                          |                                     |
| 20   | 79           | 78.2               | Y                | 17       | 14                       | 1.21 (0.71, 1.94)                   |
| 21   | 55           | 93.2               | Y                | 18       | 11                       | 1.64 (0.97, 2.59)                   |
| 22   | 13           | 65                 | N                | 1        |                          |                                     |
| 23   | 132          | 79.5               | Y                | 19       | 22                       | 0.86 (0.52, 1.35)                   |
| 24   | 7            | 53.8               | N                | 1        |                          |                                     |
| 25   | 238          | 78.2               | Y                | 39       | 33                       | 1.18 (0.84, 1.62)                   |
| 26   | 18           | 81.8               | N                | 4        |                          |                                     |

1. Sites with < 20 participants for the 2.5 year MiCare cohort period and / or < 70% follow-up rates are excluded.
2. Model is adjusted for gestational age, sex, antenatal steroids, severity of illness (SNAP > 20), severe retinopathy of prematurity defined as stage 3 or greater in either eye or treatment with laser or injections of anti-vascular endothelial growth factor, nosocomial infection and brain injury, defined as any grade 3 or 4 intraventricular hemorrhage, ventricular dilatation  $\geq 10$  mm, intraparenchymal hemorrhage or periventricular leukomalacia.



**COMMENTS:**

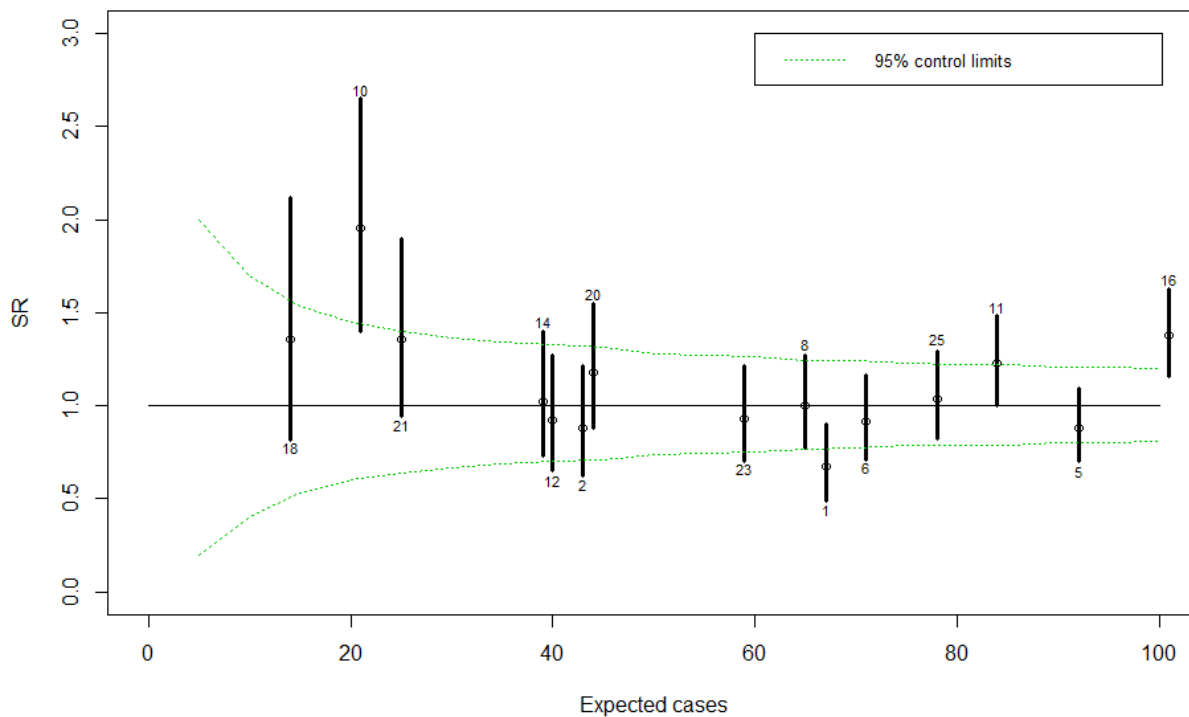
Sites with points outside the green “funnel” represent higher or lower adjusted sNDI rates than expected. When the 95% confidence interval doesn’t cross 1, the results are statistically significant. Therefore 3 sites have statistically higher or lower sNDI rates.

Presentation No 29:

Adjusted standardized ratios by site – significant NDI or death- MiCare cohort

| Site | Children (n) | Follow-up Rate (%) | Included Yes/ No | sNDI or death (n) | Adjusted Expected outcome (n) | Adjusted standardized ratio (95%CI) |
|------|--------------|--------------------|------------------|-------------------|-------------------------------|-------------------------------------|
| 1    | 205          | 76.6               | Y                | 45                | 67                            | 0.67 (0.49, 0.90)                   |
| 2    | 143          | 87.8               | Y                | 38                | 43                            | 0.88 (0.63, 1.21)                   |
| 3    | 11           | 84.6               | N                | 3                 |                               |                                     |
| 4    | 16           | 76.5               | N                | 3                 |                               |                                     |
| 5    | 268          | 80.1               | Y                | 81                | 92                            | 0.88 (0.70, 1.09)                   |
| 6    | 233          | 85.5               | Y                | 65                | 71                            | 0.92 (0.71, 1.17)                   |
| 7    | 33           | 56.6               | N                | 7                 |                               |                                     |
| 8    | 181          | 71.4               | Y                | 65                | 65                            | 1.00 (0.77, 1.27)                   |
| 9    | 80           | 48.2               | N                | 35                |                               |                                     |
| 10   | 74           | 81.2               | Y                | 41                | 21                            | 1.95 (1.40, 2.65)                   |
| 11   | 254          | 79.8               | Y                | 103               | 84                            | 1.23 (1.00, 1.49)                   |
| 12   | 105          | 82.4               | Y                | 37                | 40                            | 0.93 (0.65, 1.27)                   |
| 13   | 30           | 56.8               | N                | 14                |                               |                                     |
| 14   | 130          | 76.3               | Y                | 40                | 39                            | 1.03 (0.73, 1.40)                   |
| 15   | 44           | 60.8               | N                | 21                |                               |                                     |
| 16   | 342          | 83.1               | Y                | 139               | 101                           | 1.37 (1.16, 1.62)                   |
| 17   | 115          | 39.3               | N                | 65                |                               |                                     |
| 18   | 50           | 91.5               | Y                | 19                | 14                            | 1.36 (0.82, 2.12)                   |
| 19   | 28           | 25.8               | N                | 11                |                               |                                     |
| 20   | 114          | 78.2               | Y                | 52                | 44                            | 1.18 (0.88, 1.55)                   |
| 21   | 71           | 93.2               | Y                | 34                | 25                            | 1.36 (0.94, 1.90)                   |
| 22   | 15           | 65                 | N                | 3                 |                               |                                     |
| 23   | 168          | 79.5               | Y                | 55                | 59                            | 0.93 (0.70, 1.21)                   |
| 24   | 13           | 53.8               | N                | 7                 |                               |                                     |
| 25   | 283          | 78.2               | Y                | 81                | 78                            | 1.04 (0.82, 1.29)                   |
| 26   | 19           | 81.8               | N                | 5                 |                               |                                     |

1. Sites with < 20 participants for the 2.5 year MiCare cohort period and / or < 70% follow-up rates are excluded.
2. Model is adjusted for gestational age, sex, antenatal steroids, Apgar < 7, multiples, outborn, severity of illness (SNAP > 20), necrotizing enterocolitis Bell's stage 2 or greater and severe brain injury, defined as any grade 3 or 4 intraventricular hemorrhage, ventricular dilatation  $\geq 10$  mm, intraparenchymal hemorrhage or periventricular leukomalacia.



**COMMENTS:**

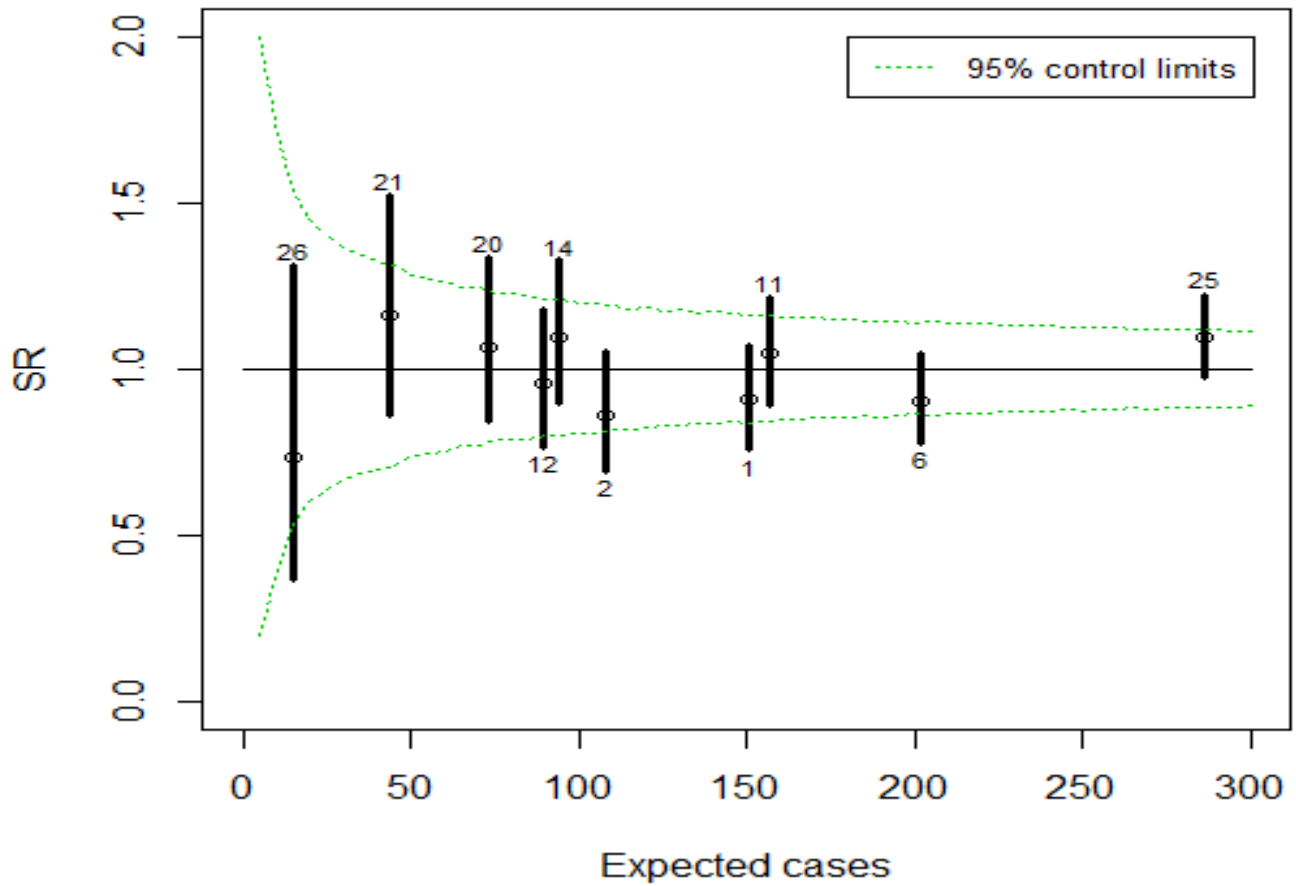
Sites with points outside the green “funnel” represent higher or lower adjusted significant NDI or death rates than expected. When the 95% confidence interval doesn’t cross 1, the results are statistically significant. Therefore 3 sites have statistically higher or lower significant NDI or death rates.

Presentation No 30:

Adjusted Standardized ratios by site – Neurodevelopmental Impairment (NDI)- Post- MiCare cohort (Oct 1 2011- Dec 31, 2016 births)

| Site | Children (n) | Follow-up Rate % | Included Yes/ No | NDI (n) | Adjusted Expected NDI (n) | Adjusted standardized ratio (95%CI) |
|------|--------------|------------------|------------------|---------|---------------------------|-------------------------------------|
| 1    | 320          | 74.8             | Y                | 137     | 151                       | 0.91 (0.76, 1.07)                   |
| 2    | 238          | 80.1             | Y                | 93      | 108                       | 0.86 (0.70, 1.05)                   |
| 3    | 61           | 51.7             | N                | 34      |                           |                                     |
| 4    | 6            | 19.4             | N                | 1       |                           |                                     |
| 5    | 7            | 1.1              | N                | 6       |                           |                                     |
| 6    | 440          | 71.3             | Y                | 183     | 202                       | 0.91 (0.78, 1.05)                   |
| 7    | 17           | 14.8             | N                | 5       |                           |                                     |
| 8    | 3            | 0.7              | N                | 1       |                           |                                     |
| 9    | 27           | 18.4             | N                | 13      |                           |                                     |
| 10   | 99           | 59.6             | N                | 65      |                           |                                     |
| 11   | 353          | 88.9             | Y                | 164     | 157                       | 1.04 (0.89, 1.22)                   |
| 12   | 197          | 87.6             | Y                | 85      | 89                        | 0.96 (0.76, 1.18)                   |
| 14   | 218          | 73.4             | Y                | 103     | 94                        | 1.10 (0.89, 1.33)                   |
| 15   | 7            | 8.8              | N                | 1       |                           |                                     |
| 16   | 419          | 59.4             | N                | 171     |                           |                                     |
| 17   | 4            | 1.3              | N                | 0       |                           |                                     |
| 18   | 9            | 10.1             | N                | 5       |                           |                                     |
| 19   | 5            | 4.1              | N                | 2       |                           |                                     |
| 20   | 160          | 74.8             | Y                | 78      | 73                        | 1.07 (0.84, 1.33)                   |
| 21   | 99           | 73.9             | Y                | 51      | 44                        | 1.16 (0.86, 1.52)                   |
| 22   | 9            | 16.4             | N                | 4       |                           |                                     |
| 23   | 89           | 33               | N                | 34      |                           |                                     |
| 25   | 680          | 82.7             | Y                | 313     | 286                       | 1.09 (0.98, 1.22)                   |
| 26   | 40           | 74.1             | Y                | 11      | 15                        | 0.73 (0.37, 1.31)                   |

1. Sites with < 20 participants for the 5 year post MiCare cohort period and / or < 70% follow-up rates are excluded.
2. Model is adjusted for gestational age, sex, outborn, severity of illness (SNAP> 20), bronchopulmonary dysplasia, necrotizing enterocolitis Bell's stage 2 or greater and severe brain injury, defined as any grade 3 or 4 intraventricular hemorrhage , ventricular dilatation  $\geq 10$  mm, intraparenchymal hemorrhage or periventricular leukomalacia.



**COMMENTS:**

Sites with points outside the green “funnel” represent higher or lower adjusted NDI rates than expected. When the 95% confidence interval doesn’t cross 1, the results are statistically significant. Therefore no sites have statistically higher or lower NDI rates.

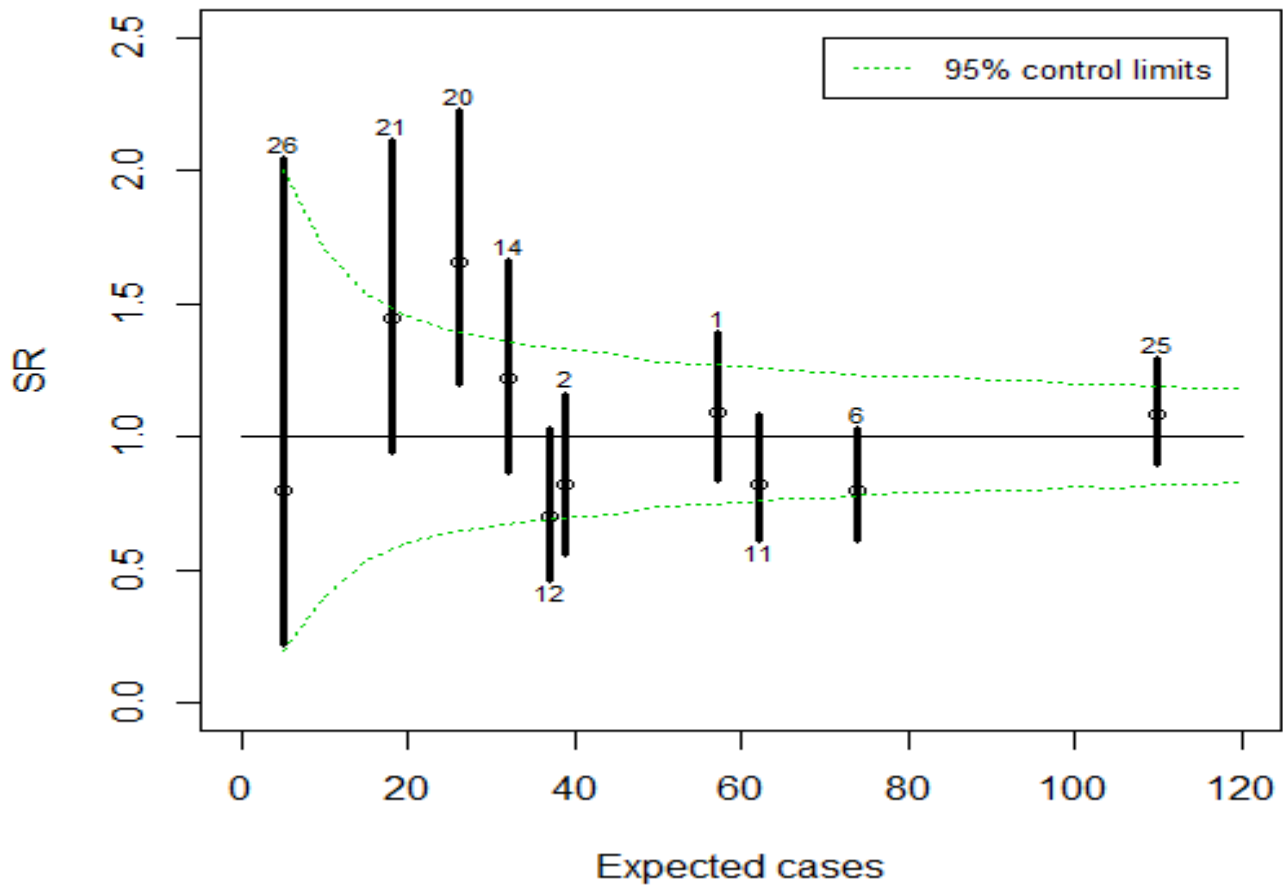
Presentation No 31:

Adjusted standardized ratios by site – significant NDI- post MiCare cohort

| Site | No. of children | Follow-up Rate (%) | Included Yes/ No | No. with sNDI | Adjusted/Expected sNDI (n) | Adjusted standardized ratio( 95%CI) |
|------|-----------------|--------------------|------------------|---------------|----------------------------|-------------------------------------|
| 1    | 320             | 74.8               | Y                | 62            | 57                         | 1.09 (0.83, 1.39)                   |
| 2    | 238             | 80.1               | Y                | 32            | 39                         | 0.82 (0.56, 1.16)                   |
| 3    | 61              | 51.7               | N                | 16            |                            |                                     |
| 4    | 6               | 19.4               | N                | 0             |                            |                                     |
| 5    | 7               | 1.1                | N                | 3             |                            |                                     |
| 6    | 440             | 71.3               | Y                | 59            | 74                         | 0.80 (0.61, 1.03)                   |
| 7    | 17              | 14.8               | N                | 3             |                            |                                     |
| 8    | 3               | 0.7                | N                | 0             |                            |                                     |
| 9    | 27              | 18.4               | N                | 6             |                            |                                     |
| 10   | 99              | 59.6               | N                | 28            |                            |                                     |
| 11   | 353             | 88.9               | Y                | 51            | 62                         | 0.82 (0.61, 1.08)                   |
| 12   | 197             | 87.6               | Y                | 26            | 37                         | 0.70 (0.46, 1.03)                   |
| 14   | 218             | 73.4               | Y                | 39            | 32                         | 1.22 (0.87, 1.67)                   |
| 15   | 7               | 8.8                | N                | 1             |                            |                                     |
| 16   | 419             | 59.4               | N                | 56            |                            |                                     |
| 17   | 4               | 1.3                | N                | 0             |                            |                                     |
| 18   | 9               | 10.1               | N                | 2             |                            |                                     |
| 19   | 5               | 4.1                | N                | 1             |                            |                                     |
| 20   | 160             | 74.8               | Y                | 43            | 26                         | 1.65 (1.20, 2.23)                   |
| 21   | 99              | 73.9               | Y                | 26            | 18                         | 1.44 (0.94, 2.12)                   |
| 22   | 9               | 16.4               | N                | 3             |                            |                                     |
| 23   | 89              | 33                 | N                | 16            |                            |                                     |
| 25   | 680             | 82.7               | Y                | 119           | 110                        | 1.08 (0.90, 1.29)                   |
| 26   | 40              | 74.1               | Y                | 4             | 5                          | 0.80 (0.22, 2.05)                   |

1. Sites with < 20 participants for the 5 year post MiCare cohort period and / or < 70% follow-up rates are excluded.
2. Model is adjusted for gestational age, sex, antenatal steroids, severity of illness (SNAP> 20), severe retinopathy of prematurity defined as stage 3 or greater in either eye or treatment with laser or injections of anti-vascular endothelial growth factor, nosocomial infection and brain injury, defined as any grade 3 or 4 intraventricular hemorrhage, ventricular dilatation  $\geq$  10 mm, intraparenchymal hemorrhage or periventricular leukomalacia.





**COMMENTS:**

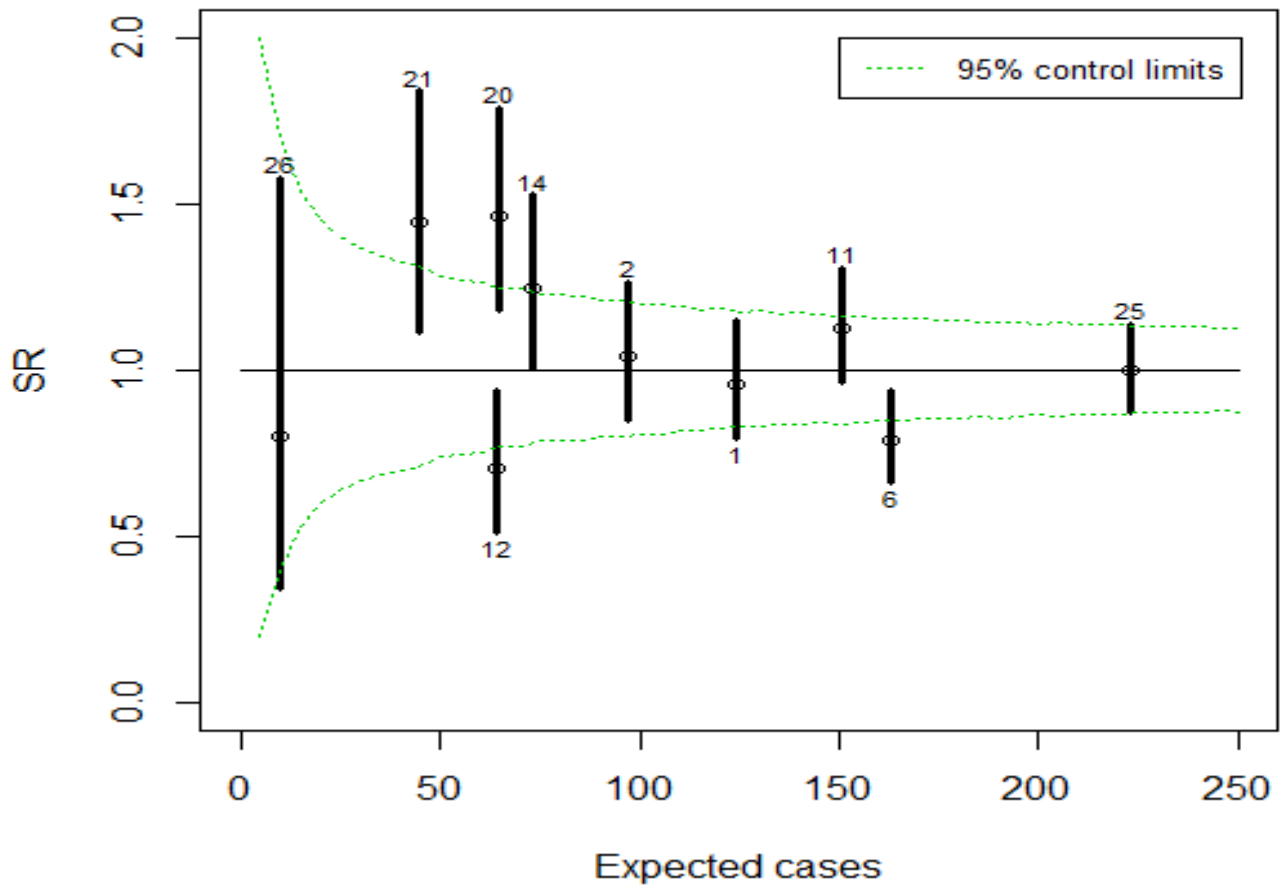
Sites with points outside the green “funnel” represent higher or lower adjusted sNDI rates than expected. When the 95% confidence interval doesn’t cross 1, the results are statistically significant. Therefore one site has a statistically higher sNDI rate.

Presentation No 32:

Adjusted Standardized ratios by site – significant NDI or Death post- MiCare cohort

| Site | No. of children | Follow-up Rate (%) | Included Yes/ No | No. with outcome | Adjusted/Expected outcome (n) | Adjusted standardized ratio (95%CI) |
|------|-----------------|--------------------|------------------|------------------|-------------------------------|-------------------------------------|
| 1    | 379             | 74.8               | Y                | 119              | 124                           | 0.96 (0.80, 1.15)                   |
| 2    | 308             | 80.1               | Y                | 101              | 97                            | 1.04 (0.85, 1.27)                   |
| 3    | 91              | 51.7               | N                | 46               |                               |                                     |
| 4    | 16              | 19.4               | N                | 10               |                               |                                     |
| 5    | 100             | 1.1                | N                | 96               |                               |                                     |
| 6    | 510             | 71.3               | Y                | 129              | 163                           | 0.79 (0.66, 0.94)                   |
| 7    | 27              | 14.8               | N                | 13               |                               |                                     |
| 8    | 81              | 0.7                | N                | 78               |                               |                                     |
| 9    | 47              | 18.4               | N                | 26               |                               |                                     |
| 10   | 128             | 59.6               | N                | 57               |                               |                                     |
| 11   | 472             | 88.9               | Y                | 170              | 151                           | 1.13 (0.96, 1.31)                   |
| 12   | 217             | 87.6               | Y                | 45               | 64                            | 0.70 (0.51, 0.94)                   |
| 14   | 270             | 73.4               | Y                | 91               | 73                            | 1.25 (1.01, 1.53)                   |
| 15   | 37              | 8.8                | N                | 31               |                               |                                     |
| 16   | 560             | 59.4               | N                | 197              |                               |                                     |
| 17   | 61              | 1.3                | N                | 56               |                               |                                     |
| 18   | 28              | 10.1               | N                | 21               |                               |                                     |
| 19   | 24              | 4.1                | N                | 20               |                               |                                     |
| 20   | 213             | 74.8               | Y                | 95               | 65                            | 1.46 (1.18, 1.79)                   |
| 21   | 141             | 73.9               | Y                | 65               | 45                            | 1.44 (1.11, 1.84)                   |
| 22   | 23              | 16.4               | N                | 17               |                               |                                     |
| 23   | 158             | 33                 | N                | 85               |                               |                                     |
| 25   | 785             | 82.7               | Y                | 223              | 223                           | 1.00 (0.87, 1.14)                   |
| 26   | 44              | 74.1               | Y                | 8                | 10                            | 0.80 (0.35, 1.58)                   |

1. Sites with < 20 participants for the 5 year post MiCare cohort period and / or < 70% follow-up rates are excluded.
2. Model is adjusted for gestational age, sex, antenatal steroids, Apgar < 7, multiples, outborn, severity of illness (SNAP> 20), necrotizing enterocolitis Bell's stage 2 or greater and severe brain injury, defined as any grade 3 or 4 intraventricular hemorrhage, ventricular dilatation  $\geq$  10 mm, intraparenchymal hemorrhage or periventricular leukomalacia.



**COMMENTS:**

Sites with points outside the green “funnel” represent higher or lower adjusted sNDI or death rates than expected. When the 95% confidence interval doesn’t cross 1, the results are statistically significant. Therefore 4 sites have statistically higher or lower sNDI or death rates.

## I. Summary of Publications

### Manuscripts 2016:

1. Morin J, Luu TM, Superstein R, Ospina LH, Lefebvre F, Simard MN, Shah V, Shah PS, Kelly EN; Canadian Neonatal Network and the Canadian Neonatal Follow-Up Network Investigators. Neurodevelopmental Outcomes Following Bevacizumab Injections for Retinopathy of Prematurity. *Pediatrics* 2016 Apr;137(4) pii: e20153218. doi: 10.1542/peds.2015-3218.

### Manuscripts 2017:

1. Isayama T, Lee SK, Yang J, Lee D, Daspal S, Dunn M, Shah PS; Canadian Neonatal Network and Canadian Neonatal Follow -Up Network Investigators. Revisiting the Definition of Bronchopulmonary Dysplasia: Effect of Changing Panoply of Respiratory Support for Preterm Neonates. *JAMA Pediatr.* 2017 Mar 1;171(3):271-279
2. Asztalos E, Church PT, Riley P, Fajardo C, Shah PS, Canadian Neonatal Network and Canadian Neonatal Follow-Up Network investigators. Neonatal factors associated with a good neurodevelopmental outcome in the very preterm infant. *Am J Perinatol.* 2017 Mar;34(4):388-396.
3. Asztalos E, Church PT, Riley P, Fajardo C, Shah PS, Canadian Neonatal Network and Canadian Neonatal Follow-Up Network investigators. Association between Primary Caregiver Education and Cognitive and Language Development of Preterm Neonates. *Am J Perinatol.* 2017 Mar;34(4):364-371
4. Synnes A, Luu TM, Moddemann D, Church P, Lee D, Vincer M, Ballantyne M, Majnemer A, Creighton D, Yang J, Sauve R, Saigal S, Shah P, Lee S, CNN, CNFUN. Determinants of developmental outcomes in a very preterm Canadian cohort. *Arch Dis Child Fetal Neonatal Ed.* 2017 May;102(3):F235-F234.
5. Raghuram K, Yang J, Church PT, Cieslak Z, Synnes A, Mukerji A, Shah PS, CNN and CNFUN. Canadian Neonatal Network and Canadian Neonatal Follow-Up Network Investigators. Head growth trajectory and neurodevelopmental outcomes in preterm neonates. *Pediatrics.* 2017 Jul;140(1) pii: e20170216. doi: 10.1542/peds.2017-0216
6. Soraisham AS, Rabi Y, Lodha AK, Shah PS, Synnes A, Yang J, Singhal N, CNN, CNFUN. Neurodevelopmental outcomes of preterm infants resuscitated with different oxygen concentration at birth. *J Perinatol.* 2017 Oct;37(10):1141-1147.

## Manuscripts 2018:

1. Shah P, McDonald S, 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, for the Canadian Preterm Birth Network Investigators. The Canadian Preterm Birth Network: a study protocol for improving outcomes for preterm infants and their families. doi: 10.9778/cmajo.20170128 CMAJO January 18, 2018 vol. 6 no. 1 E44-E49
2. 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.e1
3. Haslam MD, Lisonkova S, Creighton D, Church P, Yang J, Shah PS, Joseph KS, and Synnes A; Canadian Neonatal Network and the 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
4. 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 Perinatol.* 2018 Jul;38(7):844-849.
5. Ting JY, Synnes A, Roberts A, Deshpandey AC, Dow K, Yang J, Lee KS, Lee SK, Shah PS; Canadian Neonatal Network and Canadian Neonatal Follow-Up Network. Association of Antibiotic Utilization and Neurodevelopmental Outcomes among Extremely Low Gestational Age Neonates without Proven Sepsis or Necrotizing Enterocolitis. *Am J Perinatol.* 2018 Aug;35(10):972-978
6. 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.
7. Stockley EL, Ting JY, Kingdom JC, McDonald SD, Barrett JF, Synnes AR, Monterrosa L, Shah PS; Canadian Neonatal Network; Canadian Neonatal Follow-up Network; Canadian Preterm Birth Network Investigators. Intrapartum magnesium sulfate is associated with neuroprotection in growth-restricted fetuses. *Am J Obstet Gynecol.* 2018 Dec;219(6):606.e1-606.e8.
8. Iwami H, Isayama T, Lodha A, Canning R, Abou Mehrem A, Lee SK, Synnes A, Shah PS; Canadian Neonatal Network and Canadian Neonatal Follow-Up Network Investigators. Outcomes after Neonatal Seizures in Infants Less Than 29 Weeks' Gestation: A Population-Based Cohort Study. *Am J Perinatol.* 2018 Jul 17. doi: 10.1055/s-0038-1667107. [Epub ahead of print] PMID:30016820

9. Nassel D, Chartrand C, Doré-Bergeron MJ, Lefebvre F, Ballantyne M, Van Overmeire B, Luu TM; Canadian Neonatal Network and the Canadian Neonatal Follow-Up Network. Very Preterm Infants with Technological Dependence at Home: Impact on Resource Use and Family. *Neonatology*. 2019 Mar 25;115(4):363-370.

### **Manuscripts 2019:**

1. Lodha A, Entz R, Synnes A, Creighton D, Yusuf K, Lapointe A, Yang J, Shah PS; investigators of the Canadian Neonatal Network (CNN) and the Canadian Neonatal Follow-up Network (CNFUN). Early caffeine administration and neurodevelopmental outcomes in preterm infants. *Pediatrics*. 2019 Jan;143(1).
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