Session 2.
 Seeing the Food System through the Eyes of Children and Adolescents

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With the support of the Kingdom of the Netherlands
The State of Children’s Diets (0-4 years)

Nemat Hajeebhoy
Bill and Melinda Gates Foundation

based on a background paper by Kendra Siekmans
Why do we care about the diets of young children?

• Dietary diversity is associated with stunting:
  • Children consuming only one food group in the previous day had a 1.37 higher odds of being stunted compared to the reference group (≥5 food groups) (Krasevec et al, Mat Child Nut 2017)

• Multiple lines of evidence (biological, historical, epidemiological) link Animal Source Food (ASF) consumption and linear growth
  • Children who did not consume any ASF in the previous day had a 1.44 higher odds of being stunted compared to children consuming all three types of ASF (egg, meat, and dairy) (Krasevec et al, Mat Child Nut 2017)

• Type and diversity of ASF associated with stunting (Headey et al. Am J Agr Econ 2018)
  • Any ASF: 2.3 pp lower stunting rate
  • Diversity in ASFs: 1.8 pp lower stunting for 1 ASF; 3.4 pp for 2 ASFs; 4.5 pp for 3 ASFs
  • Type of ASF: 2.0 pp lower stunting for dairy; 1.7 pp for meat/fish; 1.1 pp for egg

• Plant-based complementary foods alone are insufficient to meet needs for certain nutrients (iron, zinc, and calcium)
**Recommended Practices**

- **Start Breastfeeding within one hour of birth**
- **Breastfeed exclusively for the first 6 months of life**
- **Provide nutritionally adequate, age appropriate and safely prepared complementary foods starting at 6 months; and continue breastfeeding until age 2 or longer**

**Measurable Indicators**

- **Early initiation of breastfeeding**
  - Percentage of children born in the last 24 months who were put to the breast within one hour of birth.

- **Exclusive breastfeeding**
  - Percentage of infants aged 0-5 months who only drank breastmilk the previous day.

- **Introduction of solid, semi-solid and soft foods**
  - Percentage of infants aged 6-8 months who received solid, semi-solid or soft foods the previous day.

- **Minimum meal frequency**
  - Percentage of children aged 6-23 months who were fed at least the minimum number of times (meals/snacks) the previous day.

- **Minimum diet diversity**
  - Percentage of children aged 6-23 months who were fed at least 5 (3 out of 6) food groups the previous day.

- **Minimum acceptable diet**
  - Percentage of children aged 6-23 months who were fed the minimum number of meals/snacks as well as food from the minimum number of food groups.

- **Continued breastfeeding at 1 and 2 years of age**
  - Percentage of children aged 12-15 months and percentage of children aged 20-23 months who were fed breast milk the previous day.

*Source: UNICEF 2016*
Too few children are getting the nutrition they need to survive, grow and develop

Per cent of children: put to the breast within one hour of birth, exclusively breastfed (0-5 months); introduced to solids (6-8 months), with a minimum meal frequency, minimum diet diversity and minimum acceptable diet (6-23 months) and continued breastfeeding at 1 year (12-15 months) and 2 years (20-23 months), 2017.

Source: UNICEF global databases, 2018, based on MICS, DHS and other nationally representative sources. Note: Data included in these global averages are the most recent for each country between 2013-2018.
Only one in four infants and young children are eating food from the minimum number of food groups.

Source: UNICEF Global Infant and Young Child Feeding databases, 2018

Note: Aggregates presented for regions where available data covers at least 50 per cent of the regions’ birth population.
Globally, consumption of eggs and flesh foods is low but of greatest concern among the youngest children.

<table>
<thead>
<tr>
<th>Animal Source Food Type</th>
<th>Global/Sample</th>
<th>6-11 months</th>
<th>12-17 months</th>
<th>18-23 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flesh foods</strong></td>
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</tr>
<tr>
<td>Global</td>
<td>19</td>
<td>32</td>
<td>37</td>
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<tr>
<td>Indonesia</td>
<td>36</td>
<td>59</td>
<td>70</td>
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<td>Mexico</td>
<td>49</td>
<td>64</td>
<td>67</td>
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<td>Pakistan</td>
<td>9</td>
<td>20</td>
<td>28</td>
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<tr>
<td>Turkey</td>
<td>19</td>
<td>51</td>
<td>53</td>
<td></td>
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<tr>
<td>United Republic of Tanzania</td>
<td>25</td>
<td>37</td>
<td>41</td>
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<tr>
<td><strong>Eggs</strong></td>
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<tr>
<td>Global</td>
<td>12</td>
<td>19</td>
<td>23</td>
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<tr>
<td>Indonesia</td>
<td>31</td>
<td>55</td>
<td>62</td>
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<tr>
<td>Mexico</td>
<td>22</td>
<td>36</td>
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<tr>
<td>Pakistan</td>
<td>18</td>
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<tr>
<td>Turkey</td>
<td>36</td>
<td>54</td>
<td>64</td>
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<tr>
<td>United Republic of Tanzania</td>
<td>7</td>
<td>9</td>
<td>9</td>
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<tr>
<td><strong>Dairy</strong></td>
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<tr>
<td>Global</td>
<td>38</td>
<td>46</td>
<td>49</td>
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<tr>
<td>Indonesia</td>
<td>41</td>
<td>48</td>
<td>60</td>
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<tr>
<td>Mexico</td>
<td>72</td>
<td>77</td>
<td>83</td>
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<tr>
<td>Pakistan</td>
<td>54</td>
<td>61</td>
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<tr>
<td>Turkey</td>
<td>84</td>
<td>88</td>
<td>89</td>
<td></td>
</tr>
<tr>
<td>United Republic of Tanzania</td>
<td>1</td>
<td>0.4</td>
<td>0.5</td>
<td></td>
</tr>
</tbody>
</table>

Even in richest households, many infants and young children are not being fed a minimally diverse diet

Source: UNICEF Global Database, August 2018
Why are children 0-4 years not receiving the diets they need for optimal growth and development?
## Age-specific characteristics of children <5 years

<table>
<thead>
<tr>
<th></th>
<th>0-5 months</th>
<th>6-23 months</th>
<th>24-59 months</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physiological changes</strong></td>
<td>Rapid growth and development</td>
<td>Slowing growth</td>
<td></td>
</tr>
<tr>
<td><strong>Autonomy</strong></td>
<td>Low</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited motor skills</td>
<td>Begins feeding self</td>
<td>Feeds self</td>
</tr>
<tr>
<td><strong>Taste preferences</strong></td>
<td>Sweet, umami; aversion to sour and bitter</td>
<td>Foods with post-ingestive benefits (<em>e.g.</em>, energy-density of foods)</td>
<td></td>
</tr>
<tr>
<td>(biological)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Taste preferences</strong></td>
<td>Amniotic fluid, breast milk, formula</td>
<td>Sensitive to caregiver aversions; energy-dense foods</td>
<td></td>
</tr>
<tr>
<td>(conditioned)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Psychosocial factors</strong></td>
<td>Difficulty with concept formation/classification</td>
<td>One-dimensional judgements (<em>can begin indicating what do/do not want to eat</em>); low attention span</td>
<td>Heightened neophobia</td>
</tr>
</tbody>
</table>

Food Systems for Children and Adolescents

With the support of the Kingdom of the Netherlands
Interpersonal and socio-environmental factors

• Caregivers are key gatekeeper of young children’s diets
  • Social norms and traditional practices, knowledge and experiences of caregivers might not align with behaviors that support healthy diets for children
  • Interactions with other caregivers (e.g., fathers, grandmothers, siblings)
  • Own eating practices

• Constraints on caregivers’ time, skills, flexibility, income, decision-making power, access to resources

• Convenience of foods a key driver, particularly in low-income families
Physical-environmental factors: availability, affordability, accessibility

- Poor availability of foods for infant and young children adversely impacts diets
- Increased availability of commercially produced ultra-processed foods, sugar-sweetened drinks, street foods
- Affordability and cost of nutrient-dense foods
- Access to foods in markets, shops and vendors

Photo Source: Emiliana Sabo 2015/Indonesia
Physical-environmental factors: advertising and marketing

• “Four Ps” of advertising and marketing
  • Product
  • Promotion
  • Price
  • Place

Photo Source: Marion Nestle 2011/Ecuador; Bryan Watt 2011/Laos
Key Takeaways

• Dietary diversity and particularly consumption of animal source foods is important for young children

• We are performing very poorly, as a human race, in terms of how we feed our young children

• Unless we address food systems issues along with caregiver issues we will not tilt the scales in favour of our young children
The State of Children’s Diets (5-9 years)

Roland Kupka
UNICEF

based on a background paper by Peninah Masibo
What are the age-specific characteristics and nutritional needs of school-age children?
### Age-specific characteristics of children 5-9 years

<table>
<thead>
<tr>
<th>Category</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physiological changes</strong></td>
<td>Slower growth compared to 0-2 years</td>
</tr>
<tr>
<td></td>
<td>Some populations, may see initiation of puberty at &lt;10 years of age</td>
</tr>
<tr>
<td></td>
<td>Increased muscular strength and stamina</td>
</tr>
<tr>
<td><strong>Autonomy</strong></td>
<td>Medium (knowledge of what to do and ability to do it; sense of self, more independence)</td>
</tr>
<tr>
<td></td>
<td>Feeds self; increasingly self-controlled diet*</td>
</tr>
<tr>
<td><strong>Taste preferences (biological)</strong></td>
<td>Sweet, salty and sour; aversion to bitter</td>
</tr>
<tr>
<td></td>
<td>Higher sensory threshold for sweetness</td>
</tr>
<tr>
<td><strong>Taste preferences (conditioned)</strong></td>
<td>Developing taste based on what is taught be caregivers</td>
</tr>
<tr>
<td></td>
<td>Preferences reinforced by what is consumed (e.g., energy-dense foods high in sugar, fat, etc.)</td>
</tr>
<tr>
<td><strong>Psychosocial factors</strong></td>
<td>Can make multidimensional judgements and simultaneous considerations; able to differentiate information for accuracy</td>
</tr>
<tr>
<td></td>
<td>Low attention span</td>
</tr>
</tbody>
</table>

* There is reduced parental supervision, but food is still prepared, provided and supervised by adults; in many LMIC food may also be self-procured during this age period
Nutritional needs of school-age children

- Nutrient needs in relation to body size are lower than during early childhood
- Steady linear growth
- Body composition and body shape remain relatively constant
- Improving the nutrition of school-age children has measurable positive impacts on linear growth, cognition, and health outcomes
What are school-age children eating?
What are school-age children eating?

Diets of school-age children in developing countries are limited in diversity, with low consumption of animal foods as well as fruits and vegetables.

The consumption of high-calorie foods is increasingly becoming popular among school-age children in many settings, especially urban areas.

A common meal pattern across the world is the skipping of breakfast.

School meals are important for improved school performance and health.

However, there are large data gaps on diets and nutritional status of school-age children because this age group is often missing from health and nutrition surveys.

Masibo P In preparation
What are school-age children eating?


<table>
<thead>
<tr>
<th>Eating fruit every day</th>
<th>BUL</th>
<th>CZH</th>
<th>IRE</th>
<th>ITA</th>
<th>LTU</th>
<th>MAT*</th>
<th>MDA</th>
<th>POR*</th>
<th>SMR</th>
<th>SPA</th>
<th>TUR</th>
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<tbody>
<tr>
<td></td>
<td>30</td>
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<td>40</td>
<td>30</td>
<td>30</td>
<td>40</td>
<td>30</td>
</tr>
<tr>
<td>Eating vegetables every day</td>
<td>BUL</td>
<td>CZH</td>
<td>IRE</td>
<td>ITA</td>
<td>LTU</td>
<td>MAT*</td>
<td>MDA</td>
<td>POR*</td>
<td>SMR</td>
<td>SPA</td>
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<td>30</td>
<td>10</td>
<td>30</td>
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<td>30</td>
</tr>
</tbody>
</table>
Why are school-age children not receiving the diets they need for optimal development?
Interpersonal factors and food environments

• Parental food choices and food availability and accessibility at home influence children’s food choices

• Unhealthy school nutrition environments limit provision of nutritious and appealing foods and beverages, consistent and accurate messages about good nutrition, and ways to learn about and practice healthy eating

• General obesogenic food environments facilitate the availability and affordability of energy-dense, nutrient-poor foods and drinks

• The marketing of foods with a high content of fat, sugar or salt to children remains widespread across the world
Socioeconomic status

In low-income countries, nutrient-poor, plant-based diets among school-age children are more common than in higher-income countries.

In countries undergoing the nutrition transition, traditional diets among school-age children are shifting towards westernized diets high in sugars, fat, and animal-source food.

In high-income countries, higher socioeconomic status of the main food provider is associated with healthier dietary patterns among school-age children.
The State of Children’s Diets (10-19 years)

Saul Morris
Global Alliance for Improved Nutrition

based on a background paper by Ty Beal, Alison Tumilowicz and Saul Morris
What are the age-specific characteristics and nutritional needs of adolescents?
# Age-specific characteristics of adolescents

<table>
<thead>
<tr>
<th></th>
<th>10-14 years</th>
<th>15-19 years</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physiological changes</strong></td>
<td>Rapid growth <em>(growth spurt; peak height velocity for females)</em></td>
<td>Rapid growth <em>(growth spurt; peak height velocity for males)</em></td>
</tr>
<tr>
<td></td>
<td>Puberty and sexual development <em>(though initiation of puberty can be early, delayed or extended depending on context)</em></td>
<td>Sexual maturation</td>
</tr>
<tr>
<td><strong>Autonomy</strong></td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Self-controlled diet <em>(demand and decide foods based on individual preferences; reduced parental supervision)</em></td>
<td></td>
</tr>
<tr>
<td><strong>Taste preferences (biological)</strong></td>
<td>Less biological preference for sweet, salty and sour compared to younger children <em>(Reduced sensory sensitivity)</em></td>
<td></td>
</tr>
<tr>
<td><strong>Taste preferences (conditioned)</strong></td>
<td>Self-developed taste, based on prior exposure to foods</td>
<td>Conditioned preference for low-nutrient, high-energy density foods compared to high-nutrient density foods</td>
</tr>
<tr>
<td><strong>Psychosocial factors</strong></td>
<td>Multidimensional judgments and ability to make simultaneous considerations</td>
<td>Able to differentiate information about nutrition, though often does not change eating behaviors <em>(“present-oriented”, not motivated by long-term consequences of diet)</em></td>
</tr>
<tr>
<td></td>
<td>Dieting eating behaviors, particularly in high-income settings</td>
<td></td>
</tr>
</tbody>
</table>
Nutritional needs of adolescents

• Rapid biological growth and development increases nutrient needs
  • growth rate for girls similar to—and for boys surpasses—rate at two years of age

• Increased energy, protein, vitamin, and mineral needs which vary during puberty based on stage of maturation and growth

• Nutrients of special concern include protein, iron, zinc, iodine, calcium, and vitamin D

• If energy intake is inadequate, dietary protein may be diverted to meet energy needs

• Iron needs among boys are increased. In girls, iron requirements increase to replace menstrual iron losses
Nutritional needs of adolescents: risk of over-consumption

- Lower energy needs *per kilogramme of body weight*
- Switch to more sedentary activities (where not involved in physical labour)
- Social aspects of eating
- Less parental control over intake, combined with increasing economic empowerment
What are adolescents eating?
What are adolescents eating?

• Keats et al. (2018):*
  • 50% of adolescent girls eat less than 3 meals per day (most skip breakfast)
  • Snacking common during school, lunch usually consumed outside the home.
  • Average daily energy intake 1,880 ± 597 kcal
  • Average daily intakes of protein (58 ± 17 g), fat (57 ± 20 g), and carbohydrate (248 ± 73 g) adequate, although carbohydrate intake particularly high compared to the RDA of 130 g
    • Older girls in Africa not meeting protein needs

* Girls only; LMICs
Proportion of Adolescents (10–19) Consuming Various Foods and Daily Consumption (of Those Who Reported Consuming the Food)

<table>
<thead>
<tr>
<th>Food Type</th>
<th>Daily</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grains</td>
<td>70</td>
<td>50</td>
</tr>
<tr>
<td>Pulses</td>
<td>75</td>
<td>60</td>
</tr>
<tr>
<td>Dairy</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>Meat, Poultry, Fish</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>Fruits</td>
<td>60</td>
<td>50</td>
</tr>
<tr>
<td>Vegetables</td>
<td>75</td>
<td>70</td>
</tr>
<tr>
<td>Sweet Snacks</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Salty Snacks</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Fast Foods</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>SSBs</td>
<td>50</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Keats et al., 2018.
What are adolescents eating?

- **Data from**
  - 72 (64) countries
  - 254,000 (242,000) school-going adolescents aged 12-17
  - 2008-2015

- **Global School Health Surveys:**
  - 34% consumed fruit less than once per day
  - 21% consumed vegetables less than once per day
  - 42% drank carbonated soft drinks at least once per day, and
  - 46% consumed fast food at least once per week
Why are adolescents not receiving the diets they need for optimal development?

• Interpersonal and social factors
• Poverty and food insecurity
• The physical environment
Food Systems for Children and Adolescents

With the support of the Kingdom of the Netherlands
Interpersonal and social factors

• Adolescents’ food choices are strongly aligned with their wider social aspirations
• Adolescents watch other people who are important to them, and are aware of imitating them
• Heavily exposed to media and social media
• Neither self-efficacy nor specific knowledge about food correlated with dietary intake, but personal likings, preferences, intentions are
• Health and nutrition not primary influencers for adolescents, but body image important for many
• Permissive parenting seems to encourage poor dietary habits
Poverty and food insecurity

• Poverty is a key driver of poor adolescent diets and nutritional status
  • Over 60% of adolescents live in LLMICs

• Adolescents living in rural areas are more likely to experience seasonal food shortages, are more dependent on locally harvested foods, and have fewer opportunities to access foods beyond what is prepared at home

• Adolescent food purchasing is likely also affected by the source and pattern of adolescent income
The physical environment

• For adolescents living in urban areas, many opportunities to access foods beyond what is prepared at home
  • shops and roadside stalls
  • (for the most marginalised groups) dumpsites where discarded food can be scavenged

• School and its immediate environs are an important shaper of dietary patterns