

Could a 'metabolic fingerprint' identify premature babies in developing countries?

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What if a blood spot from a newborn could identify vulnerable children at birth? One of the biggest vulnerabilities is being born premature. Canadian researchers are hoping that metabolic markers found in blood spots routinely collected from infant heel pricks as part of newborn screening will help determine gestational age in newborns and lead to better care for infants in developing countries.

"We are looking for a metabolic fingerprint that could help estimate gestational age from specific molecules found in blood," said Dr. Kumanan Wilson, an internal medicine specialist, senior scientist and Chair in Public Health Innovation at The Ottawa Hospital and professor at the University of Ottawa. "Knowing the gestational age of a newborn can guide assessments for that child and help determine the best post-natal care."

Preterm birth is one of the leading causes of death and illness in newborns around the world. In many low-income countries, the gestational age of a newborn is unknown. Prenatal care, including ultrasound to determine fetal age and development, is often unavailable and mothers do not always know the date of conception.

Scientists from The Ottawa Hospital, the Children's Hospital of Eastern Ontario (CHEO) and the University of Ottawa are leading an international team that will test whether a calculator that has successfully determined gestational age in Canada can be used in developing countries.

"I am very pleased to use newborn screening expertise in Ontario to help children in other countries, especially lower income countries," said Dr. Pranesh Chakraborty, Executive Director and Chief Medical Officer, Newborn Screening Ontario and clinical investigator, CHEO Research Institute and associate professor at the University of Ottawa. "We are also excited about the potential to expand this approach beyond prematurity. This research will create the tools and methods to explore this for other important childhood health issues both in Canada and abroad."

Preliminary results

The project recently received US \$1.2 million from the Gates Foundation through the Grand Challenges Explorations program. This Phase II funding will allow the team to expand a successful pilot project, which received \$100,000 in Phase I funding in 2014.

[The pilot project](#) involved analyzing routinely collected data from more than 400,000 babies born in Ontario, Canada. The researchers found that the levels of certain metabolic compounds in the blood of newborns, combined with sex and birth weight, could determine the gestational age of newborns within 1 to 2 weeks. This research was published in the *American Journal of Obstetrics & Gynecology*.

Phase II funding will allow the research team to refine and validate this gestational age calculator on a global scale. Working in partnership with scientists and clinicians in China, the Philippines, Zambia, Bangladesh, Canada and the United States, the team will pilot the method in the field, using heel prick blood samples from newborns in Bangladesh and Zambia. Dr. Steven Hawken, scientist at The Ottawa Hospital and assistant professor at the University of Ottawa, will validate the calculator using [newborn screening](#) databases from China and the Philippines.

If successful, the researchers hope their calculator will allow families and health-care workers to provide specialized care to premature babies, including vaccines. Knowing that a baby is premature would also allow for customized developmental assessments, which could lead to faster identification of other health problems. The [gestational age](#) calculator could also help monitor preterm birth at a population level and measure the success of programs to reduce this.

Provided by Children's Hospital of Eastern Ontario Research Institute

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