Increasing children's iron intake

I have been concerned about iron intake because of the high incidence of iron deficiency in Aboriginal children in our area. After reading Stanley Zlotkin's article,[1] I thought it might be a good idea to recommend that parents start giving their children Cheerios (General Mills) on a regular basis. According to Table 4 of Zlotkin's article[1] this breakfast cereal has 8.1 mg of iron in a 30-g serving, which is almost 100% of the recommended dietary allowance (RDA) of this mineral (as illustrated in Table 2 of the same article). I then went to my own children's cereal cupboard, where I found a box of Shreddies (Post, division of Kraft Foods); the side panel of the box stated that there was 29% of the RDA of iron in a 30-g serving. These numbers were very encouraging, especially given Zlotkin's strong endorsement of these ready-to-eat cereals.[1]

Unfortunately, it all sounded too good to be true. Many of my pediatric patients are already eating Count Chocula (General Mills), which has a stated 45% of the iron RDA per 30-g serving, or similar cereals, yet they are still anemic. A quick check in a standard nutritional text[2] revealed that the form of iron that is typically added to cereals is poorly absorbed. Flour and cereals are "fortified" with finely powdered metallic iron, which must be oxidized to ferric (trivalent) iron and then reduced to ferrous (divalent) iron before it can be absorbed in the gastrointestinal tract. The food industry is well aware that this added iron is poorly absorbed.[2] I would be interested in Zlotkin's comments on the bioavailability of iron in flour and cereals.

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Competing interests: None declared.

[The author and a colleague respond:]

We thank John O'Brien for his interest in the article on iron deficiency anemia in young people[1] and for his appropriate questions concerning the bioavailability and hence absorption of iron from commercially fortified cereals. This issue has recently been thoroughly reviewed.[2]

Iron bioavailability depends on the iron compound used, the level of fortification of the food consumed, the iron status of the consumer, and the presence of inhibitors and enhancers of iron absorption in both the cereal and the overall diet. Elemental iron powders have been used for the commercial fortification of cereals for more than 50 years and continue to be the most widely used form of iron for this purpose. The 3 main classes of elemental iron powders are iron reduced by hydrogen or carbon monoxide, electrolytic iron and carbonyl iron. These compounds have the advantage of causing few if any changes in the colour or flavour of prepared cereals. However, the absorption of elemental iron powders is lower than that of other fortificants such as ferrous sulfate and is often less predictable because of variations in particle size, particle distribution, shape and density. Of the 3 main types of elemental iron powders commercially available, hydrogen-reduced iron is the most commonly used in ready-to-eat breakfast cereals.

A recently completed double-blind randomized trial[3] involving 20 nonanemic female volunteers examined absorption of iron from Corn Flakes (Kel-

logg's; fortified with hydrogen-reduced iron) given as part of a typical Western breakfast. Geometric mean iron absorption from the fortified cereal was 14.1%. If we use this absorption value and consider, for example, Cheerios (General Mills; 8.1 mg iron per 30-g serving) or Count Chocula (General Mills; 4.5 mg iron per serving), a single serving of Cheerios will provide 1.1 mg and of Count Chocula 0.63 mg of "absorbed" iron. These quantities meet or exceed the recommended amount of absorbed iron for children up to 8 years of age.[4] Thus, when used on a regular basis, ready-to-eat breakfast cereals are a reasonably good source of bioavailable iron.

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Competing interests: Dr. Zlotkin has been an occasional consultant to General Mills Canada.

Considering colorectal screening

I was disappointed by the tone of Richard Schabas's commentary on colorectal screening.[1] Phrases such as "It is now time to act" do not suggest thoughtful weighing of the risks involved with widespread screening initiatives.

The recommendations of the National Committee on Colorectal Cancer Screening[2] clearly describe the potential benefits and risks of screening but also emphasize the need for adequate informed consent. For the family physician, this means ensuring that the patient knows the motivation for the test, giving advice on diet and the test procedure, explaining the concepts of false-negative and false-positive results and their rates, and clarifying the need for colonoscopic follow-up of positive results and its associated morbidity. Anything less would be inadequate in the current Canadian legal environment.

The time required for a family doctor to provide such education, follow-up and counselling can be significant. Physician resources are finite, and widespread deployment of fecal occult blood screening could be undertaken only at the expense of other medical services. Specifically, measurable increases in family physician workload, surgical consultations and colonoscopic waiting lists are predictable.

Evidence-based analysis cannot effectively weigh important factors such as patient anxiety and longer waiting lists arising out of false-positive results. We fail our patients by concluding that what is not easily quantified is irrelevant.

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The report of the Canadian Coordinating Office for Health Technology Assessment[1] (CCOHTA) cited in Richard Schabas's commentary on colorectal cancer screening[2] was not a full assessment but a feasibility study based on a limited literature search. CCOHTA undertakes such feasibility studies to determine whether to proceed with a full assessment. In this case, CCOHTA did not proceed, and the feasibility study was published electronically as a quick guide to current assessment information.

We would urge caution before the initiation of a national population-based screening program for people at average risk of colorectal cancer, such as the biennial program (beginning at age 50 years and ending at age 74 years) recommended by the National Committee on Colorectal Cancer Screening (NCCCS).[3] Participants should be fully informed of the risks and benefits, as outlined below.

- Screening for colorectal cancer is likely to have only a modest clinical benefit, as Schabas notes.[2] The NCCCS study[3] estimated that for people at average risk, 1300 fecal occult blood tests and 127 colonoscopies are needed to prevent 1 colorectal cancer death, that the risk of dying from colorectal cancer is 1 in 64 for people 50 to 74 years of age (1 in 345 for those 50 to 59 years of age) if they do not participate in a screening program, that the chance of improved survival is 1 in 204 if they participate fully in screening from 50 to 74 years of age and undertake any indicated follow-up procedures (1 in 1000 for those 50 to 59 years of age) and that only 1.75 life years are gained for each case detected.
- People at average risk who are unlikely to benefit from screening are asked to accept significant risks.[4] The rates of complications from follow-up colonoscopy described in the NCCCS study[3] (0.17% for perforations, 0.03% for hemorrhage and 0.02% for death) could very well be underestimated for various reasons,[5] including screening by operators who are less experienced than those in the studies on which these rates are based. More recent data from 6 prospective studies[5] suggest that the rate of perforation and hemorrhage combined could be double (0.4%) the rate given in the NCCCS report.[3] In addition, risk of