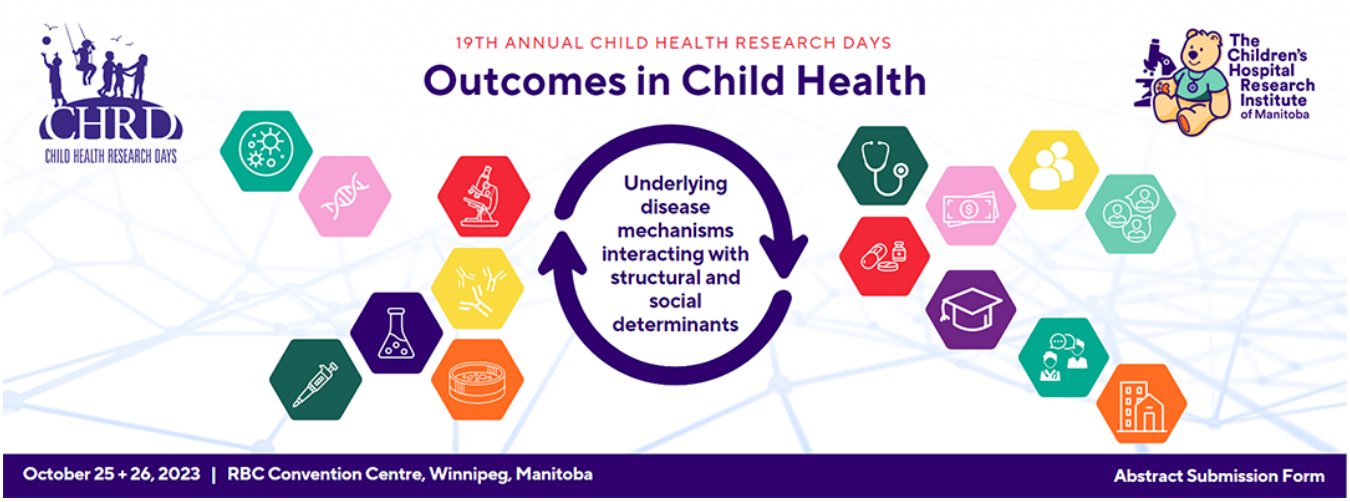

CHRD 2023: Abstract Submission Form

Submitter Name
Paul Houston

Presenter Name
Paul Houston

Presenter Status
Undergraduate Students

Research Category
Basic Science

Role in the project
Perform Experiments
Analyze Data
Write Abstract

Title
Investigating the neurodevelopmental effects of cigarette exposure in pregnancy and early life

Background
Smoking cigarettes during pregnancy increases an unborn child's risk of preterm birth, low birth weight, sudden infant death syndrome, and a host of cognitive and behavioural problems. Despite this, 30% of Canadian women still report smoking cigarettes while pregnant. The effects of cigarette smoke (CS) exposure on the developing brain are poorly understood, particularly the impact of CS exposure on neural stem cells during development.

Objective
This study aimed to measure the effects of CS exposure on the developing neocortex during pregnancy and after birth

Methods
Pregnant dams (BALB/c mice) were exposed to CS or room air twice daily, five days a week, using the InExpose inhalation exposure system for the complete duration of pregnancy. Histological analysis of pup cortices (4 CS exposed, 2 room air) was performed at postnatal day 3. To simulate second-hand CS exposure, a second group of pups underwent prenatal exposure and were indirectly exposed to cigarette smoke until weaning (3 CS exposed, 4 room air). Histological analysis was performed at 8-weeks. Brains were dissected, fixed in paraformaldehyde, embedded in OCT, and cryosectioned before mounting on slides. Nissl staining and immunohistochemistry were performed to identify cortical structures and cell types.

Results
Prenatal/postnatal CS exposure resulted in a significant overall decrease in cortical thickness in the primary somatosensory cortex, specifically in the upper layers (II-IV), as well as thinning in the auditory area (P=0.089). The prenatal exposure group also saw an overall thinning of the primary somatosensory area.

Conclusion
Both CS exposure groups saw an overall thinning of specific cortical regions. This indicates that CS exposure during pregnancy and early life may negatively affect neural stem cell lineage progression and/or maintenance of defined post-mitotic cells in the developing cortex.

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