



## **Exploring Low Cotinine Levels as a Biomarker of Tobacco Use and Dietary Intake**

Jaclyn Parks (Simon Fraser University)

Asthma Canada - AllerGen Goran-Enhoring Graduate Student Research Award

Supervisor: Tim Takaro

*Jaclyn Parks, MSc student at Simon Fraser University, is investigating indoor environmental exposures in early life as a predictor of childhood asthma and wheeze.*

*Her current project assessed nicotine metabolites as biomarkers of environmental tobacco smoke exposure and explores external exposures that make be influencing the relationship between smoke exposure, cotinine, and poor health outcomes in early life. She hopes that the findings of this work will inform future use of cotinine as a biomarker of tobacco smoke exposure, and contribute to the growing knowledge of early-onset asthma.*

### **Cotinine Concentrations, Tobacco Smoke Exposure, and Dietary Contribution in Canadian Children: An Analysis of Biomarker and Questionnaire Data in the Canadian Healthy Infant Longitudinal Development (CHILD) Study**

In the realm of childhood asthma research, there has been increasing interest in inflammatory exposures of risk. The significant drop in environmental tobacco smoke (ETS) exposure seen amongst the Canadian population, particularly those who are pregnant, is reason to revisit our understanding of ETS and health effects, as well as

the concept of dietary nicotine contribution. The CHILD Study serves as a unique opportunity to explore the concept of dietary contributions to cotinine because of its relatively low level of detection in relation to other studies that analyze cotinine concentrations. In addition, the Canadian Healthy Infant Longitudinal Development (CHILD) study population has lower maternal and environmental smoking rates relative to the general population, allowing us to look into the future of the downward trend of smoking in Canada.

Generally, those with concentrations of nicotine metabolites have seen a detrimental relationship to intermediate endpoints for asthma (wheeze and pulmonary function abnormalities) and allergy. That said, there are some nicotine-including vegetables that can contribute small but detectable level of cotinine. It has been found that a diet high in antioxidant foods, and breast milk from a mother eating a diet high in antioxidant, anti-inflammatory foods, can be protective against childhood asthma. In this case, cotinine from vegetable intake may be a marker for reduced asthma and allergy risk rather than of the increased risk of asthma and allergy from smoking-related cotinine levels, and the intake of an anti-inflammatory diet may influence the responsiveness of the developing respiratory system to ETS.

If those with less environmental smoke exposure and more vegetable intake have a lower risk of asthma and its intermediate health outcomes than those with similar cotinine levels and less vegetable intake, our understanding of cotinine and hydroxycotinine as biomarkers of asthma and allergy risk will need to change. This study will work to answer this question using a combination of questionnaire, urine sample, and clinical assessment from the CHILD Study.

The anticipated significance of this study would be a modification in how we interpret nicotine metabolites as biomarkers of environmental tobacco smoke exposure and what external exposures may be influencing the relationship between smoke exposure, cotinine, and poor health outcomes. This research project will allow a better understanding of how our biomarker data on nicotine metabolites should be considered and interpreted by future environmental health researchers.

### **About Jaclyn Parks**

Jaclyn Parks completed a Bachelor of Science (with Distinction) in Population and Quantitative Health from Simon Fraser University in 2016, and has continued her work in the Faculty of Health Sciences as a Research Assistant for Dr. Takaro for the past three years. This work has primarily been done with data from the CHILD Study to assess inflammatory exposures within the home, with a focus on cleaning products, and has allowed her to present at national and international conferences, as well as university research events.

Through her non-academic work in acute care, long-term care and recreation settings, Jaclyn has seen the effects of asthma first-hand, and is passionate about chronic disease prevention and management.

She is pursuing a career that combines exciting new research, program development, and knowledge translation, allowing people and communities to become engaged stakeholders in the health and well-being of themselves and of their community. She believes that environmental health links to all health matters, and has an interest in chronic disease management, health literacy, and climate change resilience and action.