

Cesarean-born babies at increased risk of infection-related hospitalisation in childhood

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Cesarean-born babies are at increased risk during early childhood of being hospitalised due to an infection, according to a new study of over seven million births from four countries. Credit: Bonnie Kittle

Cesarean-born babies are at increased risk during early childhood of being hospitalised due to an infection, according to a new study of over seven million births from four countries.

The study, led by the Murdoch Children's Research Institute (MCRI) and Aarhus University and published in *PLOS Medicine*, found a small but consistent increase in the absolute risk of [infection](#)-related hospitalisation rates in children up to five years of age compared with vaginally-born children.

Study lead author MCRI's Dr. Jessica Miller said because infection was the leading cause of children being admitted to hospital, any measures to reduce [infection rates](#) would make a measurable and lasting difference to the overall health of populations.

The study of 7.2 million births from Australia, Denmark, Scotland and England recorded 23 percent by cesarean and of these, 57 percent were emergency cesareans. Cesarean rates varied significantly between the countries.

Overall, about 1.5 million children in the study were hospitalised with an infection before their fifth birthday. About 14,000 of these infections may be attributed to being born by emergency cesarean and 18,500 to pre-labour cesarean.

Increased infection risks lasted until five years of age and were highest for respiratory, gastrointestinal and other viral infections.

Dr. Miller said prior to this study, the questions of whether a cesarean birth was associated with increased risk of any infection or only certain types of infection, and if the risk was different for emergency versus pre-labour cesarean had remained unclear.

Study co-lead senior author Aarhus University's Professor Lars Pedersen said despite the small increased risk of childhood infections, cesarean births may be the safest option for some women and babies.

Professor Pedersen said the link between cesarean birth and infection could reflect differences in early microbial exposure (bacteria from the mother's vagina) during delivery.

"During vaginal birth, the baby comes into contact with normal bacteria from the mother's gut and vagina. Babies born by [cesarean section](#) have much less exposure to these bacteria," he said.

Study co-lead senior author MCRI's Professor David Burgner said [cesarean births](#) were suggested to have short and long-term health implications for children including increased risk of asthma, allergy, juvenile idiopathic arthritis and inflammatory bowel disease.

"Differences in microbial exposure due to birth mode, which can persist for months or possibly years, may contribute to the increased risk of infection-related hospitalisation following a cesarean birth," he said.

"Our microbiomes can affect the development of postnatal immune responses, including to infection. The microbiome can also be optimised by postnatal factors, such as breast-feeding and early skin-to-skin contact after birth."

Global cesarean rates have almost doubled since 2000, with about 6.2 million non-medically indicated caesareans performed worldwide each year.

"Our findings have implications for clinical practice and public health policy," Professor Burgner said. "Infection is the leading cause of [early childhood](#) hospitalisation and these findings should lead to studies to

understand the mechanisms, including the effects of [birth](#) mode on immune development, and whether simple interventions, such as increasing breast-feeding rates, can offset any increased risks.

"It will be important to investigate whether similar findings are seen in low and middle income countries, where the burden of childhood infection is likely to be much higher."

Researchers from the University of Melbourne, University of Oxford, Telethon Kids Institute, University of Sydney, NHS National Services Scotland, and the University of Western Australia also contributed to the study.

More information: Jessica E. Miller, Raphael Goldacre, Hannah C. Moore, Justin Zeltzer, Marian Knight, Carole Morris, Sian Nowell, Rachael Wood, Kim W. Carter, Parveen Fathima, Nicholas de Klerk, Tobias Strunk, Jiong Li, Natasha Nassar, Lars H. Pedersen and David P. Burgner. 'Mode Of Birth And Risk Of Infection Related Hospitalisation In Childhood: A Population Cohort Study Of 7.17 Million Births From Four High-Income Countries,' *PLOS Medicine* (2020). [DOI: 10.1371/journal.pmed.1003429](#)

Provided by Murdoch Children's Research Institute

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