INTRODUCTION

Improving young children’s diets in South Asia contributes to the prevention of all forms of malnutrition, including micronutrient deficiencies, and is an important component of efforts to achieve the global nutrition targets of the World Health Assembly (WHA) and Sustainable Development Goals (SDGs).

After a child’s first six months, nutrient requirements exceed what breastmilk alone can provide. To meet growing nutrient needs and ensure proper growth and development, along with breastfeeding, infants should be introduced to nutrient-dense solid, semi-solid, or soft foods at six months of age (1,2). Despite this, only 14% of infants and young children aged 6–23 months in Pakistan consume a diet meeting the minimum recommended number of food groups (3), increasing their risk of micronutrient deficiencies and growth faltering.

This brief summarizes the main food and micronutrient gaps identified from a Comprehensive Nutrient Gap Assessment (CONGA) conducted for Pakistan as part of a landscape analysis on complementary feeding in South Asia, and key policy and programmatic implications.

WHY IS CONGA NEEDED?

Identification of nutrient and dietary gaps during the complementary feeding period is essential to inform policies and programs designed to improve child health and nutrition. However, nationally representative data specific to young children are usually only available for select nutrients and infrequently collected.

KEY MESSAGES

- Based on available evidence, **vitamin A, iron, folate, vitamin B₁₂, zinc, calcium, iodine, and vitamin D** are micronutrients of concern among young children in Pakistan.

- **More research** is required on other nutrients, which may also represent important gaps in young children’s diets in Pakistan.

- The national **food supply** is **lacking** in many essential **micronutrients**.

- The best food sources of micronutrients of concern in Pakistan are **chicken liver** (iron, vitamin A, zinc, folate, vitamin B₁₂), **beef liver** (vitamin A, iron, folate, vitamin B₁₂), **beef** (zinc, iron, vitamin B₁₂), **dark green leafy vegetables** (calcium, iron, vitamin A, folate), **dried beans** (iron, zinc, folate), **eggs** (vitamin A, zinc, folate, vitamin B₁₂), **dairy** (calcium, vitamin A, zinc, vitamin B₁₂), **chicken** (zinc, vitamin B₁₂), and **groundnuts** (zinc, folate).

- **In-depth research and triangulation of all available information** is needed to understand the primary barriers to consuming these foods.

- **Biofortification**, **fortification**, and **multi-micronutrient supplementation** can also help fill gaps for micronutrients of concern, particularly where food insecurity, social norms, palatability, and desirability make sufficient consumption from accessible diverse foods infeasible.

- Strategic actions to improve child diets will require engagement and intervention **across relevant systems** (food, social protection, health, and WASH) to address supply- and demand-side barriers.
Alternative sources of evidence can help fill data gaps, even if they are of lower quality, particularly when multiple sources point to the same nutrients of concern or dietary issues. Yet decision makers have little guidance on how to locate and interpret the evidence to identify the magnitude and significance of nutrient gaps in child diets, given the wide range of indicators used, diversity of data sources and population characteristics, and differences in severity of associated health outcomes.

A CONGA meets this need by collating the evidence and rating the burden of nutrient gaps and certainty of evidence. There are several other nutrients that may be limited in the diets of young children, including omega-3 fats (e.g., DHA) and specific essential amino acids (i.e., the quality of protein). The CONGA method can be extended in the future to these and other nutrients as more data becomes available.

**HOW DOES CONGA WORK?**

We reviewed and summarized findings from nationally representative and high-quality sub-national surveys, grey literature, and journal articles related to infant and young child feeding practices, micronutrient deficiencies, dietary intake, household consumption and expenditure, and the food supply. The evidence was reviewed to rate the burden of gap (none, low, moderate, or high) and certainty of available evidence (low, moderate, or high) for 11 micronutrients commonly lacking in young children’s diets. We then identified the most nutrient-dense, locally available food sources of key problem nutrients based on nutrient content and local availability, using local and United States Department of Agriculture (USDA) food composition tables and data on household food consumption and food prices in Pakistan.

**WHAT DID CONGA FIND IN PAKISTAN?**

Based on available evidence, micronutrients of concern during the complementary feeding period in Pakistan are vitamin A, iron, folate, vitamin B₁₂, zinc, calcium, and iodine (Table 1). The annex provides detailed evidence and respective references considered for all ratings. There is likely considerable geographic variation in nutrient gaps subnationally, which is not assessed. Consequences of deficiencies in micronutrients of concern and justifications for their ratings are summarized in brief below.

**Table 1.** Nutrient gaps and evidence ratings for children 6–23 months in Pakistan

<table>
<thead>
<tr>
<th>Gap burden</th>
<th>Vit A</th>
<th>Iron</th>
<th>Folate</th>
<th>Vit B₁₂</th>
<th>Zinc</th>
<th>Ca</th>
<th>Iodine</th>
<th>Vit B₁</th>
<th>Vit C</th>
<th>Niacin</th>
<th>Vit B₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Mod</td>
<td>Mod</td>
<td>Mod</td>
<td>Mod</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
<tr>
<td>Evidence certainty</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>Mod</td>
<td>Mod</td>
<td>Mod</td>
<td>Low</td>
<td>Low</td>
<td>Low</td>
</tr>
</tbody>
</table>

1. Micronutrients investigated via CONGA include iron, vitamin A, zinc, calcium, iodine, Vitamin B₁₂, thiamine, niacin, vitamin B₆, vitamin B₁, folate, and vitamin C.
2. Iron, zinc, iodine, vitamin A, calcium, folate, vitamin C, vitamin B₁₂, thiamine, niacin, and vitamin B₆.
3. Micronutrients of concern are those with at least a moderate burden gap and moderate certainty of evidence. There may also be other important nutrient gaps, but evidence is limited.
4. Ca, Calcium; Mod, Moderate; Vit, Vitamin.
Vitamin A
Vitamin A deficiency has severe consequences, even with mild deficiency, including night blindness, increased susceptibility to infections, and death (4). Data indicate low intake of vitamin A-rich foods during the complementary feeding period, and modeling studies suggest it is very difficult for young children to consume the recommended intake of vitamin A using locally available foods and feeding practices. Recent national estimates of vitamin A deficiency indicate a problem of severe public health significance for young children in Pakistan.

Iron
Iron deficiency is a primary cause of anemia and can result in cognitive impairment, decreased work productivity, and death (5). Data reveal low intake of iron-rich foods during the complementary feeding period, and modeling studies identify iron as a nutrient difficult for young children to consume in adequate quantities using locally available foods and feeding practices. A recent national survey indicates high prevalence of iron deficiency anemia and anemia in children.

Folate
Folate deficiency in infants and young children can have immediate and long-term consequences, including anemia, hindered brain development, and adult depression (6). Data indicate inadequate folate intake in children and inadequate availability in the food supply. A recent national survey indicates high prevalence of folate deficiency in young children.

Vitamin B₁₂
Vitamin B₁₂ deficiency in infants has immediate and long-term consequences including anemia, developmental regression, and depression during adulthood (6,7). Data indicate inadequate intake of foods rich in vitamin B₁₂ during the complementary feeding period. A recent national survey indicates moderate prevalence of vitamin B₁₂ deficiency in young children.

Zinc
Zinc deficiency in children is associated with poor health, increased risk of diarrhea, and impaired cognitive and motor development (8,9). Consumption and modeling data indicate low intake of zinc during the complementary feeding period. A recent national survey indicates moderate prevalence of zinc deficiency in children.

Calcium
Calcium deficiency increases risk of rickets, but the broader health implications of deficiency in young children are poorly understood (10). Modeling data indicate calcium needs are difficult for young children to meet using locally available foods and feeding practices, and a recent national survey indicates high prevalence of deficiency in women of reproductive age.

Iodine
Iodine deficiency has severe consequences, including growth and cognitive impairment, goiter, and death (11). Data reveal wide variation in use of iodized salt between provinces, and no data was available.
to indicate adequacy of iodization. A recent national survey indicates moderate prevalence of iodine deficiency in school-aged children and women of reproductive age.

Other micronutrients
The burden of the thiamine gap was rated low based on moderate certainty evidence. The burdens of vitamin C, niacin, and vitamin B₆ gaps were rated low based on low certainty evidence. More data is needed to generate higher evidence on the burden of these nutrient gaps in Pakistan. We did not assess the burden of the vitamin D gap, but recent national evidence suggests it is a large concern (12).

WHAT CAN BE DONE TO ADDRESS THESE GAPS?
Recommended actions to address each nutrient gap in Pakistan are summarized in Table 2. Strategic actions to improve child diets will require engagement and intervention across relevant systems (food, social protection, health, and WASH) to address both supply- and demand-side barriers. The best complementary food sources of micronutrients of concern are chicken liver (iron, vitamin A, zinc, folate, vitamin B₁₂), beef liver (vitamin A, iron, folate, vitamin B₁₂), beef (zinc, iron, vitamin B₁₂), dark green leafy vegetables (calcium, iron, vitamin A, folate), dried beans (iron, zinc, folate), eggs (vitamin A, zinc, folate, vitamin B₁₂), dairy (calcium, vitamin A, zinc, vitamin B₁₂), chicken (zinc, vitamin B₁₂), and groundnuts (zinc, folate) (Table 2). More research is needed to triangulate all available information to understand the primary barriers to consuming these foods, like limited availability, accessibility, affordability, or desirability. Biofortified and fortified foods (including fortified complementary foods), point-of-use fortification products like multi-micronutrient powders and targeted lipid-based nutrient supplements can also help fill nutrient gaps. Continued breastfeeding prevalence in Pakistan is high at one year of age but only 57% at age two years (3). Efforts to improve continued breastfeeding should be prioritized to help fill vitamin A, calcium, and iodine gaps. Improving the quality of pregnant and lactating women’s diets can also improve their children’s nutrition through improved birth outcomes, nutrient transfers at birth, and more nutrient-dense breast milk (13). While coverage of iodized salt is high, quality of salt iodization needs improvement. Behavioral aspects influencing feeding practices also need to be addressed.

Table 2. Recommended actions to address complementary feeding gaps in Pakistan

<table>
<thead>
<tr>
<th>Nutrient gap</th>
<th>Recommended actions to increase dietary intake</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>• Improve rates of continued breastfeeding.</td>
</tr>
<tr>
<td></td>
<td>• Assess and ensure availability, accessibility, affordability, and desirability of natural foods rich in vitamin A, including beef liver, chicken liver, orange/yellow fruits and vegetables, dark green leafy vegetables, eggs, dairy, and fish, as well as vitamin A-biofortified and fortified foods.</td>
</tr>
<tr>
<td></td>
<td>• Ensure adequate coverage and quality of large-scale vitamin A fortification.</td>
</tr>
<tr>
<td></td>
<td>• Consider multi-micronutrient powders and/or continued supplementation.</td>
</tr>
</tbody>
</table>

continued on next page
<table>
<thead>
<tr>
<th>Nutrient gap</th>
<th>Recommended actions to increase dietary intake</th>
</tr>
</thead>
</table>
| Iron         | • Assess and ensure availability, accessibility, affordability, and desirability of natural foods rich in iron, including chicken liver, beef liver, beef, dark green leafy vegetables, and lentils/chickpeas, as well as iron-biofortified and fortified foods.  
  • Ensure **adequate coverage** and **quality** of large-scale **iron fortification**.  
  • Consider **micronutrient powders** and/or **supplementation**.  
| Folate       | • Assess and ensure availability, accessibility, affordability, and desirability of natural foods rich in folate, including chicken liver, beef liver, lentils/chickpeas, dark green leafy vegetables, groundnuts, okra, eggs, and oranges, as well as folate-fortified foods.  
  • Ensure **adequate coverage** and **quality** of large-scale **folic acid fortification**.  
  • Consider **micronutrient powders** and/or **supplementation**.  
| Vitamin B₁₂ | • Assess and ensure availability, accessibility, affordability, and desirability of natural foods rich in vitamin B₁₂, including beef liver, chicken liver, fish, beef, eggs, dairy, and chicken, as well as vitamin B₁₂-fortified foods.  
  • Ensure **adequate coverage** and **quality** of large-scale **vitamin B₁₂ fortification**.  
  • Consider **micronutrient powders** and/or **supplementation**.  
| Zinc         | • Assess and ensure availability, accessibility, affordability, and desirability of natural foods rich in zinc, including beef, chicken liver, chicken, groundnuts, eggs, chickpeas, and yogurt, as well as zinc-biofortified and fortified foods.  
  • Ensure **adequate coverage** and **quality** of large-scale **zinc fortification**.  
  • Consider **micronutrient powders**.  
  • Ensure **adequate coverage** and **quality** of **zinc supplementation** for diarrhea treatment.  
| Calcium      | • Improve rates of **continued breastfeeding**.  
  • Assess and ensure availability, accessibility, affordability, and desirability of natural foods rich in calcium, including dark green leafy vegetables and dairy, as well as calcium-fortified foods.  

---

6 Some potential risks have been associated with supplemental iron in children with adequate iron status. Products with low iron doses may be more appropriate in this context.
<table>
<thead>
<tr>
<th>Nutrient gap</th>
<th>Recommended actions to increase dietary intake</th>
</tr>
</thead>
</table>
| **Calcium (continued)** | • Consider calcium-containing **micronutrient powders** and/or **supplementation**.  
• Collect **biochemical** and **dietary data** in young children to address evidence gaps. |
| **Iodine** | • Improve rates of **continued breastfeeding**.  
• Ensure availability of, access to, and use of **adequately iodized salt**. |

**CONCLUSION**

There is clear evidence of significant gaps in vitamin A, iron, folate, vitamin B₁₂, zinc, calcium, iodine, and vitamin D in young children’s diets during the complementary feeding period (6–23 months) in Pakistan. There may also be other important nutrient gaps, and there is likely subnational geographic variation in the magnitude of these gaps, but evidence is limited. The best food sources of micronutrients of concern that are relatively available in Pakistan are chicken liver, beef liver, beef, dark green leafy vegetables, dried beans, eggs, dairy, chicken, and groundnuts. These foods need to be available, accessible, affordable, and desirable as complementary foods to be consumed in adequate quantities by young children. Other approaches to fill gaps for micronutrients of concern should also be considered, including biofortification, fortification, and supplementation, particularly where food insecurity, prevailing social norms and feeding practices, palatability, and desirability make sufficient consumption from accessible diverse foods infeasible. Continued breastfeeding should be encouraged and can help young children consume enough vitamin A, calcium, and iodine.
REFERENCES


**Vitamin A**

**Biochemical data:** National vitamin A deficiency (serum retinol < 0.70 µmol/L) in children under 5 y was 52% (with 12% severe deficiency) in the 2018 NNS. This 2018 estimate represents only a slight decrease from the 54% prevalence found in the 2011 NNS (1,2).

**Dietary data:** 48% of children 6–23 mo consumed vitamin A-rich foods in the past 24 h nationally in the 2017/18 DHS (minimal increase from 45% in the 2012/13 DHS) (3,4).

**Diet modeling:** An Optifood analysis\(^8\) was conducted for children 6–23 mo in 12 districts in 2018. Vitamin A was identified as an APN\(^9\) for children 6–11 mo and an APN or PPN\(^10\) for children 12–23 m, depending on the province (5). A CotD analysis for children 12–23 mo in four districts in 2017 found that vitamin A was a particularly challenging nutrient need to meet for children 12–23 mo and lactating women using locally available foods in all areas studied (6).

**Food supply nutrient availability:** The amount of vitamin A available in the food supply was estimated to be inadequate for 6% of the national population in 2009 (7) and 11% of the national population in 2011 (8).

**Supplementation:** National vitamin A supplementation coverage for children 6–59 mo was 75% in the 2017/18 DHS (minimal increase from 72% in the 2012/13 DHS) (3,4).

---

**Iron**

**Biochemical data:** The 2011 NNS found that 44% of children under 5 y were iron deficient (ferritin < 12 ng/dL). Iron deficiency was not assessed in the 2018 NNS. However, the 2018 NNS found that prevalence of iron deficiency anemia in children under 5 y was 29% and prevalence of anemia in children under 5 y was 54% (down from 62% in the 2011 NNS) (1,2).

**Dietary data:** 38% of children 6–23 mo consumed iron-rich foods in the past 24 h nationally in the 2017/18 DHS (slight increase from 35% in the 2012/13 DHS). Fortified food consumption was < 20% in both 2012/13 and 2017/18 (3,4).

**Diet modeling:** The 2018 Optifood analysis in 12 districts identified iron as an APN for children 6–23 mo (5). The 2017 CotD analysis in four districts found that iron was a particularly challenging nutrient need to meet for children 12–23 mo, adolescent girls, and lactating women using locally available foods in all areas studied (6).

**Food supply nutrient availability:** The amount of iron available in the food supply was estimated to be inadequate for 94% of the national population in 2011 (8).

---

\(^7\) APN, Absolute Problem Nutrient; CotD, Cost of the Diet; DHS, Demographic and Health Survey; h, hours; Mod, Moderate; mo, months; NNS, National Nutrition Survey; PPN, Partial Problem Nutrient; WRA, women of reproductive age (15–49 years); y, years.

\(^8\) Optifood is a linear modeling tool that uses habitual dietary data to analyse the nutrients a population obtains from local diets and develop realistic food-based and non-food-based recommendations to optimize nutrient adequacy. The model also determines ‘problem nutrients’, for which recommended intakes are difficult to meet based on local food patterns.

\(^9\) An APN is where even the best-case scenario diet modelling did not achieve 100% of the recommended nutrient intake based on locally available foods.

\(^10\) A PPN is when 100% of RNI is reached in the best-case scenario modelling, but 70% of RNI is not reached in the worst-case scenario.
<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Burden Gap</th>
<th>Certainty Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Folate</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;12&lt;/sub&gt;</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Zinc</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Calcium</td>
<td>Moderate</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

**Folate**

**Biochemical data:** The 2018 NNS found national prevalence of folate deficiency (serum folate < 3 ng/ml) in children 6–59 mo to be 40% (unpublished data).

**Diet modeling:** The 2018 Optifood analysis in 12 districts identified folate as a PPN for children 6–11 mo and as either an APN or PPN for children 12–23 mo (depending on the province) (14). The 2017 CotD analysis in four districts did not identify folate as a challenging nutrient need to meet for children 12–23 using locally available foods in any area studied (6).

**Food supply nutrient availability:** The amount of folate available in the food supply was estimated to be inadequate for 85% of the national population in 2009 (7) and 39% of the national population in 2011 (8).

**Vitamin B<sub>12</sub>**

**Biochemical data:** The 2018 NNS found national prevalence of vitamin B<sub>12</sub> deficiency (serum B<sub>12</sub> < 191 pg/ml) in children 6–59 mo to be 25% (unpublished data).

**Dietary data:** Among breastfed children 6–23 mo, 13% consumed meat, fish or poultry, ~50% consumed dairy, and 29% consumed eggs in the past 24 h nationally in the 2017/18 DHS (with little change since the 2012/13 DHS). Estimates are similar for non-breastfed children, but consumption of eggs is higher (36%) (3,4).

**Diet modeling:** The 2018 Optifood analysis in 12 districts identified vitamin B<sub>12</sub> as adequately consumed by children 6–11 mo and a PPN for children 12–23 mo (4). The 2017 CotD analysis in four districts found that vitamin B<sub>12</sub> was a particularly challenging nutrient need to meet using locally available foods for children 12–23 mo and lactating women in all areas studied (6).

**Food supply nutrient availability:** The amount of vitamin B<sub>12</sub> available in the food supply was estimated to be inadequate for 12% of the national population in 2009 (7) and 13% of the national population in 2011 (8).

**Zinc**

**Biochemical data:** The 2018 NNS found national prevalence of zinc deficiency in children under 5 y to be 19% (a decrease from 39% in children under 5 y in the 2011 NNS) (1,2,9).

**Dietary data:** 13% of breastfed and non-breastfed children 6–23 mo consumed meat, fish, or poultry in the past 24 h nationally in the 2017/18 DHS (slight decreased from the 2012/13 DHS) (3,4).

**Diet modeling:** The 2018 Optifood analysis in 12 districts identified zinc as an APN for children 6–23 mo (5). The 2017 CotD analysis in four districts did not identify zinc as a limiting nutrient for children 12–23 mo (6).

**Food supply nutrient availability:** The amount of zinc available in the food supply was estimated to be inadequate for 39% of the national population in 2009 (7) and 42% of the national population in 2011 (8).

**Calcium**

**Biochemical data:** In 2018 NNS, prevalence of calcium deficiency in WRA was found to be 27% (a decrease from 59% and 52% prevalence found in pregnant and non-pregnant WRA, respectively, in the 2011 NNS) (1,2). No prevalence data was available for children.
### Calcium (continued)

<table>
<thead>
<tr>
<th>Dietary data:</th>
<th>35% of breastfed and 79% of non-breastfed children 6–23 mo consumed animal milk, respectively. And 9% of breastfed children and 12% of non-breastfed children 6–23 mo consumed other dairy foods in the past 24 h nationally in the 2017/18 DHS (3).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet modeling:</td>
<td>The 2018 Optifood analysis in 12 districts identified calcium was identified as a PPN for children 6–23 mo (5). The 2017 CotD analysis in four districts found that calcium was a particularly challenging nutrient need to meet using locally available foods for children 12–23 mo, adolescent girls and lactating women in all areas studied (6).</td>
</tr>
<tr>
<td>Food supply nutrient availability:</td>
<td>The amount of calcium available in the food supply was estimated to be inadequate for 18% of the national population in 2009 (7) and 7% of the national population in 2011 (8).</td>
</tr>
</tbody>
</table>

### Iodine

<table>
<thead>
<tr>
<th>Biochemical data:</th>
<th>Prevalence of iodine deficiency (urinary iodine concentration &lt; 100 μg/L) was assessed in children aged 6–12 y and WRA in the 2018 NNS. Prevalence was found to be 16% in children 6–12 y (a decrease from 37% in the 2011 NNS) and 18% in WRA (1,2,9).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household iodized salt coverage:</td>
<td>The 2018 NNS found that, nationally, 80% of households used iodized salt, but use varies widely by province (coverage is only 32% in Khyber Pakhtunkhwa Newly Merged Districts), and adequacy of iodization was not assessed (1).</td>
</tr>
</tbody>
</table>

### Vitamin B₁

<table>
<thead>
<tr>
<th>Dietary data:</th>
<th>67% of breastfed and 74% of non-breastfed children 6–23 mo consumed grains (whole grains contain moderate amounts of thiamine) in the past 24 h nationally in the 2017/18 DHS (little change from the 2012/13 DHS) (3,4).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diet modeling:</td>
<td>The 2018 Optifood analysis in 12 districts identified thiamine as a PPN for children 6–23 mo (5). The 2017 CotD analysis in four districts identified thiamine as a challenging nutrient need for children 12–23 mo to meet using locally available foods in most areas studied (6).</td>
</tr>
<tr>
<td>Food supply nutrient availability:</td>
<td>The amount of thiamine available in the food supply was estimated to be inadequate for 25% of the national population in 2009 (7) and 10% of the national population in 2011 (8).</td>
</tr>
</tbody>
</table>

### Vitamin C

<table>
<thead>
<tr>
<th>Diet modeling:</th>
<th>The 2018 Optifood analysis in 12 districts identified vitamin C as adequately consumed by children 6–23 mo (5). The 2017 CotD analysis in four districts, however, identified vitamin C as a challenging nutrient need to meet using locally available foods for children 12–23 mo in most areas studied. In addition, vitamin C was found to be a limiting nutrient for lactating women (6).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food supply nutrient availability:</td>
<td>The amount of vitamin C available in the food supply estimated to be inadequate for 75% of the national population in 2011 (8).</td>
</tr>
</tbody>
</table>

---

11 The estimates for consumption of animal milk are for all children 6–23 months, however, it is recommended that children under 12 months of age do not consume milks (flavored or plain) (10).
Niacin

<table>
<thead>
<tr>
<th>Low burden gap</th>
<th>Low certainty evidence</th>
</tr>
</thead>
</table>

**Dietary data:** 13% children 6–23 mo consumed meat, fish, or poultry (the highest sources of niacin) in the past 24 h nationally in the 2017/18 DHS (slight decrease from the 2012/13 DHS) (3,4).

**Diet modeling:** The 2018 Optifood analysis in 12 districts identified niacin as a PPN for children 6–23 mo (5). The 2017 CotD analysis in four districts, however, did not identify niacin as a challenging nutrient need to meet using locally available foods for children 12–23 mo (6).

**Food supply nutrient availability:** The amount of niacin available in the food supply estimated to be inadequate for 4% of the national population in 2011 (8).

Vitamin B₆

<table>
<thead>
<tr>
<th>No burden</th>
<th>Low certainty evidence</th>
</tr>
</thead>
</table>

**Diet modelling:** The 2018 Optifood analysis in 12 districts identified vitamin B₆ was identified as a PPN for children 6–23 mo (5). The 2017 CotD analysis in four districts, however, did not identify vitamin B₆ as a challenging nutrient need to meet using locally available foods for children 12–23 mo (6).

**Food supply nutrient availability:** The amount of vitamin B₆ available in the food supply estimated to be inadequate for 3% of the national population in 2011 (8).

ANNEX REFERENCES