

# Does Iron-Deficiency Anemia Affect Child Development?

ABBREVIATIONS. IDA, iron deficiency anemia, RCTs, randomized, controlled trials.

The global prevalence of iron-deficiency anemia (IDA) is extremely high. The possibility that IDA affects children's development is therefore a serious public health problem and has implications not only for individuals' development but also for national development in countries with high prevalence. Although infants with mild-to-moderate IDA have poor development both concurrently and in later childhood,<sup>1,2</sup> a causal link is not well-established.<sup>3</sup>

A major problem is that IDA is associated with many socioeconomic disadvantages<sup>1,2</sup> that are likely to have independent effects on children's development. Therefore randomized, controlled trials (RCTs) of iron supplementation are essential to allow causal inferences. Trials of treating IDA indicate whether the effects are remediable whereas preventive trials provide the strongest evidence of causality.

Surprisingly few RCTs of iron supplementation have been conducted in infants. Previous treatment trials have often lacked randomized designs and failed to find benefits; however, 2 RCTs found benefits. One was extremely small<sup>4</sup> and the other involved children highly infected with parasites and very low initial levels of hemoglobin.<sup>5</sup> Preventive trials have had small samples and inadequate measures of IDA and/or been confounded by other dietary components.<sup>3</sup>

The study by Lozoff and colleagues<sup>6</sup> comprises the largest preventive trial of iron supplementation in infants to date. Furthermore, the investigators used adequate measures of iron status and more comprehensive developmental measures than previous studies. They found no effect on the children's scores on the Bayley Scales or a test of recognition memory but a benefit was found in speed of information-processing, behavior, and the age of creeping. As planned, the study should have provided definitive answers. It is a tragedy and a classic example of false economy that their funding was reduced and the investigators had to abandon their randomized design and resort to a quasi-experimental approach. The low- and high-iron groups were separated by time and consumed different amounts of cows' milk. We, therefore, cannot infer with confidence that iron deficiency caused these small differences. Furthermore, as in nearly all studies, high-risk infants (low birth weight or IDA at 6 months) were excluded but

may be the most vulnerable and form a large proportion of children in low resource countries.

There is consensus that severe anemia is harmful, and these findings increase the suspicion that IDA affects children's development. However, considering the expense and difficulties of large treatment programs, there remains an urgent need to know whether mild to moderate anemia affects children's development and to what extent. The authors correctly call for more RCTs.

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## Child and Adolescent Immunizations: New Recommendations, New Standards, New Opportunities

ABBREVIATIONS. VFC, Vaccines for Children (Program); NVAC, National Vaccine Advisory Committee; AAP, American Academy of Pediatrics, VIS, vaccine information statements.

In the movie *Spiderman*, Peter Parker's guardian, Uncle Ben, tells him, "With great power there must also come great responsibility." Over the past decade, pediatricians, family physicians, nurse practitioners, physician assistants, office nurses, and the entire primary care staff have been handed increased power and responsibility. The power to protect our children from vaccine-preventable diseases and the responsibility to ensure that every child receives all necessary vaccines in a safe and effective manner.

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