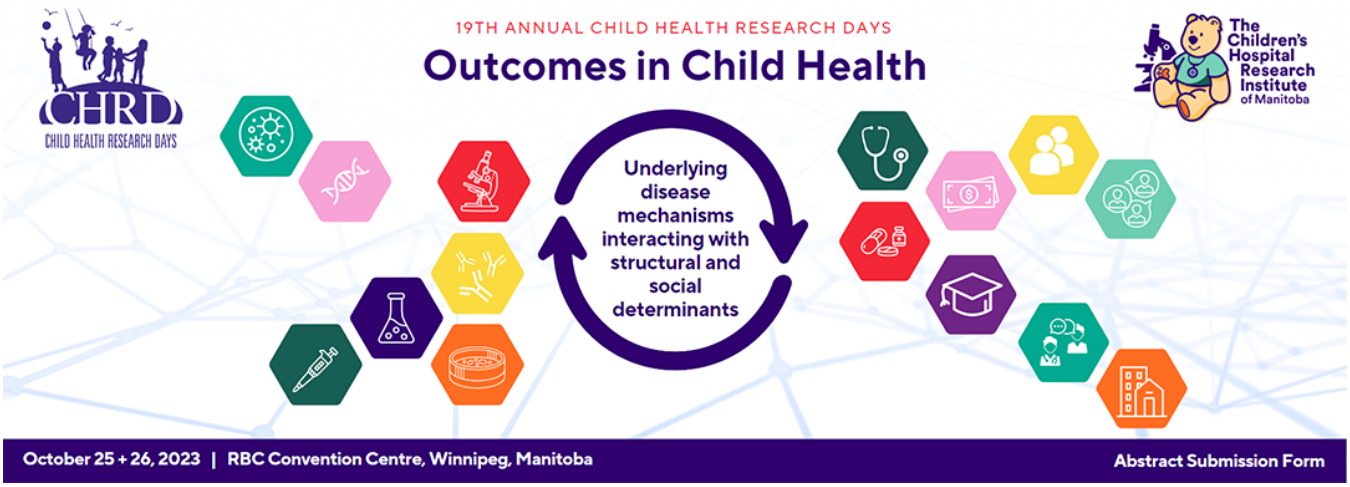

CHRD 2023: Abstract Submission Form

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Presenter Status
Non-Trainee

Research Category
Basic Science

Role in the project
Design
Perform Experiments
Analyze Data
Write Abstract

Title
Sex Determines Bronchodilator Effectiveness of Albuterol in a Murine Model of Allergic Asthma

Background
Globally 4.9 million children under the age of 18 have asthma, including 12% boys and 7% girls. Inhaled bronchodilators are primary therapeutic tools; however, some patients exhibit insensitivity.

Objective
In this study, we optimized a protocol to assess bronchodilator responsiveness in a murine model of allergic asthma and compared effects in male and female mice.

Methods
Female and male BALB/c mice (8 week) were challenged with intranasal house dust mite (HDM) (25µg/35µL) 5 days/week for 2 weeks. Mice were subjected to lung function testing (Scireq flexiVENT) with nebulized methacholine (Mch) (25, 50 and 100mg/mL) alone or after albuterol (0.1mg/mL).

Results
Percent increase of bronchoconstriction in total lung resistance (Rrs) with Mch alone from baseline by 25, 50 and 100 mg/mL was increased in females by 72, 81 and 85% compared to 62, 70 and 72% in male mice. Percent inhibition of bronchoconstriction by albuterol was evident, as it prevented the increase in Rrs caused by 25, 50 and 100mg/mL Mch, by 55, 52 and 47%, in female mice. In contrast, albuterol improved Rrs by 20, 8 and 9%, respectively in male mice. Similarly, albuterol reduced Newtonian resistance – a measure of airway reactivity by 46, 31 and 8 %, in females, but was without effect in male

mice. A similar pattern was seen for measures of small airway function (tissue damping) and lung stiffness, with albuterol reducing responses to all concentration of Mch by more than 50-60% in female mice.

Conclusion
Albuterol improves overall lung function in allergen challenged mice. There is a sex-dependent response to albuterol, being significantly greater in female mice. These findings indicate that sex is a determinant of bronchodilator response in murine models of allergic asthma.

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