

# **Maternal diabetes and neurodevelopmental outcomes of infants born before 29 weeks' gestation**

## **Authors**

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\*Full lists of CNN and CNFUN investigators and their affiliations are provided in the acknowledgements

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### **Abbreviations**

aOR- Adjusted odds ratio

Bayley III- Bayley Scales of Infant and Toddler Development Third Edition

BPD- Bronchopulmonary dysplasia

CA- Corrected age

CI- Confidence interval

CNFUN- Canadian Neonatal Follow-Up Network

CNN- Canadian Neonatal Network

CP- Cerebral palsy

GA- Gestational age

GMFCS- Gross motor function classification system

IQR- Interquartile range

LGA- Large for gestational age

NDI- Neurodevelopmental impairment

NEC- Necrotizing enterocolitis

NICU- Neonatal intensive care unit

ROP- Retinopathy of prematurity

SD- Standard deviation

SGA- Small for gestational age

SNAP-II- Score for neonatal acute physiology- version 11

sNDI- Significant neurodevelopmental impairment

## **Abstract**

**Objective:** To compare the neurodevelopmental outcomes of infants born <29 weeks gestation and exposed to diabetes in pregnancy with those unexposed.

**Methods:** This was a retrospective cohort study using the Canadian Neonatal Network (CNN) and Canadian Neonatal Follow-Up Network (CNFUN) databases. Preterm infants born <29 weeks' gestation and admitted to a level 3 NICU between 2009-2018 who had

neurodevelopmental assessments at 18-24 months corrected age (CA) were eligible.

The two primary outcomes were: i) Neurodevelopmental Impairment (NDI) ( $\geq 1$  of Bayley-III scores  $< 85$  in any domain, cerebral palsy, or vision or hearing impairment); and ii) significant NDI (sNDI) ( $\geq 1$  of Bayley-III scores  $< 70$  in any domain, cerebral palsy GMFCS  $\geq 3$ , bilateral blindness, or need for hearing aids or cochlear implants).

Secondary outcomes were the individual components of NDI and sNDI. Adjusted odds ratios with 95% CIs were calculated to determine outcomes between groups.

**Results:** Of 13988 eligible infants, 55% attended neurodevelopmental follow-up assessments. Infants exposed to diabetes had increased odds of NDI compared to those unexposed (aOR 1.09 (95% CI 1.08-1.54); there was no difference in sNDI (aOR 1.07 (95% CI 0.84-1.36). Language and motor delays were more common in those exposed to maternal diabetes.

**Conclusion:** Significantly higher rates of NDI, language, or motor delays were present in preterm infants  $< 29$  weeks' gestation exposed to diabetes in-utero. Future research is needed to determine the etiology and clinical significance of these findings.