

## HQP Profile—Diana Lefebvre

### Taking care of CHILD—actually, more like 3,500 children

It's a typical day in Dr. Diana Lefebvre's office, which means the urgent emails—the ones with exclamation marks in the subject line—are piling up in her inbox and a grant application is sitting on her desk. She'll get to it all later, after she answers a call from a scientist hoping to get blood samples for his new research project.



**Dr. Diana Lefebvre, Research Manager  
CHILD Study**

As the research manager for Canada's CHILD Study (CHILD), Dr. Lefebvre doesn't just wear many hats; on most days she wears one on top of the other. Her responsibilities include, among others: managing research staff, juggling finances, coordinating ethics approvals, helping to write grant applications and reports for funders, handling requests for biological samples and data, and communicating with the frontline coordinators and researchers who work directly with Canadian families enrolled in the study. "Actually, there's no such thing as a typical day," Dr. Lefebvre says. "The only thing I can predict about each day is that I'll be incredibly busy."

Technically a birth cohort study, CHILD has followed 3,500 Canadian children since before birth, with an eye to linking a child's early-life exposures to his or her health and development later on. Parents have completed detailed questionnaires about their lives and lifestyle since the second trimester of pregnancy, while the children have been undergoing physical assessments and providing samples of their blood, urine and feces for researchers to analyze.

The national study has four research centres—in Vancouver, Edmonton, Manitoba, and Toronto—and involves over 75 physicians, researchers, trainees and research staff. Dr. Lefebvre oversees the sites from the study's National Coordinating Centre at St. Joseph's Health Centre in Hamilton, Ontario, though she's in daily contact with people at all the sites, giving

her the sense that she's "travelling back and forth across the country every day."

"It's an exceptional scientific study," Dr. Lefebvre says of CHILD, which was launched in 2008. "Our oldest participating children are turning nine years old and the youngest are now turning five. By following these kids, our researchers have discovered links between early childhood exposures and the risk of asthma, allergies and obesity, and will potentially uncover early childhood links to more chronic conditions that develop later in life."

What links have been found so far? A few examples: A mother's fruit consumption during pregnancy can boost her baby's cognitive development at age one, and her intake of artificial sweeteners during pregnancy can increase her child's risk of obesity. Breathing in traffic pollution increases a baby's risk of developing allergies. A specific mix of gut bacteria in the first 100 days of life protects children against asthma, while the presence of furry pets in the household helps to train a baby's immune system.

#### Master troubleshooter

Running a long, multi-centre project like CHILD is a tricky business. No sooner is one challenge resolved than another surfaces. Indeed, Dr. Lefebvre sees the bulk of her job as "anticipating problems before they arise." Challenges like a

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CHILD Study family. Photo courtesy of CHILD Vancouver site.

CHILD family moving overseas: will they still be able to complete the questionnaires? Or a research assistant who leaves just before a new data collection phase begins. Or a researcher who needs blood or urine samples... yesterday.

How did she get the job in the first place? Dr. Lefebvre calls it serendipity, but her trajectory was dictated by more than chance.

After graduating with a bachelor's degree in biology from McGill University, Dr. Lefebvre worked for six years as a lab technician. All the while, she watched graduate students come and go through the lab on their way to an advanced degree. "At one point I realized: I can do that," she says.

Dr. Lefebvre completed her doctoral studies in three and a half years. Her molecular endocrinology thesis examined the role of oxytocin receptors in preterm labour. Her first post-doctoral appointment took her to Mt. Sinai Hospital in Toronto, her second to a protein kinase lab in Vancouver. Back in Toronto, she put in eight more years running a research lab, followed by two years at the Dana Farber Cancer Research Institute in Boston and a year at the Ontario Institute for Cancer Research (OICR) in Toronto.

By the time the CHILD Study research manager position came up, Dr. Lefebvre had a solid resume and, perhaps more importantly, the confidence to manage a complex research project. "Good thing I had that broad base," she reflects. "I'm pretty sure it helped me get the job."

### Why families stay

Keeping participants in the study is especially vital in a long-term project like CHILD. Families may be asked to stay involved for a decade or longer, participating in interviews, undergoing physical examinations and clinical testing, and completing questionnaires. In CHILD, 92% of the original cohort is still taking part eight years on, which is an uncommonly high figure for a cohort trial, according to Dr. Lefebvre.

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That, and the special relationships that CHILD research coordinators have developed with the families at each centre. “Our senior coordinators—Linda Warner, Joyce Chikuma, Rishma Chooniedass, and Aimée Dubeau—know that if families are happy and engaged, they’ll stay on, and if they stay on, the study can continue to generate important health findings as the children grow up.”

In addition to regular newsletters, “the staff members send birthday cards to the children and get on the phone to talk to parents. The personal touch makes all the difference.” The families, in turn, “send us pictures of their kids, which we include in the newsletters—with their consent, of course.”

## Keeping it real

So what is so special about CHILD? For one thing, the participants reflect the general population: some rich, some poor, some healthy, some less so. Many cohort trials focus on populations that are at risk for a particular medical condition, but CHILD provides a snapshot of what’s happening in the real world, making it an ideal study for unearthing Canada-wide health patterns.

CHILD also stands out in terms of the scope and detail of its participant questionnaires. When it comes to nutrition, for example, parents report on every aspect of a mom’s prenatal diet, their child’s diet, including breastfeeding, infant formula, and, as the children get older, the introduction of solid foods, and diversity and amount of specific foods consumed. Detailed health and medication questionnaires form the foundation of the study, not only for the children, but for the parents as well.

Parents also provide detailed information about their indoor and outdoor home environments: What kinds of pets do they have? Do they live near a highway? Is the house made of wood, brick or stone? How many people live in the home? Is the furniture made of wood, leather or plastic? What is the “emotional temperature” inside the home? How much time do kids spend watching TV or playing video games? Since the study began, parents have filled out over 400 questionnaires, some of them spanning 10 or more pages. “It’s not just the number of questions that stands out, but their level of detail,” says Dr. Lefebvre.

Not surprisingly, collecting such copious amounts of data poses ongoing challenges. To ease the burden on families,

CHILD has created a web-based portal allowing parents to complete questionnaires from their homes. “Some families move overseas yet they continue to send in their questionnaires, and they come for clinic visits when they are back in the country,” says Dr. Lefebvre. “That’s dedication.”

## Staying afloat

The rich storehouse of CHILD data helps not only the researchers directly involved with the study but also other scientists, in Canada and elsewhere, who can mine the data to answer their own unique research questions. Dr. Lefebvre is usually the first point of contact for investigators requesting access to the data and biological samples that have been painstakingly collected over the years. To date, CHILD samples and data have fuelled 41 research grants with funding valued at over \$39 million. As Dr. Lefebvre sees it, “CHILD has become a scaffold to support dozens of new projects.”

While AllerGen and the Canadian Institutes of Health Research (CIHR) have supported CHILD for the past eight years, Dr. Lefebvre sees continued funding as the study’s biggest ongoing challenge. “Understandably, most politicians have short-term priorities, but CHILD is a marathon. To conduct a world-class study like this, you need funds to support experienced staff, store the 500,000 biological samples, and conduct complex tests and assessments. Funders don’t always appreciate that.” Which means the CHILD team can never put the funding issue to bed. “We’re always writing the next grant application and the one after that.”

For all of the study’s accomplishments to date, Dr. Lefebvre maintains that CHILD’s greatest promise still lies ahead. “We want to know what happens to the CHILD kids as they reach puberty,” she says. How will they do in school? How does screen time affect their health and development? Will the kids who have asthma now outgrow it later? Will new cases pop up? Will any of the kids will start showing signs of obesity and cardiovascular disease?

“Many adult diseases start in childhood, and CHILD gives us an opportunity to find out why and how. Having this incredible Canadian resource that can predict and possibly prevent chronic disease—we absolutely have to keep it going.” **A**