

Project Title	CHANGING TRENDS OF POSTNATAL STEROID AND LONG-TERM NEURODEVELOPMENTAL OUTCOMES IN PREMATURE INFANTS WITH BRONCHOPULMONARY DYSPLASIA
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Lead discipline (please select one)

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| <input type="checkbox"/> Nursing and Midwifery | <input type="checkbox"/> Health Economics |
| <input type="checkbox"/> Allied Health | <input type="checkbox"/> Biostatistics |
| <input checked="" type="checkbox"/> Medicine | <input type="checkbox"/> Value-based Healthcare |
| <input type="checkbox"/> Pre-clinical | <input type="checkbox"/> Epidemiology |
| <input type="checkbox"/> Health Policy | <input type="checkbox"/> Other |

Outline of the project 250 words max

The administration of corticosteroids to premature infants has been proven to be useful in the treatment and prevention of bronchopulmonary dysplasia (BPD). However, significant concerns have been raised regarding the long-term side effects of postnatal corticosteroids, in particular neurodevelopmental outcomes with early treatment. Harmful effects include neurotoxicity, potentiation of neurodegeneration and impairment of immune function and healing.

Previously, it seems that the most profound adverse effects associated postnatal corticosteroids have been when treatment has begun within the first couple of days post-delivery. Emerging data from the DART trial does not indicate a strong association with the use of low-dose dexamethasone after the first week of life in mechanically ventilated preterm babies and long-term morbidity.

Since the late 1990s there has been a significant reduction in the use of postnatal steroids in the treatment of premature babies at risk of BPD in the ACT and NSW most probably due to considerable doubt about long-term safety in terms of neurological development.

The purpose of this study is to establish whether there has been a change in the neurodevelopmental outcomes of premature babies born less than 29 weeks in the ACT and NSW with BPD. The outcome of this study will further inform us regarding the prevalence of BPD and associated outcomes.

Proposed research methods

Study Design and Data Sources

This study is a regional retrospective cohort study comparing the use of postnatal steroid and associated neurodevelopmental outcomes from 2007 to 2017. The data will be obtained from Neonatal Intensive Care Units (NICUS) Network (10 NICUs in ACT and NSW).

Outcome Measures:

The primary outcome measure for this study is moderate/severe functional disability at 2-3 years of age, corrected for prematurity, defined as:

- *Moderate functional disability:* developmental delay (GMDS-GQ or BSIDII-MDI between 2 and 3 SD below the mean), moderate cerebral palsy (able to walk with the assistance of aids), sensorineural or conductive deafness (requiring amplification with bilateral hearing aids or unilateral/bilateral cochlear implant);
- *Severe functional disability:* developmental delay (GMDS-GQ or BSIDII-MDI 3 or more SD below the mean), bilateral blindness (visual acuity of <6/60 in the better eye), or severe cerebral palsy (unable to walk with the assistance of aids).

Analysis Plan:

Analyses will be performed using SPSS version 27.0. The χ^2 test and t-test were used where appropriate. The analysis will be conducted following 2 steps: bi-variate and multivariate. The bi-variate analysis will examine differences in the postnatal steroid use and other antenatal, perinatal and postnatal baseline characteristics between the two study epochs. From the bi-variate analysis we will then select those significant at $p < 0.05$ to be included in the multivariate analysis using the stepwise multiple logistic regression elimination method based on likelihood ratio with entry and removal criteria of $p < 0.05$ and $p > 0.10$ respectively. We will use difference-in-differences analysis technique to differentiate the effects of the “reduced postnatal steroid use” on cerebral palsy and other main outcome variables from the overall downward trend reductions in these outcomes evident over time. The statistical significance of the differences will be calculated using the standard errors (SE) of the differences. The level of statistical significance for all analyses will be set at $p < 0.05$ using 2-tailed comparisons. The significance level will not be changed when multiple comparisons are performed.

Role of the student:

1. Link 3 databases (Hospital; Follow-up- and Drug) using SPSS software
2. Code and recode the linked data using standard data dictionary
3. Work closely with the supervisor on preparing the data for analysis and running preliminary analysis under supervision
4. Experience of big databases will be a bonus

Preferred study discipline being undertaken by the student

Medicine.

Benefits to the student and to the department**To Student:**

Opportunity to experience clinical research-based activities in Neonatal Medicine under the guidance of clinician and researcher in the field

To the Department:

The result of the study may impact or shed light on a controversial issue in Neonatal medicine. The result of the study will be shared with other NICU's through publication in medical media

Alignment with Government Research Priorities 100w max

This study aligns with the government research priority in health as it will lead to:

1. better models of health care and services that improve outcomes, reduce disparities for disadvantaged and vulnerable groups, increase efficiency and provide greater value for a given expenditure.
2. improved prediction, identification, tracking, prevention and management of emerging local and regional health threats.
3. effective technologies for individuals to manage their own health care, for example, using mobile apps, remote monitoring and online access to therapies

Department within ACT Health Directorate / Canberra Health Services where the student will be based

Department of Neonatology, Centenary Hospital for Women and Children, Canberra Hospital, Garran ACT 2605

Please submit form to preclinical.research@act.gov.au