



**METRO NORTH CLINICIAN
RESEARCH FELLOW 2021-2025**

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Demonstrating the effect of pre-delivery antibiotics on the neonatal intestinal microbiome and immune system.

100 000 women have elective caesarean sections every year in Australia and all of these women will receive antibiotic therapy. Antibiotics are known to affect the intestinal microbiome and are thought to be linked to many chronic diseases, including allergic disease. However, the short and long-term effects of antibiotics on mother and baby are not yet known.

My research aims to optimise clinical outcomes for mother and child following a caesarean section by determining if pre-incisional antibiotics administered to the mother at caesarean section increases childhood allergic disease.

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**Metro North
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Research Impact

An important starting point in the project, was to seek the perspectives of recently pregnant women in Metro North, relating to the increasing use of antibiotics in maternity care. Women were concerned about the effects of antibiotics on their own health, and on the health of their infant. A large percentage of women did not know that they had received antibiotics prior to their caesarean section, despite having significant concerns about the side effects. This important work was presented at the Annual Scientific Meeting of The Australian and New Zealand College of Anaesthetists and presented at a national anaesthesia conference, raising questions about informed consent and the use of prophylactic antibiotics.

With increasing concerns regarding the early exposure of neonates to antibiotics, our multidisciplinary team completed a feasibility trial, in which women were randomised to receive placebo or antibiotics prior to cesarean delivery. We studied only women at low risk of surgical infection and all women were closely followed to detect potential infection.

Importantly, we were able to collect samples of amniotic fluid and breastmilk from mothers and faeces from the babies. We can now compare the effect of antibiotics on these samples. Early results that have not yet been published, suggest that exposure to antibiotics prior to birth influences bacteria present in breastmilk up to thirty days postpartum. This research was presented at the 2025 National Scientific Congress of the Australian Society of Anaesthetists and won second place in the prestigious Gilbert Troup award.

Further analyses are planned, with the potential to highlight potential health impacts of early antibiotic exposure in neonates. We continue to build evidence to support a risk-based approach to antibiotic prophylaxis for caesarean section, which would target those most at risk of infection.

Through the additional time awarded in the Fellowship, I have strengthened existing research relationships and forged new ones, leading to additional projects, publications and grant success. Our Department of Anaesthesia and Perioperative Medicine at the RBWH has increased research activity, participating in collaborative projects with the Department of Surgery and the Women's and Newborns Services.

Through undertaking additional engagements facilitated by the Clinician Research Fellowship, I was successful in applying for the position of Mayne Professor of Critical Care, (Head of Discipline) at The University of Queensland Medical School. Securing that role has allowed me to expand my leadership experience and ensures I can pursue my personal research goals and continue capacity building with clinician researchers within Metro North and south-east Queensland.

Reflections

Time is the most valuable commodity to a Clinician Researcher and this Metro North Fellowship was certainly the gift of time. Scheduled research days allowed me to build collaborations at the Metro North, national and international level. As well as undertaking my own research, I was available to guide others and initiate projects within the specialty of anaesthesia as well as interdisciplinary projects. I have supervised PhD students, colleagues in anaesthesia, junior doctors and medical students.

My research highlights the double-edged sword of clinical practice guidelines. Once practices are cited in guidelines, it becomes increasingly difficult for clinicians to question these practices and to reassess their efficacy. Routine antibiotic prophylaxis has become standard of care prior to all cesarean deliveries. This is for good reason, to reduce surgical site infection in the mothers. However, researchers have acknowledged since that recommendation was made, that we don't know the full impact of these antibiotics on the neonate. To maintain excellence in clinical care, clinicians must constantly re-evaluate embedded practices, to ensure they are still meeting the needs of our patients.

Our collaboration with Associate Professor Severine Navarro of the QIMR Berghofer, is allowing us to undertake detailed evaluations of the impact of these antibiotics on the breastmilk and amniotic fluid of mothers and the gastrointestinal microbiome of the infants. Our results will inform the focused prevention of surgical site infection, potentially by applying a risk-stratified approach to antibiotic prophylaxis.

Key Fellowship Publications

- Eley VA, Navarro SN, Martin E, Amoako A, Hartel G, Woods C, Lu Y, Lipman J, Roberts J, Tang M, Callaway L. Cefazolin versus placebo for surgical antibiotic prophylaxis in low-risk cesarean delivery: a feasibility blinded randomized controlled trial. *BMC Pregnancy and Childbirth* 2025
- Moore J, Navarro S, McCarthy K, Rashid R, Phipps S, Amoako A, Callaway L, Eley VA. State of the art: Intrapartum antibiotics in Cesarean section, the infant microbiota and allergic diseases. *Acta Obstetrica et Gynecologica Scandinavica* 2023
- Eley VA, Hasanin A, Landau R, Benhamou D, Mercier F, Bouvet L. Antibiotic prophylaxis in obstetric care: is universal administration warranted? *Anaesthesia Critical Care and Pain Medicine* 2023 (Editorial)

Key Fellowship Presentations

- Australian Society of Anaesthetists National Scientific Congress Canberra 2-5th October 2025. Pre-incision cefazolin significantly and negatively impacts breast-milk microbiome compared to placebo after cesarean delivery. Second place Gilbert Troup Award
- Annual Scientific Meeting of the Royal Australian and New Zealand College of Obstetricians and Gynaecologists, Wellington, October 2024. Eley V, Navarro SN, Martin E, Amoako A, Hartel G, Woods C, Lu Y, Lipman J, Roberts J, Tang M, Callaway L. Cefazolin versus placebo for surgical antibiotic prophylaxis in low-risk cesarean delivery: a feasibility blinded randomized controlled trial
- Indoanesthesia, Jakarta, February 2023. Invited Speaker. Prophylactic antibiotics for caesarean section; Pros and Cons

Selected funding that has arisen during the Fellowship

- ANZCA Clinical Trials Network Pilot Grant (CIA) - \$10,000 (AUD). International multicentre study: Inadequate neuraxial anaesthesia and post-natal mental health.
- ANZCA Project Grant (CIA) - \$63,483 (AUD). Nebulised fentanyl for labour pain – a pharmacokinetic and feasibility study.
- Ferring Pharmaceuticals Research Grant (CIA) - \$50,000 (AUD). Effect of pre-delivery antibiotics on the neonatal intestinal microbiome and allergy onset.
- Metro-North Collaborative Research Grant (CIA) - \$50,000 (AUD). Effect of pre-delivery antibiotics on the neonatal intestinal microbiome and allergy onset. Intravenous Cefazolin v Placebo before elective caesarean section: RCT Feasibility Study.
- Children's Hospital Foundation Early Career Researcher Project Grant (CIA)- \$50,000 (AUD). Do pre-delivery antibiotics affect the neonatal microbiome and immune system? Intravenous Cefazolin v Placebo before elective caesarean section: RCT Feasibility Study.

Key Publications arising from Collaborations and Mentoring

- Charles EA, Carter H, Stanford S, Blake L, Eley VA, Carvalho B, Sultan P, Kua J, O'Carroll J. Patient reported pain during cesarean delivery: A systematic review and meta-analysis. *Anesthesiology* 2025
- Tognolini A, Liu X, Pandey S, Roberts J, Wallis S, Jackson D, Eley VA. Dosing optimisation of intravenous lidocaine in patients with class 1–3 obesity by population pharmacokinetic analysis. *Anaesthesia* 2025
- Sin JCK, Tabah A, Campher M, Laupland K, Eley VA. The Effect of Dexmedetomidine on Post-Anaesthesia Care Unit Discharge and Recovery: A Systematic Review and Meta-Analysis. *Anesthesia and Analgesia* 2022