

CANADIAN HEALTHY INFANT LONGITUDINAL DEVELOPMENT (CHILD) STUDY

CHILD Study Overview

- 1) The largest hands-on birth cohort study to have ever been conducted in Canada involving over 3,500 Canadian children and their families
- 2) A large pool of **early-life human genetics, epigenetics and microbiome data**. In 2012, *Time Magazine* called microbiome research “one of the fastest rising fields of medical research.”
- 3) A source of “big data” and a systems biology platform complemented by environmental data regarding exposures, stress, nutrition and lifestyle.
- 4) A **national effort** involving 4 provinces (B.C., Alberta, Manitoba, Ontario), over 40 researchers across disciplines and over 100 students and research staff.
- 5) An **international effort** linking with birth cohorts across the world.
- 6) By 2018, the CHILD Study will deliver **critical** information on:
 - links between immune development and infant microbiome, host genetics, allergies, eczema, prenatal psychosocial and demographic factors
 - role of viruses and genetics on lung health
 - relationship between food consumption in pregnancy and infant food allergy
 - relationship between infant diet and food allergy
 - impact of food, allergen and mould exposures on wheeze, dermatitis and asthma
 - impact of phthalate exposure in early life on the development of allergic disease
 - role of sleep on obesity and neurodevelopment
 - link between psychosocial factors and asthma outcomes
 - importance of the presence or absence of pets and other siblings on the development of asthma and allergies
- 7) Findings will influence **medical practice, parenting choices, consumer product regulations and policy development**—from building codes and household purchasing behaviours to decisions about childbirth and delivery, diet, breastfeeding, cleaning products used in homes, owning a family pet, and dealing with stress.
- 8) The CHILD Study **data repository** is a valuable current and future Canadian resource and will provide a wealth of information, not only informing studies of asthma and allergy, but also many other chronic diseases and aspects of health relevant for Canadian infants and children.

How more than
3,000 Canadian children are helping us find ways to prevent **asthma, allergies and other diseases.**

RATIONALE

In her 2008 report, “Reaching for the Top,” Dr. Kellie Leitch called for a federally-funded large longitudinal birth cohort study in which multiple environmental and other exposures are rigorously assessed and health status carefully monitored throughout childhood (page 3: [“Reaching for the Top”](#)).

- the CHILD Study is important to Canadians:
 - 1 in 3 Canadians is directly affected by allergic disease
 - 3 million Canadians suffer from asthma
 - 21,000 Canadians die each year due to air pollution
 - 50% of Canadian households are directly or indirectly affected by food allergies
 - 7.5% of Canadians self-report at least one food allergy

BENEFITS

- a groundbreaking prospective study that follows children over a period of years to evaluate the impact of genetics and environmental factors on health and disease outcomes
- the CHILD Study will help to point the way to prevent and control disease based on “personalized” gene-environment interactions
- investigates how the early childhood environment can interact with genetics to impact allergies, asthma and other chronic diseases.
- a key tool for understanding the effects of the environment on children’s health, and the epidemic of asthma, allergy and many other chronic diseases of later childhood and adulthood in Canada.
- potential impact similar to the Framingham Heart Study (Framingham, US) or the Dunedin Multidisciplinary Health and Development Research study (Dunedin, NZ)

The CHILD Study requires support and funding now, and beyond 2019 when AllerGen reaches the end of its NCE mandate.

With sustained funding, researchers will follow this cohort into later childhood and even adulthood, and the CHILD Study will endure as an ongoing research platform for ideas, discoveries, treatment, diagnoses, public policy, guidelines and prevention.

BACKGROUND

- the **largest** hands-on birth cohort study to have ever been conducted in Canada
- currently involves **3,259 Canadian families** (as at Nov. 5, 2014), over 40 Canadian researchers/scientists, and over 100 healthcare professionals, research staff, technicians, volunteers, and students across the country
- **721 families in Edmonton**, Alberta (Minister Rona Ambrose’s home riding is Edmonton Spruce Grove) participate in the study
- oldest children in the CHILD Study are five years old; youngest are approaching their second birthday
- mothers recruited during second trimester of pregnancy and families carefully monitored until babies are five years old

- **pan-Canadian** study involving 4 provinces: British Columbia (Vancouver, urban), Alberta (Edmonton, urban), Manitoba (Winnipeg, urban / Morden and Winkler, rural) and Ontario (Toronto, urban)
- ethnically, environmentally, culturally and socioeconomically diverse participants
- first scientific findings published in 2013 and 2014 in high-impact journals (*Canadian Medical Association Journal*, *Allergy*, *Asthma & Clinical Immunology Journal*) and received international media attention.
- a wealth of data has been collected for analysis and **five-year health outcomes** are becoming available
- launched in 2008 with \$12 million from AllerGen NCE Inc. and the Canadian Institutes of Health Research (CIHR)
- study also supported by Health Canada, Environment Canada, Canada Mortgage and Housing Corporation and the Childhood Asthma Foundation
- study investigates how the early childhood environment can interact with genetics to determine the development of allergies, asthma and other chronic diseases
- each child and its respective home environment is assessed by collecting detailed housing, dietary and socioeconomic information, dust from homes, and biological samples such as breast milk, blood from parents and children, and children’s urine, feces and nasal secretions
- links biological measures with other components, including clinical testing, environmental assessments and questionnaire responses
- **early findings** from the CHILD Study:
 - early indications of wheezing and sensitization in first year of life—15% have skin test response to allergens
 - babies born by cesarean section had lower levels of a type of gut bacteria found in babies born vaginally (at 3 months)
 - babies born by elective cesarean section still had differences in their gut bacteria at 12 months compared to babies born vaginally, but the difference was reduced if they were breastfed
 - partial and extended breastfeeding influences the microbiome (gut bacteria) to protect against early childhood overweight (at 12 months)
 - 99% of Canadian children have been exposed to at least one phthalate plasticizer by three months of age; several more exposures occur during the first three years of life
 - 45% of Canadian newborns were exposed to antibiotics during the perinatal period

By 2017, the study will have collected more than 500,000 questionnaire responses and over 600,000 biological samples that will be available to scientists for decades.