

# What vitamins and minerals should be given to breastfed and bottle-fed infants?

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### EVIDENCE-BASED ANSWER

Breastfed and formula-fed infants should receive intramuscular vitamin K soon after birth to prevent classic hemorrhagic disease of the newborn (strength of recommendation [SOR]: **A**, systematic review of controlled trials).

Routine iron supplementation for all term, healthy, breastfed infants is not proven to be safe or necessary. Formula-fed infants should be consuming formula that contains 10 to 12 mg/L of iron (SOR: **A**, 2 small randomized controlled trials).

Healthy, term infants at the highest risk for vitamin D deficiency are those who are breastfeed-

ing and have dark skin or little sun exposure (SOR: **B**, 2 case series). Infants consuming at least 500 mL of fortified formula each day do not need additional supplementation. A recommendation of vitamin D supplementation of 200 IU/day should be explained to all families, particularly those at highest risk for nutritional rickets (SOR: **C**, expert opinion). Infants older than 6 months should receive an oral fluoride supplement of 0.25 mg if they consume fluids with a water fluoride level less than 0.3 ppm (SOR: **B**, poor-quality randomized controlled trials).

### CLINICAL COMMENTARY

#### Encourage breastfeeding; keep vitamin D and iron needs in mind

Physicians can help mothers give the best nutrition to their children by encouraging breastfeeding. In most cases, no supplements are required. From this information, I will keep in mind the shorter hours of daylight in the winter and the skin tone of the child, as this may warrant discussion of vitamin D supplementation in infants who are

exclusively breastfed. Knowing the recommendations for iron supplementation will help physicians when counseling parents regarding formula choices. Lastly, vitamin K has become part of the routine protocol at delivery and should not be a factor for any child.

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### ■ Evidence summary

**Vitamin K.** The Cochrane Database of Systematic Reviews looked at randomized trials to determine the effectiveness of vitamin K prophylaxis in preventing classic hemorrhagic disease of the newborn.<sup>1</sup> Two trials demonstrated that a single dose of intramuscular vitamin K reduced clinical bleeding at 1 to 7 days. Oral vitamin K has been studied for its effects on biochemical indices of coagulation status, but not for its clinical effects on bleeding. A single oral vitamin K dose at birth resulted in lower vitamin K levels at 2 weeks and 1 month,

compared with a single dose of intramuscular vitamin K at birth.

**Iron.** The iron status of exclusively breastfed infants vs formula-fed infants was evaluated in a nonrandomized cohort study.<sup>2</sup> Twenty-five healthy, breastfed infants and 15 healthy infants fed high-iron formula were followed for 9 months. No differences in mean hemoglobin values were seen at any age between the 2 groups.

A randomized controlled trial investigated the efficacy of daily and weekly iron supplementation on iron status in 67

## FAST TRACK

## Routine iron supplementation for term, healthy, breastfed infants is not safe or necessary

exclusively breastfed infants.<sup>3</sup> At age 4 months the infants were randomized into 3 groups: daily iron, weekly iron, and no iron. No significant differences were detected in the mean weight, height, and head circumference among the groups. The mean values of hemoglobin, mean corpuscular volume, serum iron, and transferrin saturation were similar among all the groups at ages 5, 6, and 7 months.

A randomized, double-blind, placebo-controlled iron supplementation trial involved 214 exclusively breastfed infants from 4 to 9 months of age in Sweden and Honduras.<sup>4</sup> Iron supplementation did not affect weight gain in the groups, but length gain from ages 4 to 9 months was less in the iron-supplemented groups than in the placebo group ( $P < .05$  for placebo vs Fe). This effect was greater in Sweden, and only existed in Honduras for infants aged 4 to 6 months with initial mean Hgb of at least 11 mg/dL. The researchers conclude that iron supplementation may pose risks in iron-replete infants.

**Vitamin D.** A case review of nutritional rickets in North Carolina between 1990 and 1999 found that all 30 patients identified were breastfed African American infants.<sup>5</sup> Among the 166 published cases of rickets in the US from 1986 to 2003, 83% were categorized as African American or black. Ninety-six percent of cases were breastfed.<sup>6</sup>

**Fluoride.** No infant under 6 months of age should receive fluoride supplementation to prevent dental caries because of the risk of enamel fluorosis.<sup>7</sup> A systematic review that evaluated fluoride for preventing dental caries in primary teeth in children aged <5 years found 6 small clinical trials. Although the studies were not of high quality, they consistently showed that the incidence of caries was reduced by 32% to 72%.<sup>8</sup>

### Recommendations from others

The American Academy of Pediatrics (AAP) recommends that:

- All newborns receive vitamin K as an intramuscular dose of 0.5 to 1 mg<sup>9</sup>

- All full-term appropriate-for-gestational-age breastfed infants receive a supplemental source of iron starting at 4 to 6 months of age, preferably from iron-enriched complementary foods. Infants should only receive formula fortified with 10 to 12 mg/L for weaning or supplementing breastmilk<sup>10</sup>
- All infants, including those exclusively breastfed, should have a minimum intake of 200 IU of vitamin D per day starting in the first 2 months of life.

The National Academy of Sciences recommends 200 IU of vitamin D daily for all normal infants, children, and adolescents.<sup>11</sup>

The US Preventative Services Task Force (USPSTF) states evidence is insufficient to recommend for or against the routine use of iron supplements for healthy infants.<sup>12</sup>

The USPSTF, AAP, and the American Academy of Pediatric Dentistry recommends 0.25 mg/d of fluoride supplement for children ages 6 months to 3 years if the fluoride concentration in the community drinking water is less than 0.3 ppm. Older children may benefit from supplements if the fluoride concentration is between 0.3 and 0.6 ppm.<sup>13</sup>

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