

Evidence grows for iron deficiency screening in childhood

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Two recent studies from the University of Toronto and the Hospital for Sick Children are adding to mounting evidence that Canadians would benefit from more screening for iron deficiency in early childhood.

One study details the known association between [iron levels](#) and cognitive function, and identifies a new threshold in blood tests that could guide more effective clinical intervention. The other is the first health-economic analysis of potential screening programs for [iron](#) deficiency in Canada, which shows that both targeted and universal screening would be cost-effective.

Iron is critical for growth and development, yet experts estimate that over 10 percent of young children in developed countries are iron deficient. Canada has no recommendation on screening, which is left to the discretion of physicians and parents.

The current studies, published in the *Journal of Pediatrics* and *CMAJ Open*, respectively, build on the researchers' [previous work](#) that showed screening with a ferritin [blood test](#) can detect iron deficiency earlier than the more standard hemoglobin test, which only reveals a deficiency that has progressed to anemia.

"We found a fairly strong association between serum ferritin and cognitive function, but also that the association peaks and does not improve beyond a certain level," says Patricia Parkin, a professor of paediatrics at U of T and a clinician-investigator at SickKids. "That threshold is important for clinicians, because it enables them to make a quick and accurate decision on further tests or therapies."

Parkin and her colleagues identified a cut-off of 17 micrograms of serum ferritin per litre, which is five micrograms higher than the current level that clinicians use in practice. Five micrograms may sound small, but the researchers found the increase in cognition associated with a five-unit rise in ferritin is similar to the increase in IQ associated with a 1000-gram increase in [birth weight](#), in a comparison with data from another study.

The results were based on screening tests in more than 700 participants in TARGeT Kids!, the largest research cohort of young Canadian children recruited in primary care.

Parkin says that while the new cut-off is not definitive, she hopes it will open up discussion about the suitability of the current number in clinical practice. She also hopes that more practitioners in the U.S. will consider measuring ferritin in addition to a hemoglobin test, which they typically administer to children at the age of one.

"A serum ferritin test with a well defined threshold would identify far more children in the U.S. and prevent many more from developing a chronic deficiency or anemia," says Parkin, who is also the research director of the Paediatric Outcomes Research Team at SickKids and a scientist in the [Joannah & Brian Lawson Centre for Child Nutrition](#) at U of T.

In Canada, a key question for researchers and policy-makers has been the potential cost of new screening programs. The health-economic study in *CMAJ Open* offers an answer on the possible cost of screening for iron deficiency in childhood through a comparison of costs for universal screening, targeted screening for high-risk groups, and no screening (the current standard of care).

"We found that, across the board, screening would be cost-effective," says Sarah Carsley, an assistant professor at U of T's [Dalla Lana School of Public Health](#) who completed her Ph.D. in the Parkin lab. "Moreover, universal screening was almost a third more cost-effective than targeted screening, although both were clearly cost-effective, using standard willingness-to-pay thresholds."

Carsley and her colleagues estimated health care costs and quality-adjusted life years to arrive at an "incremental cost-effectiveness ratio,"

which for both types of screening and with conservative estimates was well below the level at which an intervention would be deemed too expensive.

Children in Ontario typically see a primary care physician for an in-depth, enhanced well-baby visit at 18 months of age. Parkin, Carsley and others have [previously suggested](#) that this might be an ideal time to discuss screening with a [serum ferritin test](#), which is inexpensive and available in most labs.

One drawback with the ferritin and hemoglobin tests is that they require a small blood draw, which many children find upsetting. Parkin says more research is needed on whether parents would feel the value of screening outweighs the upset of a blood draw, and whether family physicians and pediatricians would embrace [screening](#) based on the existing evidence.

Meanwhile, parents can reduce the risk of iron deficiency by providing children with a diet rich in iron and in vitamin C (which helps iron absorption), and by limiting cow's milk to two cups a day, as it can inhibit iron absorption and may reduce consumption of other healthy foods. Those worried about iron deficiency can discuss risk factors and options with health-care providers, before birth and in the first year of life.

Treatment for [iron deficiency](#) is very effective, and can include dietary advice and daily supplements in pill or liquid form. "The fix is pretty easy," says Parkin. "It's short in duration and inexpensive, which should drive interest in a broader discussion about how we can better address this issue. Iron deficiency has been an under-recognized public health problem for too long."

More information: Patricia C. Parkin et al. Association between

Serum Ferritin and Cognitive Function in Early Childhood, *The Journal of Pediatrics* (2019). [DOI: 10.1016/j.jpeds.2019.09.051](https://doi.org/10.1016/j.jpeds.2019.09.051)

Sarah Carsley et al. Iron deficiency screening for children at 18 months: a cost-utility analysis, *CMAJ Open* (2019). [DOI: 10.9778/cmajo.20190084](https://doi.org/10.9778/cmajo.20190084)

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