

2020 Dietary Guidelines Advisory Committee: DRAFT - Part D. Chapter 6: Nutrients from Dietary Supplements During Infancy and Toddlerhood

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This chapter includes questions examined by the
Birth to 24 Months Subcommittee

DietaryGuidelines.gov

LIST OF QUESTIONS

1. What is the relationship between iron from supplements consumed during infancy and toddlerhood and growth, size, and body composition?
2. What is the relationship between vitamin D from supplements consumed during infancy and toddlerhood and bone health?

METHODOLOGY

- Both questions were answered using new NESR systematic reviews.

**Final protocols and draft conclusion statements available at [DietaryGuidelines.gov](https://www.dietaryguidelines.gov)
Part D. Chapter 6: Nutrients from Dietary Supplements During Infancy and Toddlerhood
2020 Dietary Guidelines Advisory Committee: *Meeting on Draft Report***

REVIEW OF THE SCIENCE

- 16 articles were included in the NESR systematic reviews.
- Conclusion statements were graded from Moderate to Grade Not Assignable.
- Most evidence consisted of RCTs.
- For the iron question, all of the evidence focused on growth and/or size outcomes (not body composition) in infants and toddlers (not older ages)
- For the vitamin D question, most of the evidence focused on bone mass and biomarkers of bone metabolism (not rickets or fracture) in infants and toddlers (not older ages)

DISCUSSION

Introduction to iron supplementation

- American Academy of Pediatrics (AAP, 2010) recommends iron supplementation for breastfed infants from 4 months until iron-containing complementary foods are introduced
- Other authoritative organizations (e.g., Canada, UK, New Zealand) recommend against ***routine*** supplementation of breastfed infants, and instead recommend supplementation for high-risk groups or those with a diagnosis of iron deficiency; some also note the importance of delayed umbilical cord clamping
- “Double-edged sword”?
 - Iron is important to prevent anemia and support development, and supplementation can be highly beneficial for iron-deficient infants
 - However, excess iron intake among iron-replete infants may be harmful

DISCUSSION

Key findings: iron and growth

- Results of review:
 - **No positive effects, and possibly negative effects, on growth** when iron supplements were given to breastfed infants younger than age 9 months, compared with infants not given iron or given a placebo
- The potentially adverse effects of iron supplements on growth of infants and children younger than age 2 years are **consistent with other findings**:
 - In a meta-analysis of children 4-24 months from both high-income and lower-income countries, infants and children randomized to receive iron supplements had less length gain and weight gain than those who did not receive iron (Pasricha 2013 – *Lancet Glob Health*)

DISCUSSION

Potential mechanisms: iron and growth

- **Potential mechanisms** by which iron may adversely affect growth among iron-replete children:
 - increased gastrointestinal illness
 - impaired zinc or copper status
 - pro-oxidative or pro-inflammatory effects
 - disturbances in the gut microbiota
- Before 6 months of age, iron homeostasis appears to be absent/limited → supplemental iron likely to be absorbed even if iron-replete
- After 6 months, infants appear to be able to downregulate iron absorption appropriately

SUMMARY:

Draft Evidence-Based Advice to USDA and HHS related to iron from supplements during infancy and toddlerhood

Routine iron supplementation of all breastfed infants may not be advisable. An alternative could be to screen for iron deficiency among higher-risk infants <6 months, and provide iron supplements only to those with iron deficiency.

After 6 months, other sources of iron can be provided, such as iron-rich or iron-fortified complementary foods, so iron supplementation is generally not needed.

DISCUSSION

Introduction to vitamin D supplementation

- Vitamin D deficiency most likely in those living at high latitudes, with dark skin, with inadequate sunlight exposure.
- AI for infants is 400 IU/day; RDA for children 1y+ is 600 IU/day.
- Average human milk vitamin D concentration is only ~20 IU/L.
- Maternal high-dose vitamin D supplementation may increase human milk concentration, but risks/benefits not fully evaluated.
- AAP recommends vitamin D supplements for breastfed infants:
 - “Because human milk contains inadequate amounts of vitamin D (unless the lactating mother is taking supplements of approximately 6,000 IU/d), breastfed and partially breastfed infants should be supplemented with **400 IU of vitamin D per day** beginning in the first few days of life and continued until the infant has been weaned and is drinking at least 1 L/d of vitamin D-fortified infant formula or cow milk”.

DISCUSSION

Key findings: vitamin D and bone health

- Existing recommendations regarding vitamin D supplementation during infancy are based on a body of evidence compiled largely before 2000, the starting date for this review.
- The limited evidence available since 2000 suggests that doses higher than 400 IU per day (the current AAP recommendation for infants) do not result in differences in biomarkers of bone metabolism.

SUMMARY:

Draft Evidence-Based Advice to USDA and HHS related to vitamin D from supplements during infancy and toddlerhood

At this time, the evidence does not provide a basis for recommending vitamin D supplementation above 400 IU per day during infancy.

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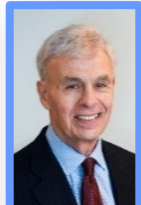
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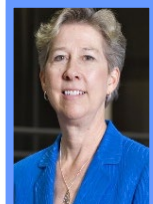
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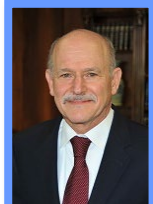
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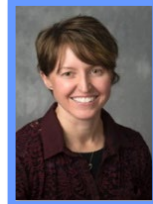
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