

HEALTH CARE: EARLY DIAGNOSIS

Did she miss a chance to boost her chances?

Renee Stocks, who has a rare medical disorder, is a poster child for Canada's patchwork-quilt approach to newborn screening

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OTTAWA -- Four-year-old Renee Stocks races down the front hall of her family's home in the Ottawa suburb of Nepean and leaps into her mother's arms. She has a burst of energy from the medication she takes four times a day. But 20 minutes later, she slumps in front of the television, complaining that her legs hurt.

With her big brown eyes and mop of blond hair, Renee appears perfectly healthy. She can spell her name, count to 20 and play computer games. But she is facing an uncertain future.

Renee has a rare medical disorder called glutaric acidemia type II, or more simply GA II, which prevents her from producing enzymes crucial to breaking down dietary fats and proteins into forms easily handled by the body. Without these enzymes, fats and proteins build up, causing damage to the brain, liver, lungs and kidneys.

"If we don't stop it, she can lose her ability to talk, her ability to speak, her ability to breathe, her ability to swallow, all of those things," said her mother, Brenda Stocks. "How can I sit by every day and wait and watch and not know without doing something? That's a mother's worst nightmare."



Four-year-old Renee Stocks, who has the rare disorder glutaric acidemia type II, hugs her mom in their Ottawa home this month. *(Bill Grimshaw for The Globe and Mail)*

Renee is a poster child for Canada's patchwork-quilt approach to newborn screening. She was born on Oct. 9, 2003, three years before Ontario expanded its screening for rare genetic disorders from just two diseases to 27. At the time, Saskatchewan was the only province that tested newborns for her disease.

Had Renee been tested at birth, she could have been put on a strict diet that would have reduced her chances of serious health problems later in life, said Frank Frerman, a professor of pediatrics at the University of Colorado Health Sciences Center. He and a colleague at the university, Stephen Goodman, discovered the defective protein that causes GA II.

The number of cases of GA II referred to the university has tripled to as many as 10 a month during the past decade as jurisdictions in the United States and elsewhere expand their newborn screening, Prof. Frerman said. He said many babies respond well to high doses of the vitamin riboflavin in addition to a diet low in protein and fat.

"If you can relieve this problem with something as simple as vitamin therapy, boy, you're way ahead," he said.

Renee was not diagnosed with GA II until she was three years old - 2½ years after the first clinical signs of her illness appeared.

Today, she has a feeding tube inserted into her stomach and eats a specially prepared diet that costs \$1,000 a month.

The Canadian Organization for Rare Disorders is pushing for a national strategy to address the conditions that it says affect one in every 2,000 births, or in the case of GA II, one in every 100,000.

"The best doctor, the best nurse, the best mom, the best dad doesn't have a fighting chance if there are no signs or symptoms," said John Adams, a parent advocate for expanded newborn screening and a volunteer at the organization. "If you're not looking for it in an organized and coherent way, you're going to miss some cases."

Mr. Adams's 21-year-son was one of the lucky ones. He has a rare disorder, phenylketonuria, or PKU, that can cause mental retardation. It was detected through newborn screening and he is in good health.

The number of tests performed varies wildly from province to province, leaving Canada lagging behind other developed countries.

Saskatchewan and Ontario come closest to following recommendations by the American College of Medical Genetics in 2005 that 29 tests be performed routinely on all babies.

Saskatchewan expanded its program in 2001 to 19 of the 29 diseases from the two for which most provinces had tested since the 1960s - PKU and congenital hypothyroidism.

Ontario expanded its newborn screening program following a report in 2005 from the province's Ombudsman, André Marin, who said too many children were needlessly dying and being left permanently disabled.

British Columbia still tests for only four conditions. It is considering expanding the list to 12 diseases. Alberta is the only province that tests newborns for cystic fibrosis. Ontario and Saskatchewan will begin doing so in 2008.

The College of Medical Genetics said screening tests are necessary because the damage can begin before the first signs of illness appear. A machine developed in the 1990s can identify more than three dozen congenital diseases from a few drops of blood extracted from a newborn's heel. If detected by these tests, which cost about \$50, most of these conditions can be readily treated.

The college recommends testing for a core group of 29 diseases where treatment is available. However, GA II falls into that group of diseases where there is no consensus in the medical community on the most effective treatment, so it is not among the 29.

"There are people who would say that if you cannot treat a disease with absolute certainty then you shouldn't screen for it," Dr. Goodman said. "I don't happen to buy the argument."

In Canada, only three other provinces in addition to Saskatchewan - Nova Scotia, New Brunswick and Prince Edward Island - test for GA II.

But Ontario and six other provinces test for glutaric acidemia type I, which picks up the presence of GA II, Dr. Goodman said.

Of the 141,000 babies screened last year at the Children's Hospital of Eastern Ontario in Ottawa, which screens all the babies in Ontario, an estimated 200 were diagnosed with a rare disease, equivalent to about one in every 700 births, said Pranesh Chakraborty, director of the lab. No instances of GA II were found. He said it is a difficult balancing act deciding which diseases to include in the screening program.

With Renee, her parents had no idea anything was wrong with her until she became seriously ill at six months. She was rushed to the hospital by ambulance after vomiting and a high fever that left her slumped over in her baby seat. She spent 72 days in intensive care on life support.

"We were passed from medical service to medical service, trying to find out what was wrong with her," Ms. Stocks said.

On Renee's third birthday, following a series of tests, including organ and muscle biopsies, the family got the bad news when Dr. Goodman in Colorado confirmed that Renee had GA II.

Renee's language development was behind her peers but she has since caught up with the help of speech therapy. However, she is taught at home instead of attending junior kindergarten classes at school, because the risk of coming in contact with a sick child is too high.

The Stocks have had to refinance the family home to help pay for Renee's special diet and put other plans on hold, including a summer vacation and finishing the basement. The high carbohydrate diet prepared by the Hospital for Sick Children in Toronto includes fake chicken fingers and macaroni and cheese. To restrict the amount of amino acids, which Renee cannot break down, the diet adds components of protein individually. Ms. Stocks said the federal government recently agreed to pick up the tab for the diet.

But her big worry is how the family will pay for the experimental drug Renee started taking on Dec. 1. The drug, known as L-3-Hydroxybutyrate, was developed by a Belgian doctor, Johan Van Hove, who now works at the Colorado lab, and costs \$200 a day. It is known as an orphan drug because the cost is not covered by private insurance plans or the Ontario government. It is also well beyond the reach of what her husband, Andrew, earns as a paramedic. Local residents recently held a fundraiser for the family, raising \$14,200, enough for a two-month supply of the drug.

"I'm not bitter at the government for not funding this because I understand that there has to be checks and balances in place," Ms. Stocks said. "But it is our only hope."

How screening differs by province

The American College of Medical Genetics recommends newborns be screened for 29 conditions, all easy to detect and treat. Tandem mass spectrometry, a new technology introduced in the 1990s, makes it possible to screen for several dozen conditions at once. Previously, these conditions had to be looked for one at a time, an expensive and time-consuming process. Many are treatable with a change of diet or medication, if caught early. All provinces provide some form of newborn screening but the extent varies widely.

CONDITION

CF CH GA-I GALT HB S/S HEAR MCAD PKU OTHER

PROVINCE

B.C.	X	X			X	X	0
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Alta.	X	X	X			X	X	14
Man.		X		X			X	2
Sask.		X	X	X		X	X	14
Ont.		X	X	X	X	X	X	20
Que.		X	X				X	8
N.S.		X	X			X	X	6
N.B.		X	X		X	X	X	6
PEI		X	X		X	X	X	6
Nfld.		X				X	X	2

CF: Cystic fibrosis

CH: Congenital hypothyroidism

GA-I: Glutaric acidemia type I

GALT: Transferase deficient galactosemia (classical)

HB S/S: Sickle cell anemia

HEAR: Hearing screening

MCAD: Medium-chain acyl-CoA dehydrogenase deficiency

PKU: Phenylketonuria/hyperphenylalaninemia

Source: Canadian Organization for Rare Disorders