

## Born a bit too early: A study of early planned birth and child development at school age

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### Objectives

Fetal growth and development is a continuum with the optimal time of birth at 39-40 weeks gestation. Internationally, significant changes in clinical practice have seen planned birth (labour induction or pre-labour caesarean section) before 40 completed weeks gestation increase. Fetal brain development accelerates rapidly in the later stages of pregnancy from 32 weeks gestation, making it vulnerable to disruption from even slightly shortened gestation. This study aimed to investigate the association of gestational age and mode of birth with early childhood development.

### Approach

This study utilised a population-based record-linkage of administrative birth, hospital and development data to obtain a cohort of 153,730 live born infants in New South Wales, Australia. These infants were born between 2002 and 2007, with a gestational age of at least 32 weeks and had an early development assessment in their first year of school in 2009 or 2012. Childhood development was assessed in five main domains (physical health and wellbeing, language and cognitive skills, social competence, emotional maturity, and communication skills and general knowledge) with each comprised of a number of sub-domains. Children with a score below the 10th percentile nationally are considered developmentally vulnerable (DV) in that domain. Children who were DV for two or more of the five main domains are classified as developmentally high risk (DHR) and this was the primary study outcome. Robust multivariable Poisson models were used to obtain individual and combined relative risks for gestational age and mode of birth with DHR, adjusted for maternal demographic, socio-economic, perinatal, and child characteristics.

### Results

Overall, 9.6% of children were DHR. The adjusted relative risk (aRR) (95% confidence interval) of being DHR decreased with increasing gestational age (referent: 40 weeks); 32-33 weeks 1.25 (1.08-1.44), 34-36 weeks 1.26 (1.18-1.34), 37 weeks 1.17 (1.10-1.25), 38 weeks 1.06 (1.01-1.10), 39 weeks 0.98 (0.94-1.02), 41+ weeks 0.99 (0.94-1.03) and for planned birth (referent: vaginal birth following spontaneous labour), 1.07 (1.04-1.11). The aRR for planned birth at 37 weeks was 1.26 (1.18-1.34) and at 38 weeks 1.13 (1.08-1.19).

### Conclusion

Early (<39 weeks gestation) planned birth is associated with an increased risk of poor development in children starting school. Given the timing of planned birth is modifiable, delaying birth for an additional week or more may improve child development. Strategies and interventions to inform more judicious decision making, weighing all the risks and benefits for early planned birth are required to ensure optimal child health and development.

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