Canadian Neonatal Follow-Up Network

Réseau Canadien de Suivi Néonatal


# CNFUN Annual Report 2018

## Introduction

The Canadian Neonatal Follow-Up Network (CNFUN) is a 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 standardised set of assessments to be done at standardised 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 it's 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 be composed of 9 members:

- The director of the network
- 5 members representing different geographic regions of Canada. In the upcoming 2019 elections, one of these members will be elected as a co-director.
- 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 trained in 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" (**C**hild **H**ealth **I**nitiatives **L**imiting **D**isability- **B**rain **R**esearch **I**mproving **G**rowth and **H**ealth **T**rajectories) 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 –Neonatal follow-up (Québec)

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

Dr. Dianne Creighton (retired Aug 2018)- psychologist (Alberta)

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

Dr. Marilyn Ballantyne – Nurse / researcher (Ontario)

Dr. Paige Church –Neonatologist / neonatal follow-up (Ontario)

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

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

**Annual report review committee**

Dr. Anne Synnes – Neonatologist, neonatal follow-up- founding director (British Columbia)
Dr. Thuy Mai Luu –Neonatal follow-up (Québec)
Dr. Jehier Afifi-Neonatologist, neonatal follow-up (Nova Scotia)
Dr. Matt Hicks-Neonatologist, neonatal follow-up, epidemiologist (Alberta)
Carolina Segura- CNFUN National Coordinator (British Columbia)

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I. Summary of Publications

# A. Executive summary

As the first CNFUN annual report this marks a new milestone. One of the CNFUN goals is to provide accurate up to date information and to improve health care and long term outcomes. The latter is not possible without measuring outcomes over time. With new funding as part of the parent-EPIQ study this is now possible. We thank the MiCare Coordinating Site for their work in developing and maintaining our database and data analysis. Thank you to the CNFUN annual report working group and our CNFUN coordinator, Carolina Segura.

Standardized neonatal follow-up, especially in a country as geographically large as Canada is very difficult. This report is the result of a long journey made possible by the personal commitment by the site investigators and teams at all of the Canadian Neonatal/Perinatal Follow-Up Programs (NFUPs) across Canada. The results you find in this report required much more than collecting existing data. NFUPs had to change or adapt their infrastructure to accommodate the agreed upon 18 - 21 month corrected age assessment, including identifying one or more trained assessors for the standardized neurodevelopmental evaluation using the Bayley Scales of Infant and Toddler Development 3rd edition (Bayley-III). A strategy to identify and recruit all children born preterm at 28 completed weeks' gestation or less has to be in place. The CNFUN database group worked tirelessly to develop the standardized history, physical exam and the data base elements and their definitions which created the CNFUN database and manuals. Thank you to Sonny Yeh at the MiCare Coordinating site for developing and supporting the database. Sites have entered and uploaded all the data, using limited resources, to the web based CNFUN database maintained at the MiCare Coordinating Site. Linkage to the Canadian Neonatal Network required that the NFUPs track down the unique identifier before entering the data. 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. NFUP sites received no funding for providing CNFUN data for births October 1, 2011 until approximately April 1, 2016. The cost of data abstraction, but not collection, is now covered by the Parent-EPIQ study.

Most importantly the willingness of the families of children born preterm to attend the NFUP visits made this possible. Families travel on average 100 kilometers to the NFUP

and some travel 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.

As shown in our results, the journey to improve neurodevelopmental outcomes in our preterm graduates has just started. Evidence based Practice to Improve Quality (EPIQ) has successfully improved short term outcomes in the NICU. The 11 "Parent-EPIQ" intervention sites are committed to demonstrating whether they can do the same for long term outcomes.

In the process of creating this report we have identified some issues with the database which we are working on. As this is our first annual report we welcome feedback and comments.

Anne Synnes MDCM, MHSc, FRCPC

Director, CNFUN

# B. Participating sites

Presentation No 1

## i. CNFUN site description

| 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 | Foothills Hospital University of Calgary | Leonora Hendson | 3 |
| EDM | Neonatal and Infant Follow-Up Clinic Edmonton | Glenrose Rehabilitation Hospital | Amber Reichert | 3 |
| RQHR | Developmental Assessment Clinic Regina | Regina General Hospital | Zarin Kalapesi, J.P. Bodani | 4 |
| RUH | Saskatoon | Royal University Hospital | Sibasis Daspal | 2 |
| SBGH | High Risk Newborn Follow-Up Program Winnipeg | St. Boniface General Hospital | Diane Moddemann, Cecilia de 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 | McMaster Children's Hospital Hamilton Health Sciences Centre | Saroj Saigal, S el-Helou | 1 |
| KGH | Special Infant Clinic Kingston | Kingston General Hospital | Sarah McKnight (new), Kim Dow (retiring) | 2 |

| Abbreviation | NFUP Program Name / City | Hospital Site | Site Investigator | Number of CNFUN members |
|---|---|---|---|---|
| SJHC (LHSC) | Developmental Follow-Up Clinic<br>London | St. Joseph's Health Care London | Kevin Coughlin | 1 |
| CHEO/OTTA | Neonatal Follow-Up Clinic<br>Ottawa | Children's Hospital of Eastern Ontario | Thierry Daboval | 1 |
| SUNY | Neonatal Follow-Up Program<br>Toronto | Sunnybrook Health Sciences Center | Paige Church | 3 |
| HSC | Neonatal Follow-Up Pogram<br>Toronto | Hospital for Sick Children | Linh Ly | 1 |
| MSH | Neonatal Follow-Up Pogram<br>Toronto | Mount Sinai Hospital | Edmond Kelly | 2 |
| WRH | Neonatal Neurodevelopment Follow-Up Program<br>Windsor | Windsor Regional Hospital | Chukwuma Nwaesei | 2 |
| CHUS | Clinique de suivi neonatal<br>Sherbrooke | Centre Hopitalier Universitaire de Sherbrooke | Alyssa Morin | 2 |
| CHUQ | Centre Hospitalier Universitaire de Quebec (Laval Site) | Centre Mere Enfant<br>Centre Hospitalier de L'Université Laval | Sylvie Bélanger | 2 |
| HSJ | Clinique de suivi neonatal<br>Montréal | Universite de Montreal, Hôpital Sainte-Justine | Thuy Mai Luu, V. Dorval | 3 |
| JGH | Neonatal Follow-Up Clinic<br>Montréal | Jewish General Hospital | Ermelinda Pelausa, Kim-Anh Nguyen | 3 |
| MUHC | Neonatal Follow-Up Program<br>Clinic de Suivi Neonatal<br>Montréal | McGill University Health Centre/ Montreal Children's Hospital/ L'Hôpital de Montréal pour enfants | Marc Beltempo, May Khairy | 2 |

| Abbreviation | NFUP Program Name / City | Hospital Site | Site Investigator | Number of CNFUN members |
|---|---|---|---|---|
| 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 |
| IWK | Perinatal Follow-Up Program Halifax | IWK Health Centre and Cape Breton Regional Hospital | Jehier Afifi | 4 |
| JCHC | High-Risk Follow-Up Clinic St. John's | Janeway Children's Health & Rehabilitation Centre | Phil Murphy | 2 |
| HMR | Montréal | Hôpital Maisonneuve-Rosemont | Marie St-Hilaire | 1 |

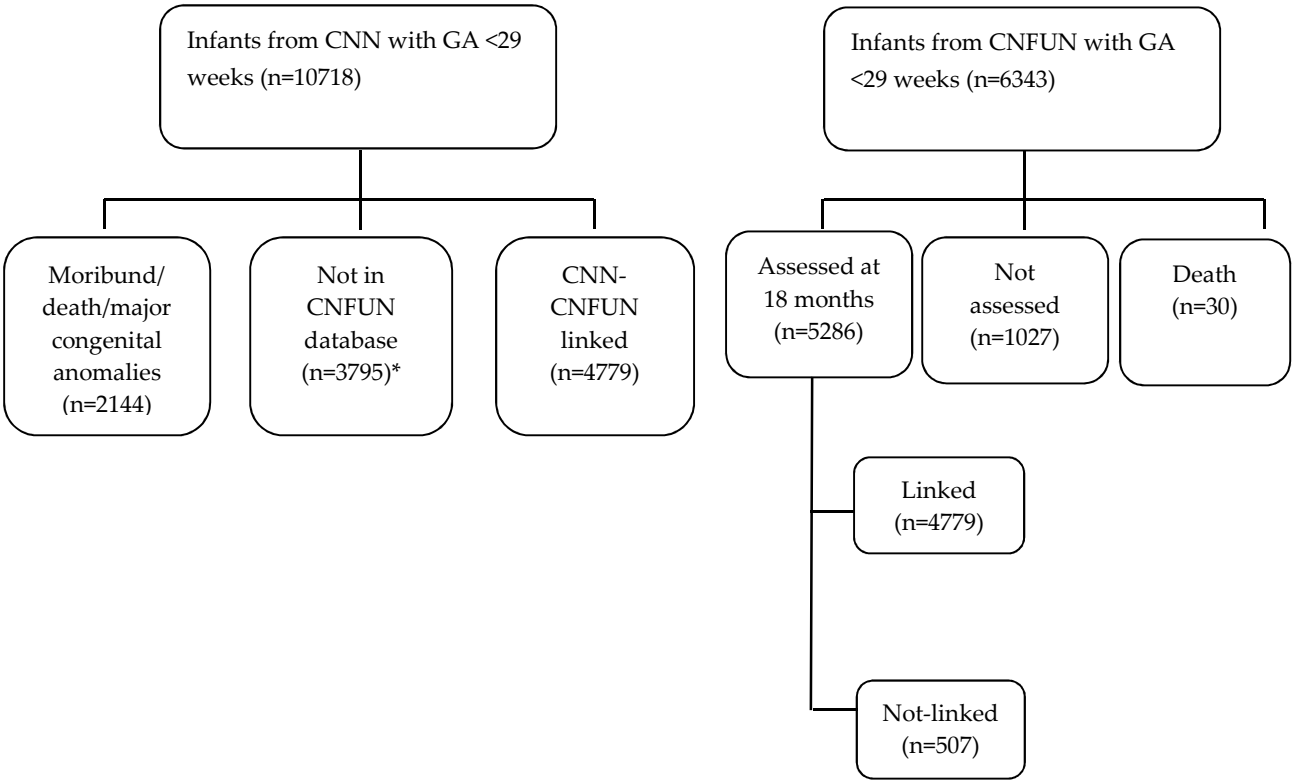
Presentation No 2

ii. 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 |
|---|---|---|---|---|
| 7 | Yes | 30/53 (56.6) | 14/83 (16.9) | No |
| 1 | Yes | 170/222 (76.6) | 235/343 (68.5) | Yes |
| 6 | Yes | 213/249 (85.5) | 276/487 (56.7) | Yes |
| 5 | Yes | 205/256 (80.1) | 7/484 (1.4) | Yes |
| 18 | Yes | 43/47 (91.5) | 9/74 (12.2) | No |
| 19 | Yes | 17/66 (25.8) | 5/106 (4.7) | No |
| 10 | Yes | 56/69 (81.2) | 70/121 (57.9) | Yes |
| 21 | Yes | 55/59 (93.2) | 81/110 (73.6) | Yes |
| 26 | Yes | 18/22 (81.8) | 24/36 (66.7) | No |
| 17 | Yes | 64/163 (39.3) | 3/250 (1.2) | No |
| 15 | Yes | 31/51 (60.8) | 7/62 (11.3) | No |
| 23 | Yes | 132/166 (79.5) | 60/222 (27) | Yes |
| 9 | Yes | 53/110 (48.2) | 4/117 (3.4) | No |
| 16 | Yes | 250/301 (83.1) | 262/561 (46.7) | Yes |
| 25 | Yes | 241/308 (78.2) | 511/665 (76.8) | No |
| 14 | Yes | 103/135 (76.3) | 161/246 (65.4) | Yes |
| 20 | Yes | 79/101 (78.2) | 115/166 (69.3) | Yes |
| 11 | Yes | 178/223 (79.8) | 229/321 (71.3) | Yes |
| 3 | Yes | 11/13 (84.6) | 9/92 (9.8) | No |
| 2 | Yes | 115/131 (87.8) | 177/233 (76) | No |
| 22 | Yes | 13/20 (65) | 6/44 (13.6) | No |
| 24 | Yes | 7/13 (53.8) | 0/20 (0) | Yes |
| 4 | Yes | 13/17 (76.5) | 7/23 (30.4) | No |
| 12 | Yes | 84/102 (82.4) | 158/194 (81.4) | Yes |
| 13 | Yes | 21/37 (56.8) | 0/68 (0) | No |
| 8 | Yes | 145/203 (71.4) | 2/339 (0.6) | No |
| 27 | No | - | - | No |

Presentation No 3

iii. CNN and CNFUN flow diagram for births April 1, 2009- Dec 31, 2015




*Includes infants at CNFUN sites that were not actively recruiting 2012-2015

# 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)** |
|---|---|---|
| **Motor** | CP with GMFCS 3,4 or 5 | CP with GMFCS 1 or higher |
| | Bayley III Motor Composite <70 | Bayley III Motor Composite <85 |
| **Cognitive** | Bayley III Cognitive Composite <70 | Bayley III Cognitive Composite <85 |
| **Language** | Bayley III Language Composite <70 | Bayley III Language Composite <85 |
| **Hearing** | Hearing aid or cochlear implant | Sensorineural/mixed hearing loss |
| **Vision** | 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- from ophthalmology report. If no report available, impairment 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 sNDI or those who could not be tested using the Bayley-III with a Bayley-III Adaptive Behavior score < 85

# D. Descriptive Analyses

Presentation No 4

Survival and participant assessments

| Year of birth | NICU admission (n) | NICU death n (%) | NICU survivors n (%) | Death After NICU (%) | CNFUN data** (n) | Linked CNN-CNFUN data for NICU survivors n (%)** | Known outcome*** for NICU admissions n (%) |
|---|---|---|---|---|---|---|---|
| 2009* | 1201 | 212 (17.7) | 881 (73.4) | (0.4) | 774 | 659 (75%) | 876 (73%) |
| 2010 | 1613 | 244 (15.1) | 1335 (82.8) | (0.9) | 1123 | 1014 (76 %) | 1272 (79%) |
| 2011 | 1527 | 258 (16.9) | 1218 (79.8) | (0.3) | 935 | 852 (70 %) | 1115 (73%) |
| 2012 | 1590 | 251 (15.8) | 1288 (81.0) | 0 (0) | 722 | 676 (52%) | 927 (58%) |
| 2013 | 1622 | 256 (15.8) | 1307 (80.6) | (0.2) | 664 | 615 (47%) | 874 (54%) |
| 2014 | 1621 | 232 (14.3) | 1319 (81.4) | (0.1) | 637 | 597 (45%) | 830 (51%) |
| 2015 | 1544 | 201 (13.0) | 1256 (81.4) | (0.1) | 431 | 366 (29%) | 569 (37%) |
| '09-'15 | 10718 | 1654 (15.4) | 8604 (80.3) | 30 (0.3) | 5286 | 4779 (56%) | 6463 (64%) |

n= number

* April 1 to December 31

** CNFUN number of participants (includes those not linked to CNN)

*** Death or CNFUN outcomes

**Comments:**

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. About 10% (507) of patients in the CNFUN database are not able to be linked to CNN.

Presentation No 5

Follow-up rates

| Year of birth | NICU admission n | NICU survivors n (%) | Lost to Follow up n (%)** | Linked CNN-CNFUN data for NICU survivors n (%) | Known outcome*** for NICU admissions n (%) | NICU survivors at participating sites# n | Follow-up rate for participating CNFUN sites n (%) |
|---|---|---|---|---|---|---|---|
| 2009* | 1201 | 881 (73.4) | 222 | 659 (75%) | 876 (73%) | 881 | 659 (75%) |
| 2010 | 1613 | 1335 (82.8) | 321 | 1014 (76 %) | 1272 (79%) | 1335 | 1014 (76%) |
| 2011 | 1527 | 1218 (79.8) | 366 | 852 (70 %) | 1115 (73%) | 1218 | 852 (70%) |
| 2012 | 1590 | 1288 (81.0) | 612 | 676 (52%) | 927 (58%) | 884 | 645 (73%) |
| 2013 | 1622 | 1307 (80.6) | 692 | 615 (47%) | 874 (54%) | 933 | 611 (65%) |
| 2014 | 1621 | 1319 (81.4) | 722 | 597 (45%) | 830 (51%) | 902 | 589 (65%) |
| 2015 | 1544 | 1256 (81.4) | 890 | 366 (29%) | 569 (37%) | 869 | 361 (42%) |
| '09-'15 | 10718 | 8604 (80.3) | 3825 | 4779 (56%) | 6463 (64%) | 7022 | 4731 (67%) |

n= number

* April 1 to December 31

** Either not known to a CNFUN site or not seen by a CNFUN site

*** Death or CNFUN outcomes

# After 2012, CHUS, ECH, EDM, GVS, HHSC, HSC, JCHC, KGH, OTTA, RQHR, SEHC, SJRH did not provide data and are excluded

**COMMENTS:**

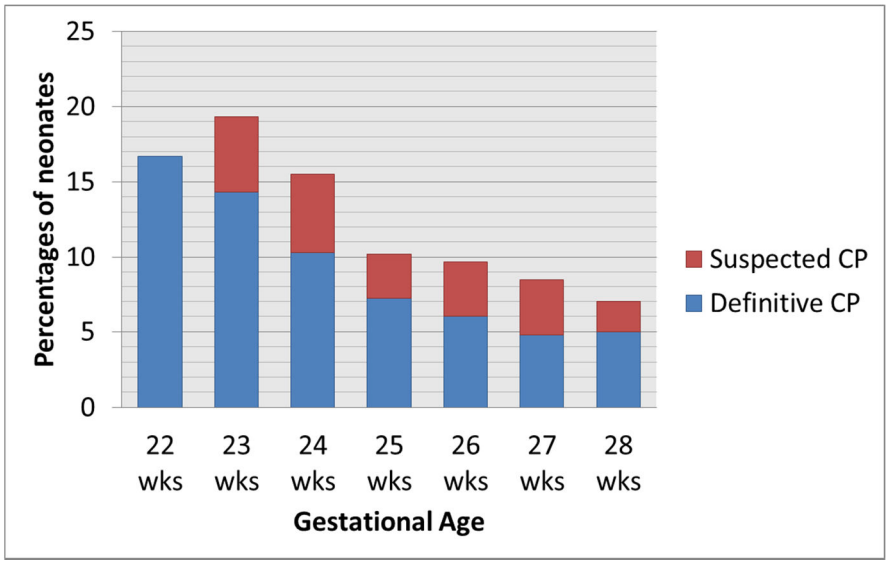
Results from 2015 will be reviewed due to variations in number of participant uploads at local sites and the MiCare coordinating site. Analyses using the MiCare cohort are more reliable than the post-MiCare cohort due to larger attrition bias in the later period.

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

Presentation No 6

Cerebral palsy rates by gestational age (GA)

| GA | CNN-CNFUN linked cases or deaths n | Death or definitive CP n (%) | CNN-CNFUN linked cases with CP data for n | Definitive CP n (%) | Missing CP GMFCS | GMFCS ≤2 N (%) | GMFCS 3-5 N (%) | Suspected CP n (%) |
|---|---|---|---|---|---|---|---|---|
| 22 wks | 44 | 39 (89%) | 6 | (16.7) | 0 | (100) | 0 (0) | 0 (0) |
| 23 wks | 396 | 290 (73%) | 119 | 17 (14.3) | 2 | 9 (60.0) | 6 (40.0) | 6 (5.0) |
| 24 wks | 871 | 470 (54%) | 439 | 45 (10.3) | 4 | 28 (68.3) | 13 (31.7) | 23 (5.2) |
| 25 wks | 1156 | 422 (37%) | 776 | 56 (7.2) | 4 | 30 (57.7) | 22 (42.3) | 23 (3.0) |
| 26 wks | 1236 | 325 (26%) | 945 | 57 (6.0) | 6 | 31 (60.8) | 20 (39.2) | 35 (3.7) |
| 27 wks | 1339 | 236 (18%) | 1134 | 54 (4.8) | 6 | 30 (62.5) | 18 (37.5) | 42 (3.7) |
| 28 wks | 1421 | 195 (14%) | 1271 | 63 (5.0) | 6 | 33 (57.9) | 24 (42.1) | 25 (2.0) |
| Total | 6463 | 1977 (31%) | 4690 | 293 (6.3) | 28 | 162 (61.3) | 103 (38.9) | 154 (3.3) |



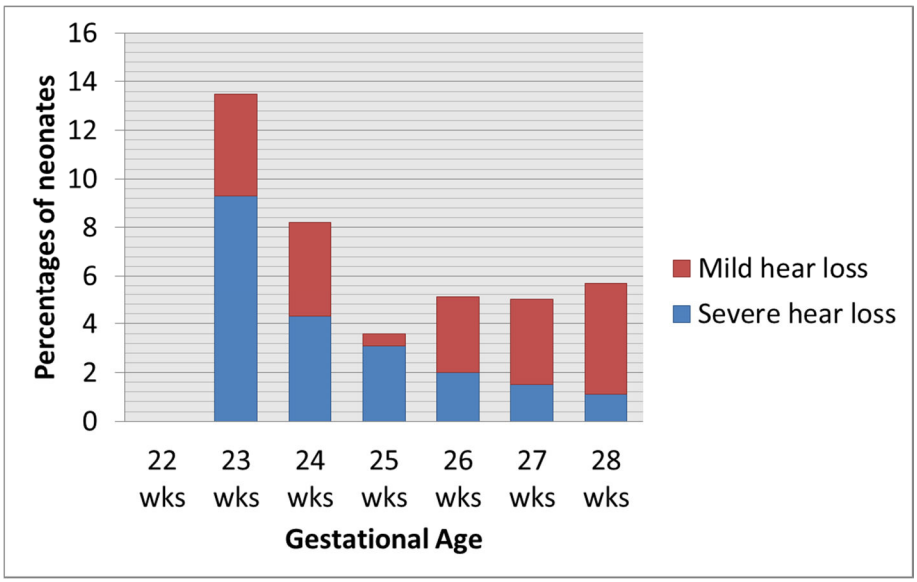

**COMMENTS:**

Cerebral palsy rates decrease with increasing gestational age.

Presentation No 7

Hearing impairments rates by gestational Age (GA)

| GA | CNN-CNFUN linked cases or deaths n | Death or any hearing impairment n (%) | CNN-CNFUN linked cases with data for hearing | Normal hearing n (%) | Mild hearing impairment n (%) | Severe hearing impairment n (%) |
|---|---|---|---|---|---|---|
| 22 wks | 44 | 38 (86%) | 6 | 6 (100) | 0 (0) | 0 (0) |
| 23 wks | 396 | 289 (73%) | 118 | 102 (86%) | 5 (4%) | 11 (9%) |
| 24 wks | 871 | 461 (53%) | 438 | 402 (92%) | 17 (4%) | 19 (4%) |
| 25 wks | 1156 | 432 (37%) | 767 | 701 (91 %) | 42 (6%) | 24 (3%) |
| 26 wks | 1236 | 316 (26%) | 939 | 891 (95 %) | 29 (3%) | 19 (2%) |
| 27 wks | 1339 | 238 (18%) | 1128 | 1072 (95 %) | 39 (4%) | 17 (2%) |
| 28 wks | 1421 | 204 (14%) | 1261 | 1189 (94 %) | 58 (5%) | 14 (1%) |
| Total | 6463 | 1978 (31%) | 4657 | 4363 (94 %) | 190 (4 %) | 104 (2%) |



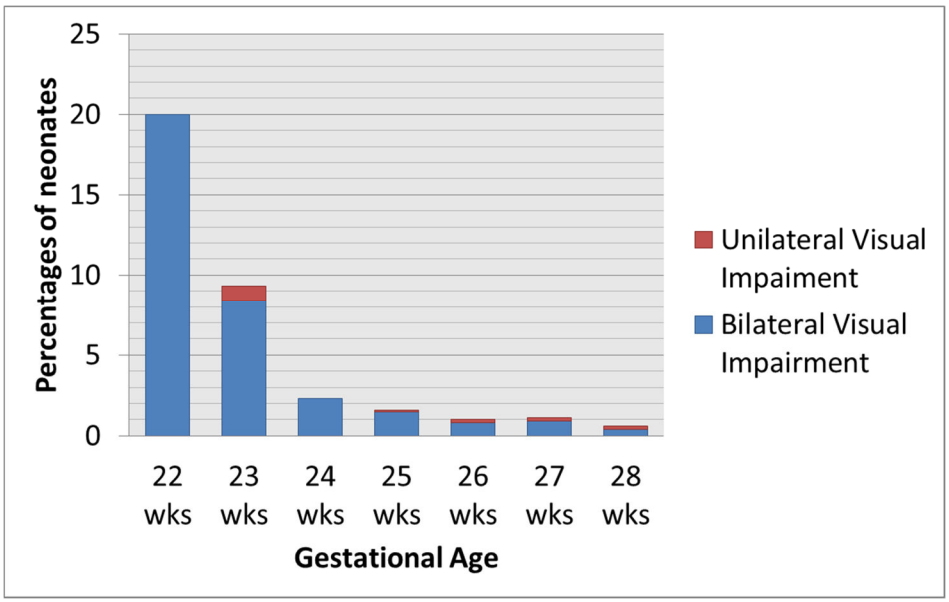

**COMMENTS:**

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.

Presentation No 8

Visual impairment rates by gestational Age (GA)

| GA | CNN-CNFUN linked cases or deaths n | Death or any visual impairment n (%) | CNN-CNFUN linked cases with data for vision n | Normal Vision n (%) | Unilateral visual impairment n (%) | Bilateral visual impairment n (%) |
|---|---|---|---|---|---|---|
| 22 wks | 44 | 39 (89%) | 5 | 4 (80%) | 0 (0) | (20%) |
| 23 wks | 396 | 283 (71%) | 107 | 97 (91%) | (0.9%) | 9 (8.4%) |
| 24 wks | 871 | 434 (50%) | 399 | 390 (98%) | 0 (0) | 9 (2.3%) |
| 25 wks | 1156 | 378 (33%) | 724 | 712 (98%) | (0.1%) | 11 (1.5%) |
| 26 wks | 1236 | 277 (22%) | 887 | 878 (99%) | (0.2%) | 7 (0.8%) |
| 27 wks | 1339 | 194 (14%) | 1065 | 1053 (99%) | (0.2%) | 10 (0.9%) |
| 28 wks | 1421 | 139 (10%) | 1190 | 1183 (99%) | (0.2%) | 5 (0.4%) |
| Total | 6463 | 1744 (27%) | 4377 | 4317 (99%) | 8 (0.2%) | 52 (1.2%) |



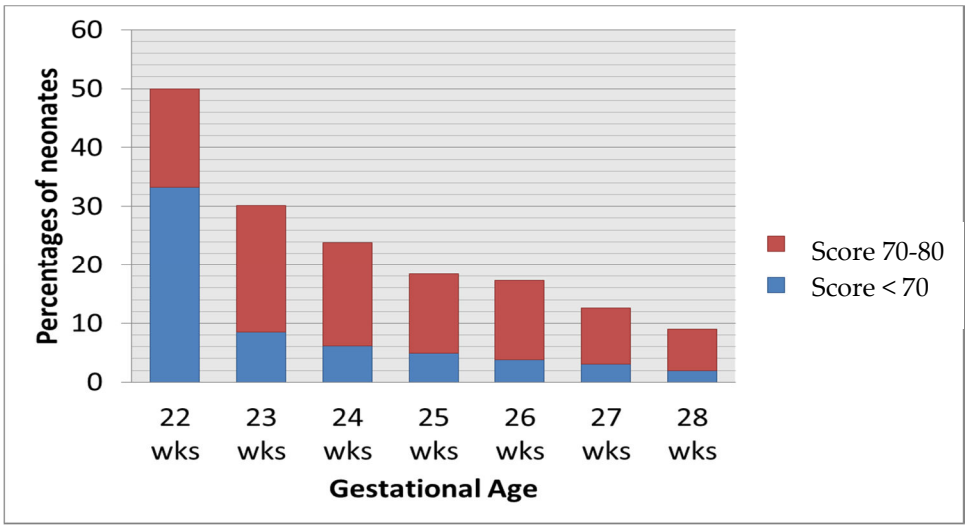

**COMMENTS:**

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 9

Bayley- III cognitive composite scores rates by gestational Age (GA)

| GA | CNN-CNFUN linked cases or deaths n | Death or cognitive score < 85 n (%) | CNN-CNFUN linked cases with cognitive data n | Median score (IQR) | Bayley-III ≥ 85 n (%) | Score70-84 n (%) | Score < 70 n (%) |
|---|---|---|---|---|---|---|---|
| 22 wks | 44 | 41 (93%) | 6 | 83 (65, 90) | (50%) | (17%) | (33%) |
| 23 wks | 396 | 305 (77%) | 106 | 90 (80, 100) | 74 (70%) | 23 (22%) | 9 (9%) |
| 24 wks | 871 | 523 (60%) | 410 | 90 (85, 100) | 312 (76%) | 73 (18%) | 25 (6%) |
| 25 wks | 1156 | 502 (43%) | 741 | 95 (85, 105) | 605 (82%) | 100 (14%) | 36 (5%) |
| 26 wks | 1236 | 423 (34%) | 894 | 95 (85, 105) | 739 (83%) | 121 (14%) | 34 (4%) |
| 27 wks | 1339 | 317 (24%) | 1071 | 95 (90, 105) | 936 (87%) | 102 (10%) | 33 (3%) |
| 28 wks | 1421 | 239 (17%) | 1192 | 100 (90, 105) | 1085 (91%) | 85 (7%) | 22 (2%) |
| Total | 6463 | 2350 (36%) | 4420 | 95 (90, 105) | 3754 (85%) | 505 (11%) | 161 (4%) |



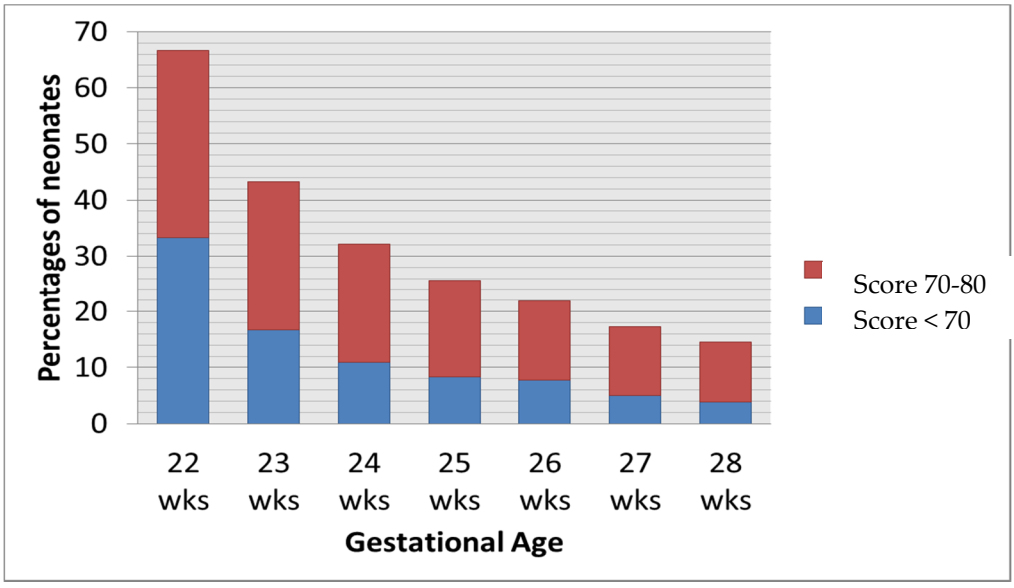

**COMMENTS:**

Cognitive scores on the Bayley Scales of Infant and Toddler Development- 3rd 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 10

Bayley- III motor composite scores rates by gestational age (GA)

| GA | CNN-CNFUN linked cases or deaths n | Death or motor score < 85 n (%) | CNN-CNFUN linked cases with motor data n | Median score | Bayley-III ≥ 85 n (%) | Score 70-84 n (%) | Score < 70 n (%) |
|---|---|---|---|---|---|---|---|
| 22 wks | 44 | 42 (95%) | 6 | 76 (67, 94) | (33%) | (33%) | (33%) |
| 23 wks | 396 | 317 (80%) | 102 | 88 (73, 97) | 58 (57%) | 27 (27%) | 17 (17%) |
| 24 wks | 871 | 552 (63%) | 394 | 90 (79, 97) | 267 (68%) | 84 (21%) | 43 (11%) |
| 25 wks | 1156 | 548 (47%) | 713 | 94 (82, 100) | 531 (75%) | 123 (17%) | 59 (8%) |
| 26 wks | 1236 | 456 (37%) | 856 | 94 (85, 100) | 668 (78%) | 121 (14%) | 67 (8%) |
| 27 wks | 1339 | 357 (27%) | 1011 | 94 (88, 100) | 836 (83%) | 124 (12%) | 51 (5%) |
| 28 wks | 1421 | 299 (21%) | 1151 | 97 (88, 103) | 984 (86%) | 122 (11%) | 45 (4%) |
| Total | 6463 | 2571 (40%) | 4233 | 94 (85, 100) | 3346 (79%) | 603 (14%) | 284 (7%) |



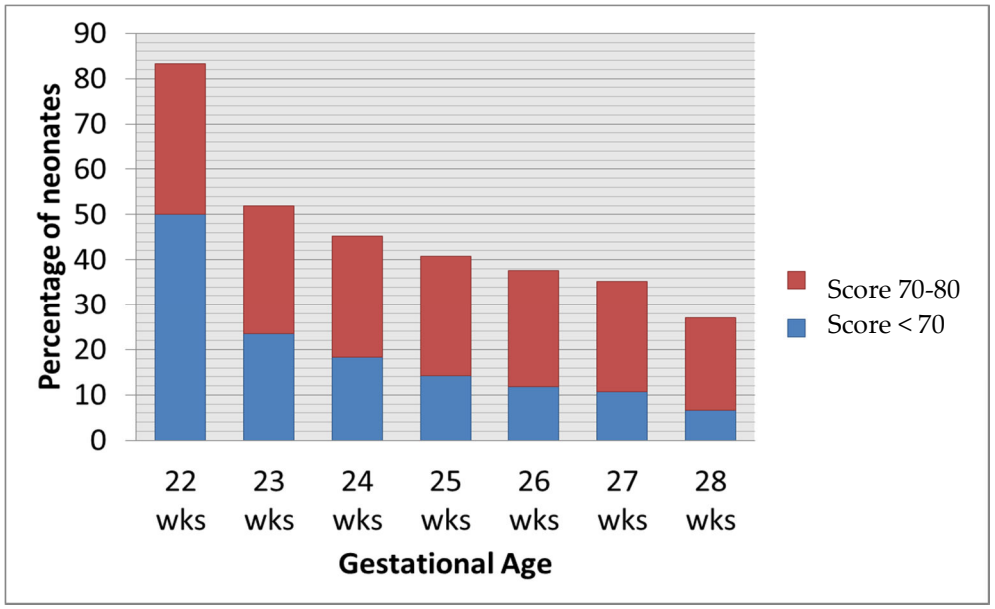

**COMMENTS:**

Motor scores on the Bayley Scales of Infant and Toddler Development- 3rd 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 11

Bayley- III language composite scores rates by gestational Age (GA)

| GA | CNN-CNFUN linked cases or deaths n | Death or language score < 85 n (%) | CNN-CNFUN linked cases with language data n | Median score (IQR) | Bayley-III ≥ 85 n (%) | Score 70-84 n (%) | Score < 70 n (%) |
|---|---|---|---|---|---|---|---|
| 22 wks | 44 | 43 (98%) | 6 | 71 (62, 79) | (17%) | (33%) | (50%) |
| 23 wks | 396 | 326(82%) | 102 | 83 (71, 94) | 49 (48%) | 29 (28%) | 24 (24%) |
| 24 wks | 871 | 605(69%) | 398 | 86 (74, 97) | 218 (55%) | 107 (27%) | 73 (18%) |
| 25 wks | 1156 | 658(57%) | 716 | 89 (77, 100) | 424 (59%) | 190 (27%) | 102 (14%) |
| 26 wks | 1236 | 594(48%) | 865 | 89 (77, 100) | 539 (62%) | 223 (26%) | 103 (12%) |
| 27 wks | 1339 | 543(41%) | 1024 | 91 (79, 100) | 663 (65%) | 250 (24%) | 111 (11%) |
| 28 wks | 1421 | 440(31%) | 1137 | 94 (83, 103) | 829 (73%) | 233 (21%) | 75 (7%) |
| Total | 663 | 3209(50%) | 4248 | 91 (79, 100) | 2723 (64%) | 1034 (24%) | 491 (12%) |



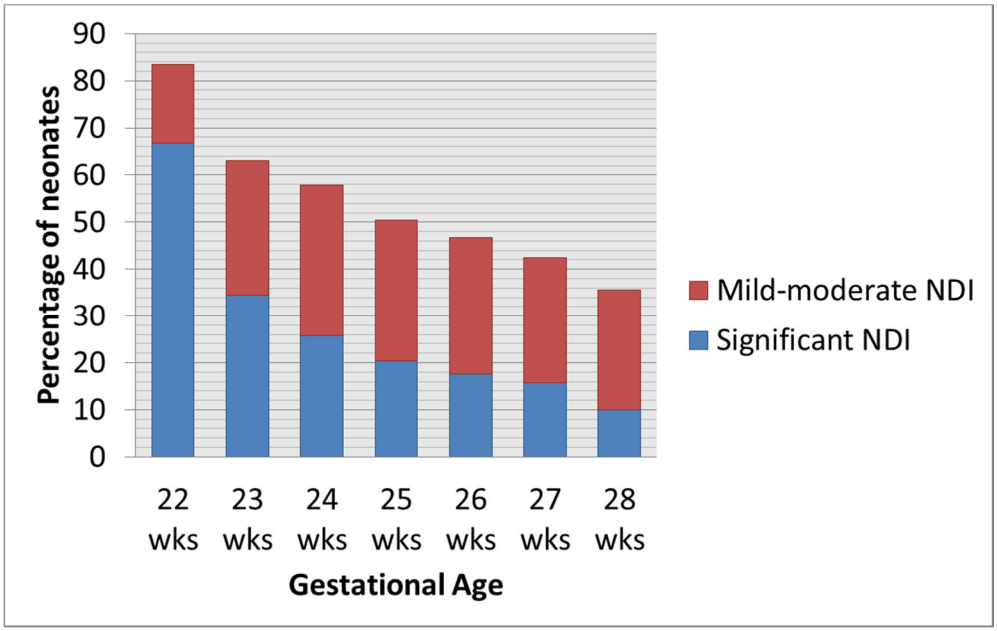

**COMMENTS:**

Language scores on the Bayley Scales of Infant and Toddler Development- 3rd 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 language delay and have limited predictive ability.

Presentation No 12

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 | 44 | 43 (98%) | 6 | (17%) | (17%) | (67%) |
| 23 wks | 396 | 350 (88%) | 122 | 45 (37%) | 35 (29%) | 42 (34%) |
| 24 wks | 871 | 683 (78%) | 446 | 188 (42%) | 143 (32%) | 115 (26%) |
| 25 wks | 1156 | 762 (66%) | 784 | 388 (50%) | 236 (30%) | 160 (20%) |
| 26 wks | 1236 | 719 (58%) | 966 | 515 (53%) | 282 (29%) | 169 (18%) |
| 27 wks | 1339 | 669 (50%) | 1149 | 662 (58%) | 307 (27%) | 180 (16%) |
| 28 wks | 1421 | 589 (41%) | 1286 | 829 (65%) | 329 (26%) | 128 (10%) |
| Total | 6463 | 3815 (59%) | 4759 | 2628 (55%) | 1333 (28%) | 798 (17%) |




**COMMENTS:**

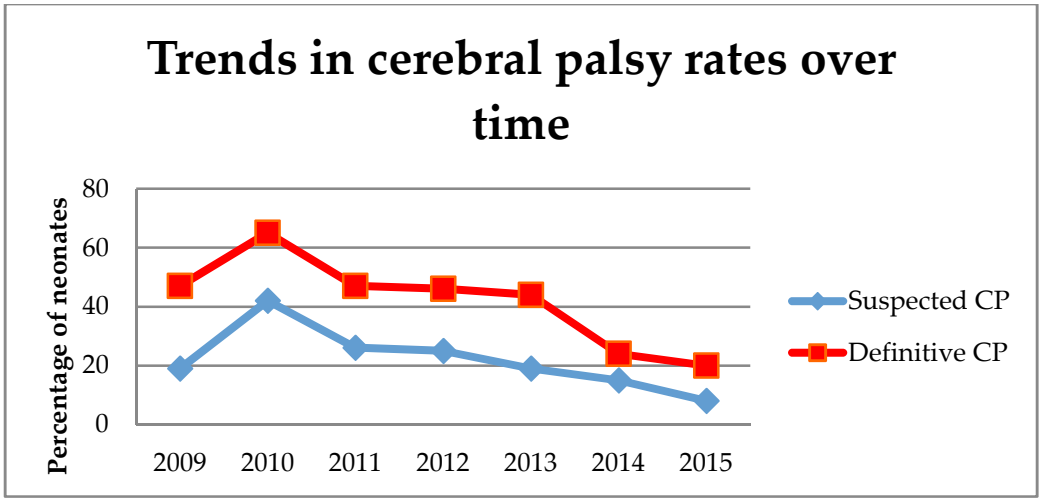
Neurodevelopmental impairment rates decrease with increasing gestational age.

## F. Outcomes Over Time

Presentation 13

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 ≤ 2 n (%) | CP GMFCS 3-5 n (%) |
|---|---|---|---|---|---|---|---|---|
| 2009 | 647 | 12 | 581 (90%) | 19 (2.9%) | 47 (7.3%) | 7 | 26 (65%) | 14 (35%) |
| 2010 | 998 | 16 | 891 (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 | 589 | 8 | 550 (93%) | 15 (2.5%) | 24 (4.1%) | 1 | 15 (65%) | 8 (35%) |
| 2015 | 353 | 13 | 325 (92%) | 8 (2.3%) | 20 (5.7%) | 0 | 13 (65%) | 7 (35%) |
| '09-'15 | 4690 | 89 | 4243 (90%) | 154 (3.3%) | 293 (6.2%) | 28 | 162 (61%) | 103 (39%) |



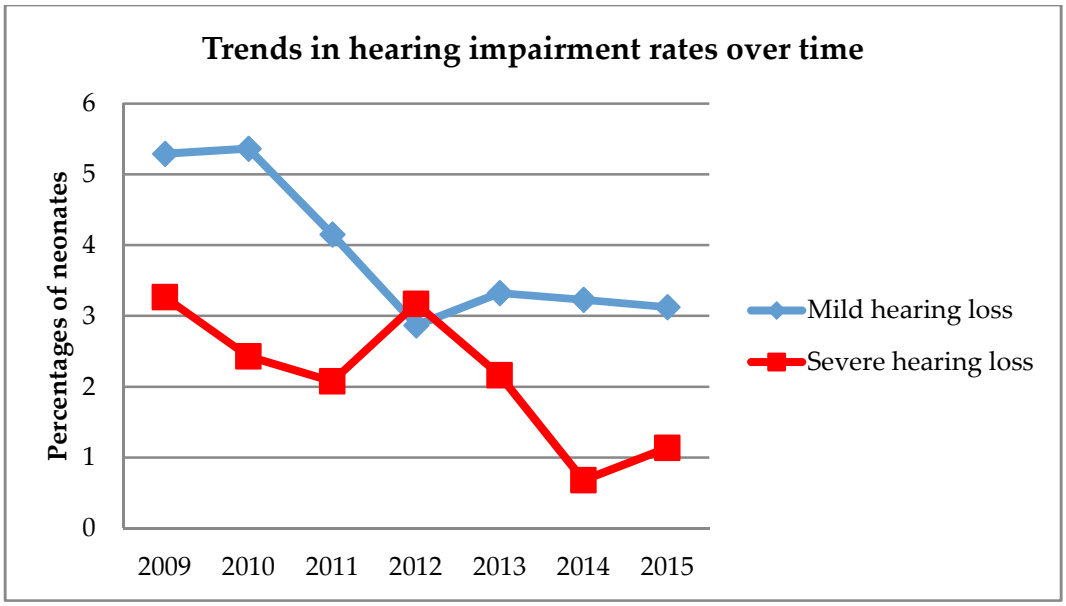

**COMMENTS:**

Higher attrition rates in the later years may impact the results. There has not been a clinically significant change in cerebral palsy rates with a possible downward trend in definitive cerebral palsy. The majority of cerebral palsy cases are mild.

Presentation No 14

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 | 989 | 25 | 912 (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 | 589 | 8 | 566 (96%) | 19 (3.2%) | 4 (0.7%) |
| 2015 | 352 | 14 | 337 (96%) | 11 (3.1%) | 4 (1.1%) |
| '09-'15 | 4657 | 122 | 4363 (94%) | 190 (4.1%) | 104 (2.2%) |



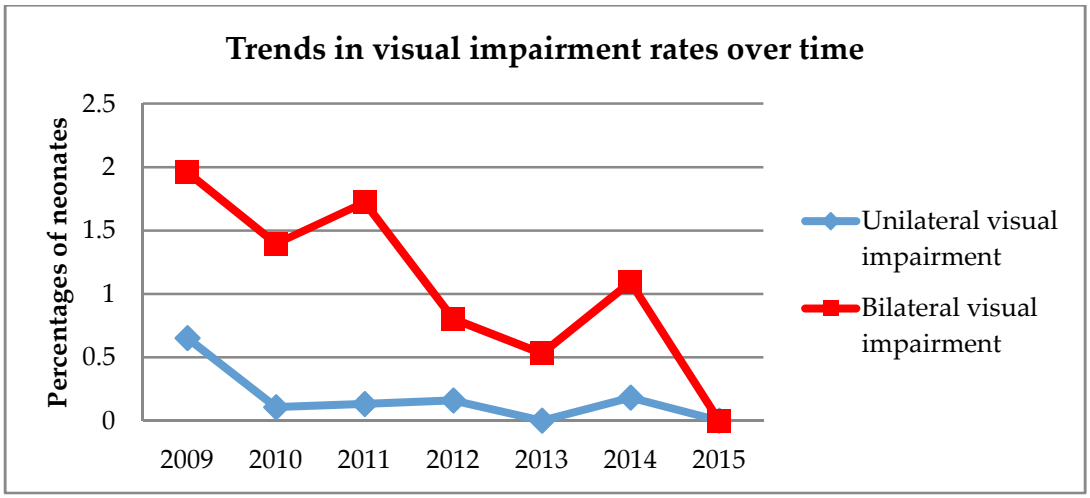

**COMMENTS:**

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 not prescribed hearing aid(s) or cochlear implant(s). Hearing impairment rates have shown a downward trend over time though numbers are small. Higher attrition rates in the later years may impact the results.

Presentation No 15

Trends in visual impairment rates over time

| Yr of birth | CNFUN complete data (n) | Missing vision data ( n) | Normal Vision n (%) | Unilateral visual impairment n (%) | Bilateral visual impairment n (%) |
|---|---|---|---|---|---|
| 2009 | 613 | 46 | 597 (97%) | (0.7%) | 12 (2.0%) |
| 2010 | 932 | 82 | 918 (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 | 549 | 48 | 542 (99%) | (0.1%) | 6 (1.0%) |
| 2015 | 341 | 25 | 341 (100%) | 0 (0) | 0 (0) |
| '09-'15 | 4377 | 402 | 4317 (99%) | 8 (0.1%) | 52 (1.1%) |



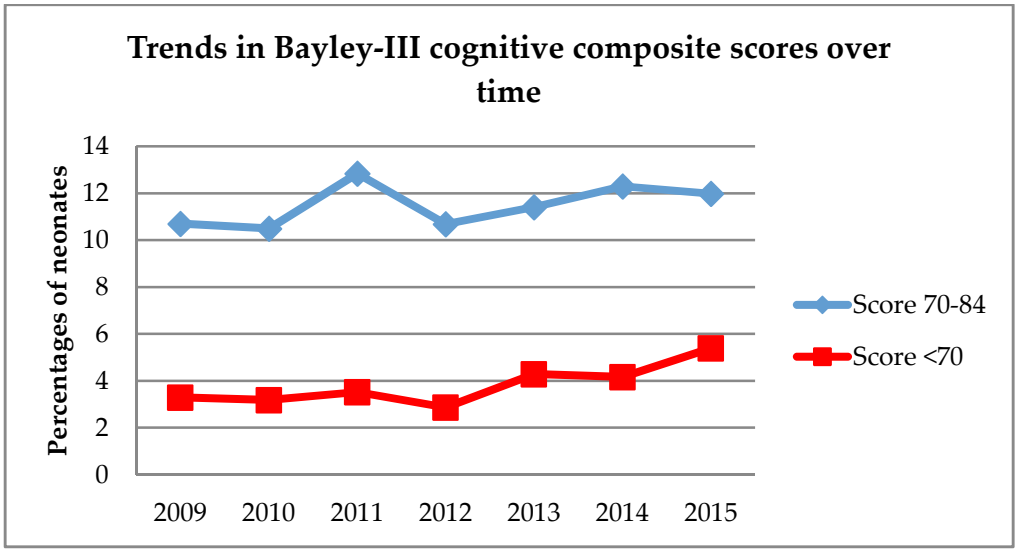

**COMMENTS:**

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

Presentation No 16

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 ≥ 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) | 814 (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 | 553 | 44 | 95 (85, 105) | 462 (84%) | 68 (12%) | 23 (4.2%) |
| 2015 | 334 | 32 | 95 (90, 105) | 276 (83%) | 40 (12%) | 18 (5.4%) |
| '09-'15 | 4420 | 359 | 95 (90, 105) | 3754 (85%) | 505 (11%) | 161 (3.6%) |



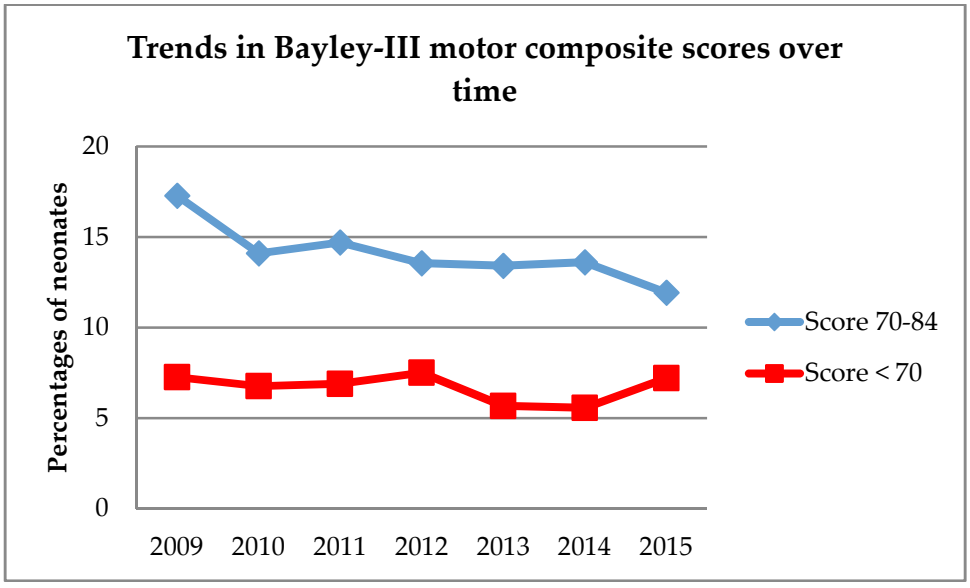

**COMMENTS:**

Higher attrition rates in the later years may impact the results. There has not been a clinically significant change and no evidence of reduction in cognitive developmental delay incidence as measured by the Bayley-III at 18 months corrected age. The Bayley-III has a poor predictive value.

Presentation No 17

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 ≥ 85 n (%) | Score 70-84 n (%) | Score < 70 n (%) |
|---|---|---|---|---|---|---|
| 2009 | 579 | 80 | 94 (85, 100) | 437 (75%) | 100 (17%) | 42 (7.3%) |
| 2010 | 901 | 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 | 522 | 75 | 94 (88, 103) | 422 (81%) | 71 (14%) | 29 (5.6%) |
| 2015 | 319 | 47 | 94 (88, 103) | 258 (81%) | 38 (12%) | 23 (7.2%) |
| '09-'15 | 4233 | 546 | 94 (85, 100) | 3346 (79%) | 603 (14%) | 284 (6.7%) |



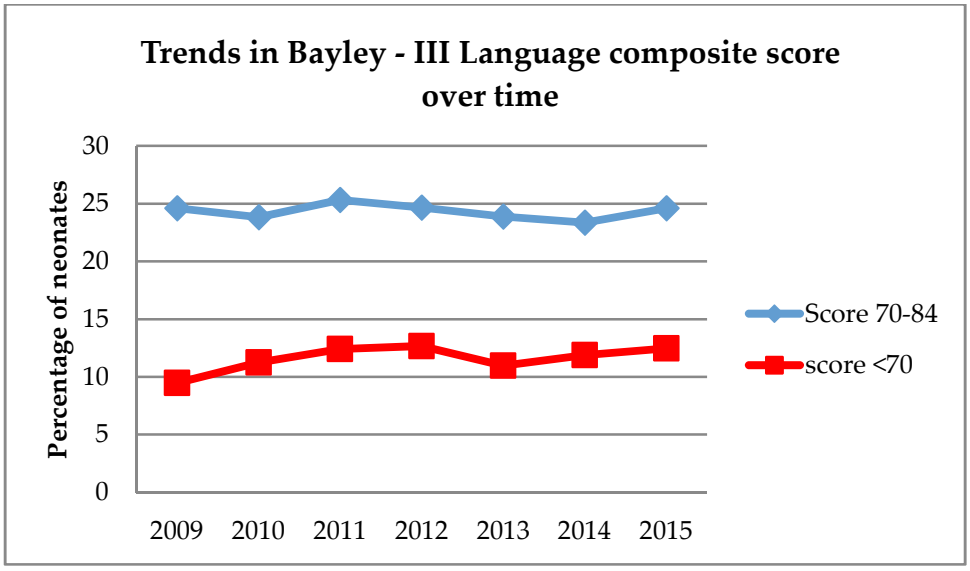

**COMMENTS:**

Higher attrition rates in the later years may impact the results. There has not been a clinically significant change in motor developmental delay incidence as measured by the Bayley-III at 18 months corrected age. The Bayley-III has a poor predictive value. Not all children with low Bayley-III motor composite scores have cerebral palsy and vice versa (data not shown).

Presentation No 18

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 ≥ 85 n (%) | Score 70-84 n (%) | Score < 70 n (%) |
|---|---|---|---|---|---|---|
| 2009 | 581 | 78 | 91 (79, 100) | 383 (66%) | 143 (25%) | 55 (9%) |
| 2010 | 915 | 99 | 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 | 522 | 75 | 90 (77, 100) | 338 (65%) | 122 (23%) | 62 (12%) |
| 2015 | 321 | 45 | 89 (79, 100) | 202 (63%) | 79 (25%) | 40 (12%) |
| '09-'15 | 4248 | 531 | 91 (79, 100) | 2723 (64%) | 1034 (24%) | 491 (12%) |



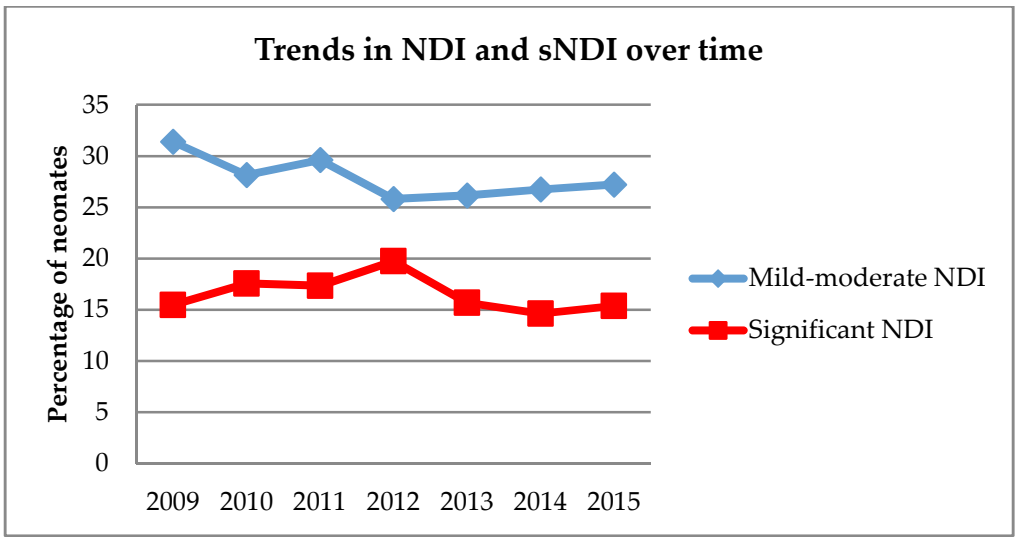

**COMMENTS:**

Higher attrition rates in the later years may impact the results. There has not been a clinically significant change and no evidence of decrease in the incidence of language developmental delay as measured by the Bayley-III at 18 months corrected age. Low language scores on the Bayley-III is the most frequent domain of neurodevelopmental impairment in this report. The Bayley-III has a poor predictive value.

Presentation No 19

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 | 659 | 6 | 347 (53%) | 205 (31%) | 101 (15%) |
| 2010 | 1014 | 1 | 550 (54%) | 285 (28%) | 178 (18%) |
| 2011 | 852 | 4 | 450 (53%) | 251 (30%) | 147 (17%) |
| 2012 | 676 | 2 | 367 (54%) | 174 (26%) | 133 (20%) |
| 2013 | 615 | 3 | 356 (58%) | 160 (26%) | 96 (16%) |
| 2014 | 597 | 2 | 349 (59%) | 159 (27%) | 87 (15%) |
| 2015 | 366 | 2 | 209 (57%) | 99 (27%) | 56 (15%) |
| '09-'15 | 4779 | 20 | 2628 (55%) | 1333 (28%) | 798 (17%) |




**COMMENTS:**

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 20

Neurodevelopmental outcomes 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 21

Significant neurodevelopmental outcomes 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 22

Neurodevelopmental outcomes for post MiCare cohort (Births Oct 1, 2011- Mar 31, 2015)*

| 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 | 221 | 129 (58.4) | 92 (41.6) | 11 (5) | 10 (4.5) | < 5% | 44 (19.9) | 63 (28.5) | 22 (10) |
| 2 | 140 | 86 (61.4) | 54 (38.6) | 8 (5.7) | 9 (6.4) | 0 (0) | 18 (12.9) | 40 (28.6) | 12 (8.6) |
| 6 | 276 | 163 (59.1) | 113 (40.9) | 11 (4) | 14 (5.1) | 5 (1.8) | 54 (19.6) | 77 (27.9) | 44 (15.9) |
| 10 | 62 | 21 (33.9) | 41 (66.1) | < 10% | 6 (9.7) | < 5% | 18 (29) | 37 (59.7) | 9 (14.5) |
| 11 | 229 | 123 (53.7) | 106 (46.3) | 18 (7.9) | 14 (6.1) | < 5% | 56 (24.5) | 71 (31) | 39 (17) |
| 12 | 139 | 74 (53.2) | 65 (46.8) | 15 (10.8) | < 5% | < 5% | 35 (25.2) | 46 (33.1) | 24 (17.2) |
| 14 | 154 | 87 (56.5) | 67 (43.5) | 8 (5.2) | 9 (5.8) | < 5% | 26 (16.9) | 50 (32.5) | 15 (9.7) |
| 16 | 219 | 122 (55.7) | 97 (44.3) | 12 (5.5) | 8 (3.7) | 0 (0) | 30 (13.7) | 78 (35.6) | 35 (16) |
| 20 | 89 | 54 (60.7) | 35 (39.3) | 5 (5.6) | 5 (5.6) | < 5% | 15 (16.9) | 24 (27) | 13 (14.6) |
| 21 | 63 | 31 (49.2) | 32 (50.8) | < 10% | < 5% | 0 (0) | 14 (22.2) | 26 (41.3) | 13 (20.6) |
| 23 | 56 | 39 (69.6) | 17 (30.4) | < 10% | < 10% | < 5% | 7 (12.5) | 10 (17.9) | < 10% |
| 25 | 457 | 261 (57.1) | 196 (42.9) | 21 (4.6) | 17 (3.7) | < 5% | 64 (14) | 154 (33.7) | 66 (14.4) |
| 26 | 20 | 14 (70) | 6 (30) | < 10% | < 20% | 0 (0) | < 20% | < 20% | < 10% |
| Total | 2125 | 1205 (56.7) | 920 (43.3) | 122 (5.7) | 104 (4.9) | 19 (0.9) | 384 (18.1) | 679 (31.9) | 296 (13.9) |

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

Presentation No 23

Significant neurodevelopment for post MiCare cohort (Births Oct 1, 2011- Mar 31, 2015)*

| Site | CNFUN (n) | No NDI n (%) | Significant NDI n (%) | CP 3-5 n (%) | Severe hearing Impairment n(%) | Bilateral visual Impairment n(%) | Bayley score <85m Motor n(%) | Bayley score <85 Language n(%) | Bayley score <85 Cognitive n(%) |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 221 | 129 (58.4) | 44 (19.9) | 5 (2.3) | 8 (3.6) | < 5% | 18 (8.1) | 20 (9) | 5 (2.3) |
| 2 | 140 | 86 (61.4) | 18 (12.9) | < 5% | < 5% | 0 (0) | < 5% | 11 (7.9) | 5 (3.6) |
| 6 | 276 | 163 (59.1) | 36 (13) | < 5% | < 5% | < 5% | 15 (5.4) | 27 (9.8) | 14 (5.1) |
| 10 | 62 | 21 (33.9) | 14 (22.6) | < 5% | < 5% | < 5% | < 10% | 13 (21) | < 5% |
| 11 | 229 | 123 (53.7) | 31 (13.5) | < 5% | 0 (0) | < 5% | 21 (9.2) | 19 (8.3) | < 5% |
| 12 | 139 | 74 (53.2) | 23 (16.5) | < 5% | < 5% | < 5% | 11 (7.7) | 18 (12.9) | 7 (5.0) |
| 14 | 154 | 87 (56.5) | 23 (14.9) | 5 (3.2) | < 5% | < 5% | 8 (5.2) | 11 (7.1) | < 5% |
| 16 | 219 | 122 (55.7) | 31 (14.2) | < 5% | 6 (2.7) | 0 (0) | 9 (4.1) | 21 (9.6) | 9 (4.1) |
| 20 | 89 | 54 (60.7) | 20 (23) | < 5% | < 5% | < 5% | 7 (7.9) | 12 (13.5) | 5 (5.6) |
| 21 | 63 | 31 (49.2) | 17 (27) | < 5% | < 5% | 0 (0) | 5 (7.9) | 14 (22.2) | < 10% |
| 23 | 56 | 39 (69.6) | 9 (16.1) | < 10% | < 10% | < 5% | < 10 % | < 5% | < 5 % |
| 25 | 457 | 261 (57.1) | 85 (18.6) | 11 (2.4) | 12 (2.6) | < 5% | 16 (3.5) | 55 (12) | 13 (2.8) |
| 26 | 20 | 14 (70) | < 20% | 0 (0) | < 15% | 0 (0) | 0 (0) | < 10% | 0 (0) |
| Total | 2125 | 1205 (56.7) | 354 (16.7) | 44 (2.1) | 43 (2) | 17 (0.8) | 122 (5.7) | 224 (10.5) | 72 (3.4) |

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

# H.Site Comparisons- Adjusted Standardized Ratios

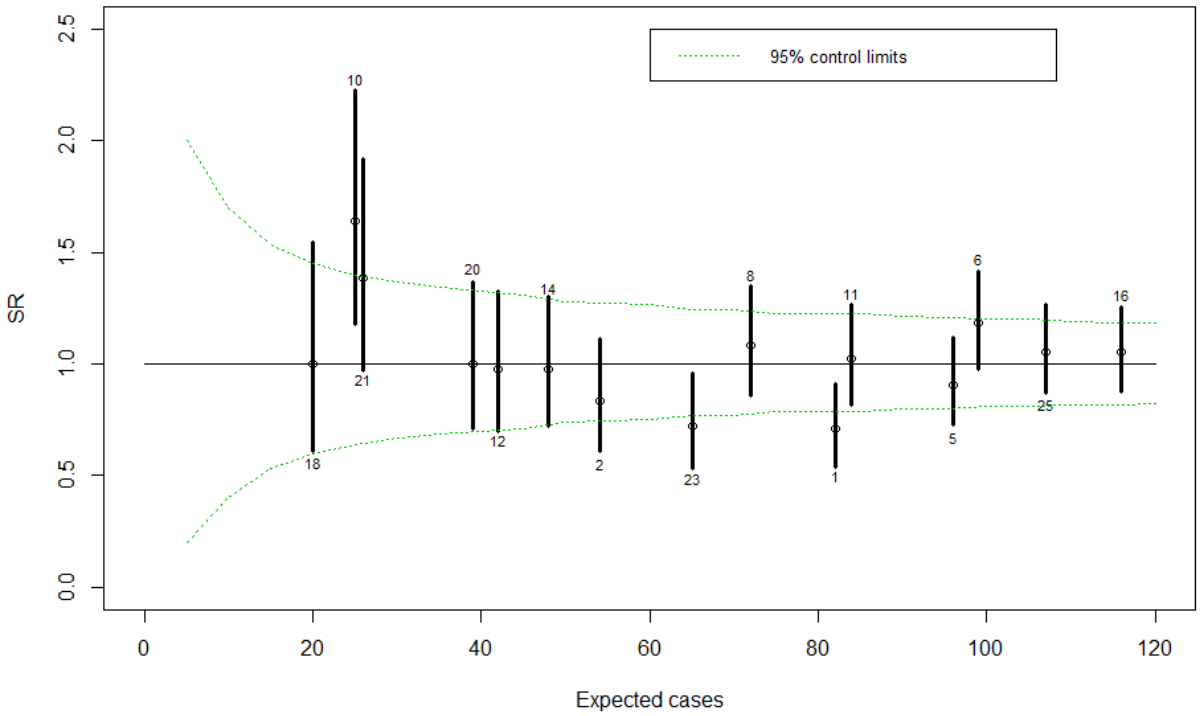
Presentation No 24

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 and brain injury




**COMMENTS:**

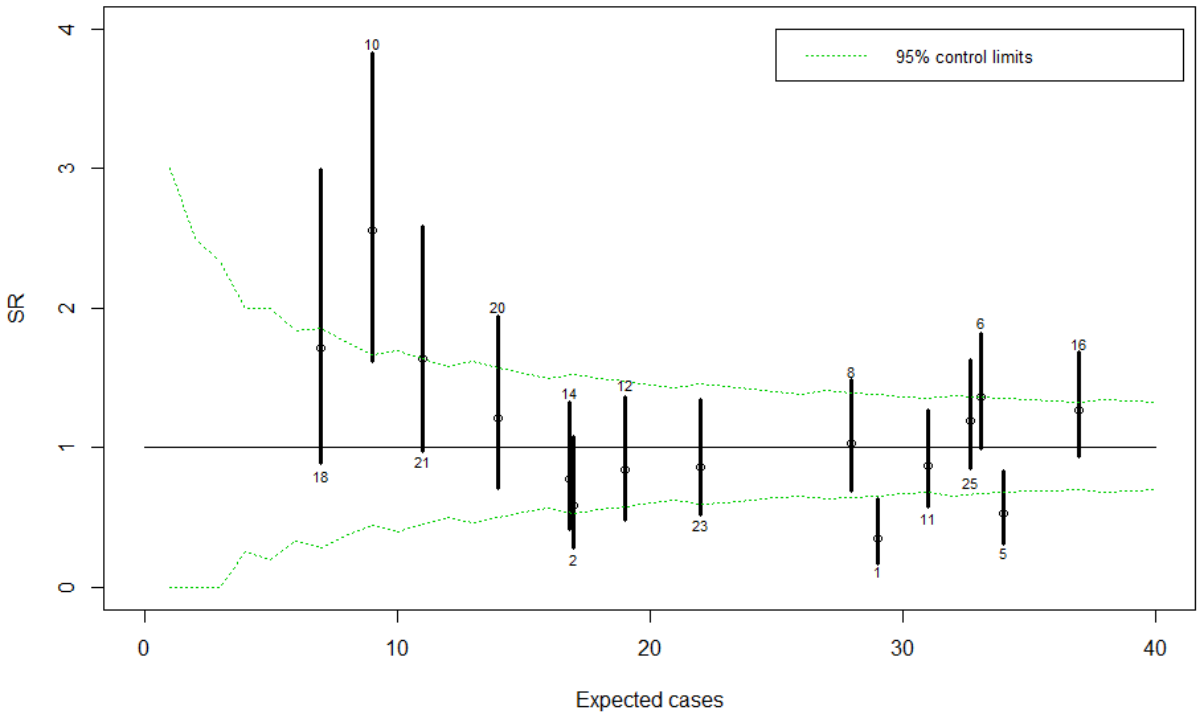
Sites with points outside the green "funnel" represent higher or lower adjusted NDI rates than expected. When the 95% confidence interval doesn't cross 1, the results are statistically significant. Therefore 3 sites have statistically higher or lower NDI rates.

Presentation No 26

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), retinopathy of prematurity, nosocomial infection and brain injury




**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.

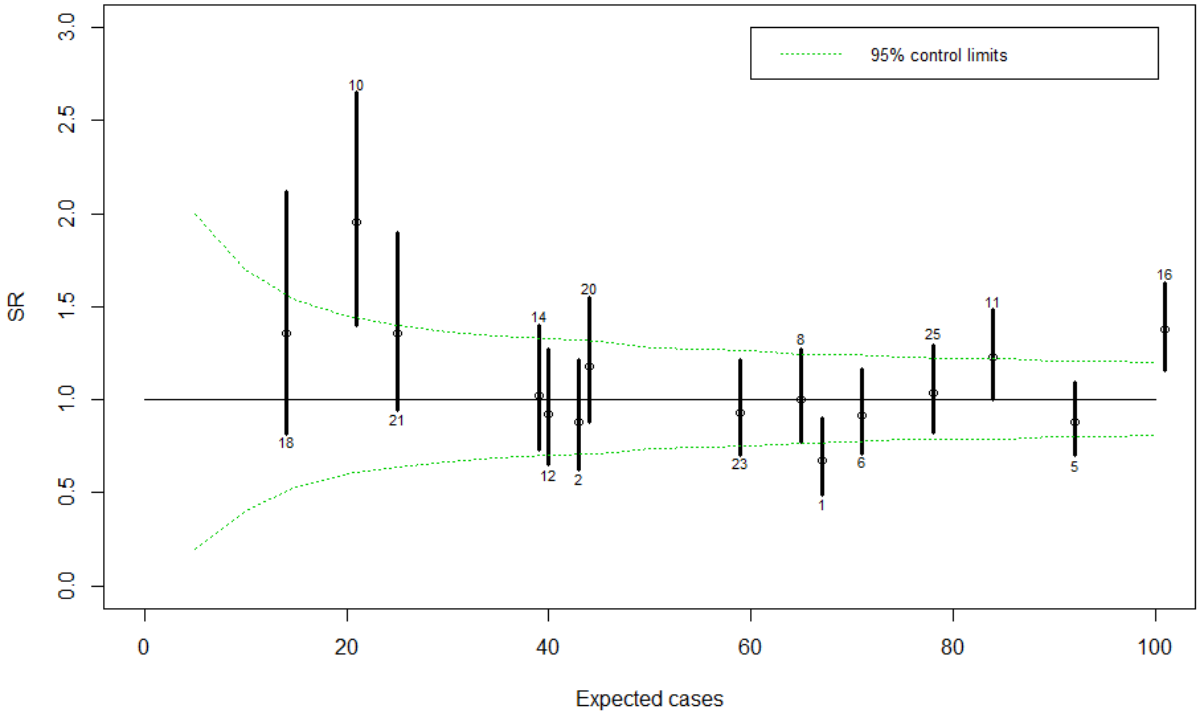
Presentation No 26

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 and brain injury




**COMMENTS:**

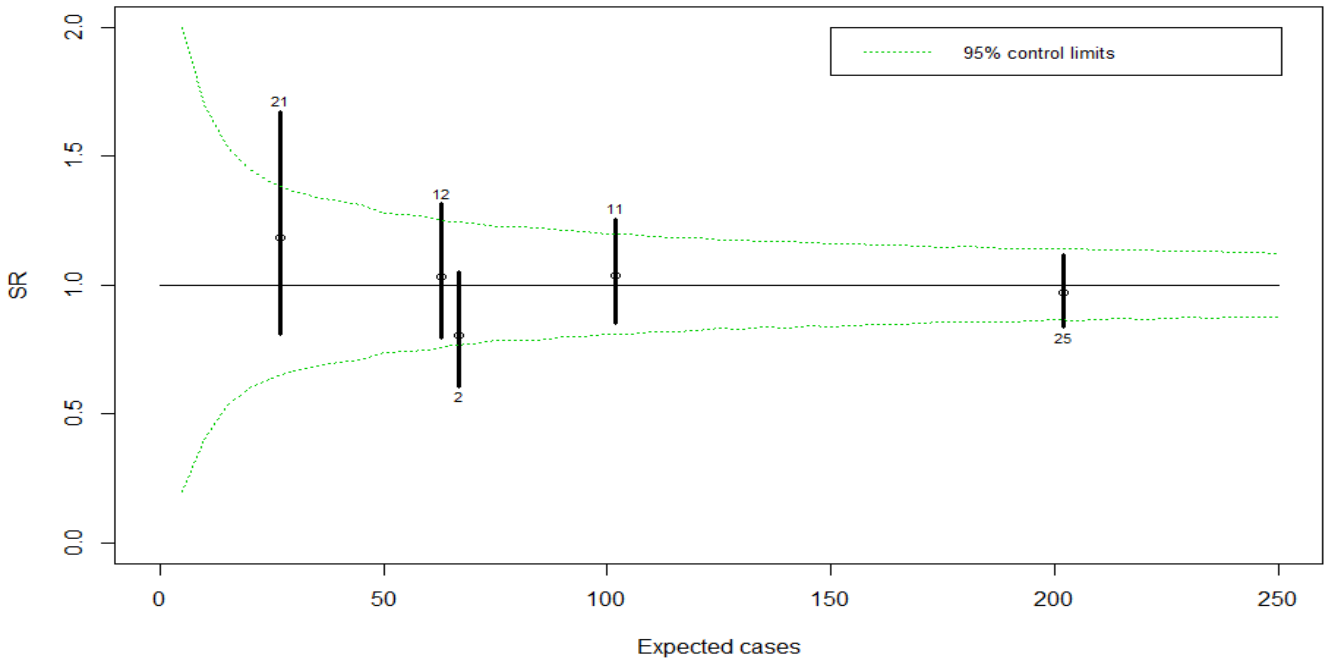
Sites with points outside the green "funnel" represent higher or lower adjusted significant NDI or death rates than expected. When the 95% confidence interval doesn't cross 1, the results are statistically significant. Therefore 3 sites have statistically higher or lower significant NDI or death rates.

Presentation No 27

Adjusted Standardized ratios by site – Neurodevelopmental Impairment (NDI)- Post- MiCare cohort (Oct 1 2011- Dec 31, 2015 births)

| Site | Children (n) | Follow-up Rate % | Included Yes/ No | NDI (n) | Adjusted Expected NDI (n) | Adjusted standardized ratio (95%CI) |
|---|---|---|---|---|---|---|
| 1 | 221 | 68.5 | N | 92 | | |
| 2 | 140 | 76 | Y | 54 | 67 | 0.81 (0.61, 1.05) |
| 3 | 9 | 9.8 | N | 3 | | |
| 4 | 7 | 30.4 | N | 1 | | |
| 5 | 6 | 1.4 | N | 5 | | |
| 6 | 276 | 56.7 | N | 113 | | |
| 7 | 11 | 16.9 | N | 2 | | |
| 8 | 1 | 0.6 | N | 0 | | |
| 9 | 4 | 3.4 | N | 2 | | |
| 10 | 62 | 57.9 | N | 41 | | |
| 11 | 229 | 71.3 | Y | 106 | 102 | 1.04 (0.85, 1.26) |
| 12 | 139 | 81.4 | Y | 65 | 63 | 1.03 (0.80, 1.32) |
| 14 | 154 | 65.4 | N | 67 | | |
| 15 | 7 | 11.3 | N | 1 | | |
| 16 | 219 | 46.7 | N | 97 | | |
| 17 | 1 | 1.2 | N | 0 | | |
| 18 | 9 | 12.2 | N | 5 | | |
| 19 | 5 | 4.7 | N | 2 | | |
| 20 | 89 | 69.3 | N | 35 | | |
| 21 | 63 | 73.6 | Y | 32 | 27 | 1.19 (0.81, 1.67) |
| 22 | 6 | 13.6 | N | 4 | | |
| 23 | 56 | 27 | N | 17 | | |
| 25 | 457 | 76.8 | Y | 196 | 202 | 0.97 (0.84, 1.12) |
| 26 | 20 | 66.7 | N | 6 | | |

1. Sites with < 20 participants for the 4 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 and brain injury




**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.

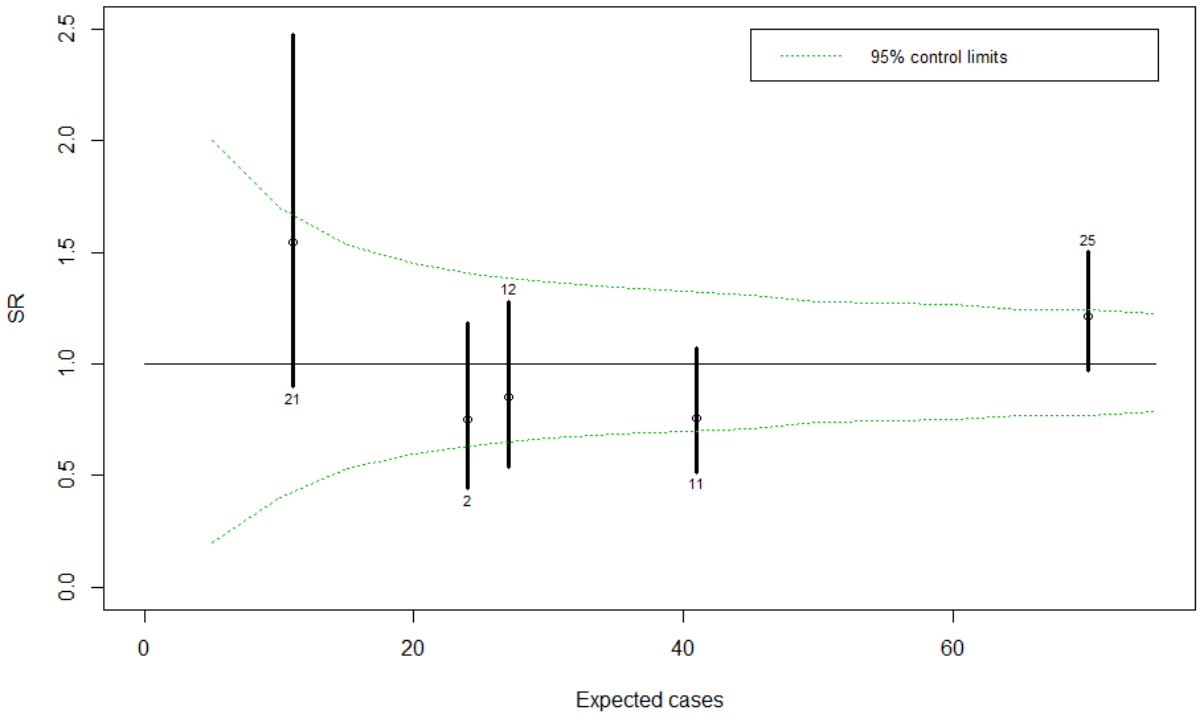
Presentation No 28

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 | 221 | 68.5 | | 44 | | |
| 2 | 140 | 76 | Y | 18 | 24 | 0.75 (0.44, 1.19) |
| 3 | 9 | 9.8 | | 2 | | |
| 4 | 7 | 30.4 | | 0 | | |
| 5 | 6 | 1.4 | | 3 | | |
| 6 | 276 | 56.7 | | 36 | | |
| 7 | 11 | 16.9 | | 2 | | |
| 8 | 1 | 0.6 | | 0 | | |
| 9 | 4 | 3.4 | | 2 | | |
| 10 | 62 | 57.9 | | 14 | | |
| 11 | 229 | 71.3 | Y | 31 | 41 | 0.76 (0.51, 1.07) |
| 12 | 139 | 81.4 | Y | 23 | 27 | 0.85 (0.54, 1.28) |
| 14 | 154 | 65.4 | | 23 | | |
| 15 | 7 | 11.3 | | 1 | | |
| 16 | 219 | 46.7 | | 31 | | |
| 17 | 1 | 1.2 | | 0 | | |
| 18 | 9 | 12.2 | | 2 | | |
| 19 | 5 | 4.7 | | 1 | | |
| 20 | 89 | 69.3 | | 20 | | |
| 21 | 63 | 73.6 | Y | 17 | 11 | 1.55 (0.90, 2.47) |
| 22 | 6 | 13.6 | | 3 | | |
| 23 | 56 | 27 | | 9 | | |
| 25 | 457 | 76.8 | Y | 85 | 70 | 1.21 (0.97, 1.50) |
| 26 | 20 | 66.7 | | 3 | | |

1. Sites with < 20 participants for the4 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), retinopathy of prematurity, nosocomial infection and brain injury




**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 no sites have statistically higher or lower sNDI rates.

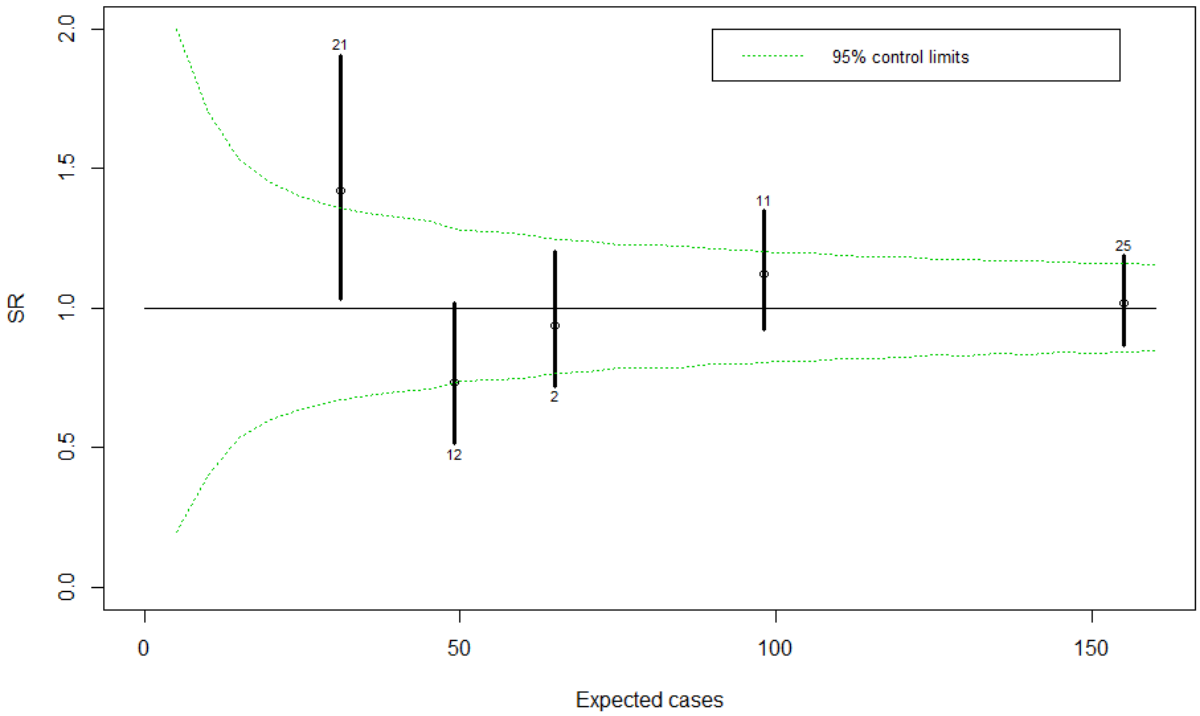
Presentation No 29

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 | 263 | 68.5 | | | | |
| 2 | 184 | 76 | Y | 61 | 65 | 0.94 (0.72, 1.21) |
| 3 | 30 | 9.8 | | | | |
| 4 | 16 | 30.4 | | | | |
| 5 | 76 | 1.4 | | | | |
| 6 | 326 | 56.7 | | | | |
| 7 | 20 | 16.9 | | | | |
| 8 | 54 | 0.6 | | | | |
| 9 | 20 | 3.4 | | | | |
| 10 | 81 | 57.9 | | | | |
| 11 | 308 | 71.3 | Y | 110 | 98 | 1.12 (0.92, 1.35) |
| 12 | 153 | 81.4 | Y | 36 | 49 | 0.73 (0.51, 1.02) |
| 14 | 185 | 65.4 | | | | |
| 15 | 26 | 11.3 | | | | |
| 16 | 310 | 46.7 | | | | |
| 17 | 42 | 1.2 | | | | |
| 18 | 24 | 12.2 | | | | |
| 19 | 16 | 4.7 | | | | |
| 20 | 122 | 69.3 | | | | |
| 21 | 92 | 73.6 | Y | 44 | 31 | 1.42 (1.03, 1.91) |
| 22 | 15 | 13.6 | | | | |
| 23 | 109 | 27 | | | | |
| 25 | 530 | 76.8 | Y | 158 | 155 | 1.02 (0.87, 1.19) |
| 26 | 22 | 66.7 | | | | |

1. Sites with < 20 participants for the 4 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 and brain injury




**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 1 site has a statistically higher 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.
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